TIME PERCEPTION: A COMPARATIVE STUDY OF MEXICAN-AMERICAN AND ANGLO-AMERICAN SUBJECTS INVOLVING TEMPORAL SENSE AND PERSPECTIVE

By

JAMES FELTON SHANE

Bachelor of Science
Kansas State University
Manhattan, Kansas
1958

Master of Arts
California State College
Long Beach, California
1965

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF EDUCATION
May, 1970

TIME PERCEPTION: A COMPARATIVE STUDY OF MEXICAN-AMERICAN AND ANGLO-AMERICAN SUBJECTS INVOLVING TEMPORAL SENSE AND PERSPECTIVE

Thesis Approved:

Kenneth St. Clair
Thesis Adviser

John D. Hampton

Mark Kuracheil

D. Durham
Dean of the Graduate College

PREFACE

Despite the obvious importance of the time sense in man, there have been comparatively few studies of individual differences in temporal cognition. The study reported here is devoted to examination of socio-cultural variation in the perception of time relationships.

It was anticipated that Mexican-American and Anglo groups would differ significantly in terms of temporal sense and perspective. In addition, differential effects of socio-economic class were determined in the perception of time.

Review of research in the perception of time included historical, developmental, and socio-cultural considerations. Agencies of enculturation within the Mexican-American community are scrutinized as social stimulus situations, including family membership, community organizations, and material-nonmaterial culture products.

Hypotheses were established which predicted significant differences between the several ethnic and socio-economic samples. Presentation of findings follow from restatement of hypotheses, statistical analysis and decisions. Adjunct findings include both Questions Test results and graphical representation of sense of time measurements.

There have been numerous people who have contributed to this study and it would be impossible to state the many ways that they have aided this writer. Brief mention should be made in regards to a few of them.

I would like to take this opportunity to express my appreciation for the assistance and counsel given me by the members of my committee: Dr. Kenneth St. Clair, for his concern, criticism, and encouragement; Dr. John Hampton, for his request for depth of thought as well as direction; Dr. Mark MacNeil, for both discussion and suggestions relative to analysis of social stimuli.

To Dr. John Stallings, Superintendent, and the building principals and teachers of the Corona Unified School District, Corona, California, sincere regards and appreciation.

To Mr. Paul Buckley and Dr. Bruce Johnson goes special gratitude for suggestions, discussion and encouragement; Mr. John Bryant and Mr. Robert Kremer, deepest appreciation for hours spent in interviewing and data collection. To Mr. Thomas Gibson and the staff of the Pupil Personnel Services Department, many thanks for their unceasing support and encouragement throughout the conduct of this study.

Finally, I would like to express appreciation to my wife, Sharon, and our parents, whose understanding, encouragement, and sacrifice were instrumental in the preparation of this manuscript.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Cultures and the attitudes and values represented in cultural traditions are in some ways the same the world over. In other ways cultures are also distinctly different in their values and their ways of living. Kluckhohn (1967, p. 293) observes that "the critical problem . . . is how to reconcile, understand, and use these differences in an institution such as a school, where curriculum practices and programs tend to reflect one value orientation - one basic tradition."

Statement of the Problem

From the day of our birth and continuing throughout our lives, we live within an environment bounded by both time and space. Lewin (1948) indicates that the young child lives within a temporal present. The child's goals are immediate, subject to change, and substitution. With the passage of time, a past accumulates as the future unfolds and man, in varying degrees, becomes capable of cognizing these. Correspondingly, goals are established which can only be realized in the distant future.

Numerous explanations of temporal perception have been advanced over the years. For example, there have been some reports that time perception varies as a function of body temperature (Bell and Provins, 1963); level of metabolic activity and time of day (Thor, 1962); memory loss (Frankenhaeuser, 1959); length of interval (Underwood, 1952; Ellis, 1955); speed of movement (Piaget, 1946), as well as surgical and drug effects.

Fraisse (1963) has observed that our bodies develop and change continuously under the action of time.

> We live in the rhythm of day and night. Our nervous centers register the duration which elapses between a gratification and the signal which preceded it. Every event we experience is given, as it were, a temporal sign by its concomitance with some habitual change (Fraisse, 1963, p. 288).

This author further maintains that the perception of temporal events is learned in association with socialization experiences accompanying normal development.

There is some evidence emanating from socio-cultural studies tending to suggest that the perception of time varies as a function of the differential experiences of group members (Hall, 1959; Kluckhohn, 1967). As Kluckhohn (1967) has observed,

> Far too little attention has been given to the full range of major variations in the time orientation. Meaningful cultural differences have been lost sight of in the too generalized view that folk peoples have no time sense and no need of one, whereas

> urbanized and industrial peoples must have one (Kluckhohn, 1967, p. 298).

Kluckhohn (1967) further observes that whereas Mexicans most often prefer present time, Anglo-Americans place an emphasis upon the future. Accordingly, Hall (1959) writes that Americans

> . . . tend to think of time as something fixed in nature, something around us and from which we cannot escape; an ever-present part of the environment, just like the air we breathe (Hall, 1959, p. 19).

In essence, Latins tend to rank time lower in over-all importance than might some other cultures. Patterns of time are ways of doing things that a child learns early in life and for which he is rewarded or punished. Once learned, these patterns are held on to tenaciously.

Fraisse (1963) suggests that the intensity of temporal pressure of societies varies as a function of the complexity of the social relations network. In other words, the more complex the social interactions within a particular culture, the greater the pressure of time upon individual members. There would appear to be little respite from such temporal pressure short of sleep, daydreaming, and escape into fantasy.

Piaget (1967) suggests that time is comprised of at least two dimensions, including interval and successive order. Sense of time connotes judgment of length or interval; perspective is concerned with sequential ordering or the judgment of past, present, and future events.

The perception of time appears related to both the motivation and learning of the organism. A motivational state is considered a necessary antecedent to concept formation and such motivation may involve phenomenal variation in the perception of time; i.e., morale, goal establishment, immediate vs. deferred gratification, etc. McClelland (1966) considers the absence of temporal perspective in early development as contributing to an intensification of motivational experiences. Underwood (1966) has observed that the role of time factors in learning is frequently taken for granted. Sherif and Sherif (1956) consider perceptual structuring as the prototype of learning, remembering, and decision-making; the passage of time appears essential for perception.

The present study proposes to further explore the question of socio-cultural variation in the perception of time. The several variables under consideration include socio-economic status and ethnic background. Specifically, what differences occur in the perception of time for each of several samples identified in terms of socio-economic status and ethnic origin? The dimensions of time constitute the dependent variables under study and include temporal sense and perspective. Temporal sense was measured through administration of (a) Verbal Estimation and (b) Reproduction tests; temporal perspective through (a) Questions Test (Sturt, 1925) and (b) "Picture Arrangement"

subtest of the Wechsler Intelligence Scale for Children (Wechsler, 1949). Control variables include chronological age, grade placement, sex, and mental ability of subjects.

In light of reports of socio-cultural variation in the perception of time, it might be anticipated that Mexican-American subjects, as a group, tend to de-emphasize the importance of time as compared to Anglo children. If this assertion is valid, such de-emphasis would most likely be represented in significant differences arising between ethnic groups in terms of temporal sense and perspective.

In an effort to isolate and identify the significance of socio-economic status in determining group differences in temporal perception, (a) above average and (b) below average socio-economic groupings need be identified. Such identification would permit examination of the potential influence of socio-economic factors in contributing exceptions to the above generalizations regarding ethnic differences.

Hypotheses

Briefly restated, the proposed research represents a comparative study of Mexican-American and Anglo-American subjects incorporating temporal sense and perspective as dependent variables. Of specific interest is the question of socio-cultural variation in the perception of time. The several variables under consideration include socio-economic level and ethnic background. At issue here is the

question as to whether temporal perception varies as a function of these socio-cultural or independent variables.

Obviously, all research attempts either to test hypotheses, raise questions, or both. Hypotheses represent statements consisting of elements expressed in an orderly system of relationships which seek to describe or explain conditions or events (Van Dalen, 1966). Within the framework of a theory, hypotheses are deductions following from and logically consistent with the assumptions upon which the theory is based. The following hypotheses represent logical extensions of a socio-cultural explanation of variation in the perception of time. These are framed as operational alternatives and represent those propositions to be accepted if the statistical nulls prove untenable. As such, each operational alternative represents a statement of expectancy stated in terms of an operation to be performed. Each hypothesis is framed in terms of instruments or procedures used to measure variables implied by theory.

H_1: There is a significant difference in temporal sense between Mexican-American and Anglo-American subjects as determined by Verbal Estimation.

H_2: There is a significant difference in temporal sense between Mexican-American and Anglo-American subjects as determined by Reproduction.

The above hypotheses propose that several ethnically diverse samples will differ significantly in sense of time as measured by the techniques of Verbal Estimation and

Reproduction (Underwood, 1966). Estimates of duration or interval include both verbal report and actual reproduction of the interval by the subjects concerned.

In subsequent hypothesis testing, each operational alternative is translated into a null statement. If such "no difference" statements reach significance, acceptance of the operational alternative is indicated. Popham (1967) suggests that behavioral science research typically utilizes the 0.05 and 0.01 levels of significance. For purposes of the study in question, a significance level of 0.05 or 5% will be utilized.

H_3: There is a significant difference in temporal perspective between Mexican-American and Anglo-American subjects as determined by the Questions Test.

H_4: There is a significant difference in temporal perspective between Mexican-American and Anglo-American subjects as determined by the Wechsler Intelligence Scale for Children, "Picture Arrangement" subtest.

The third and fourth hypotheses are specifically concerned with time perspective. It is postulated that the several samples will differ in perspective as measured by the Questions Test (Sturt, 1925) and the "Picture Arrangement" subtest of the Wechsler Intelligence Scale for Children (Wechsler, 1949). Perspective incorporates concepts of time, symbols, and dates which are tapped through administration of a relatively brief written test. In

addition, temporal perspective involves sequential ordering of events in time or the cognition of a past, present, and future measured through a picture arrangement test.

In addition to hypotheses specifically related to variation in the perception of time across ethnically diverse samples, several hypotheses relate to differences in the perception of time as mediated by socio-economic level. It is postulated that differences in the sense of time will occur between the several socio-economic levels identified after the Duncan Socio-Economic Scale (Reiss, et al., 1961). The techniques of measurement include Verbal Estimation and Reproduction involving both verbal report and actual reproduction of an interval of time.

H_5: There is a significant difference in temporal sense between socio-economic levels as determined by Verbal Estimation.

H_6: There is a significant difference in temporal sense between socio-economic levels as determined by Reproduction.

It is further hypothesized that differences in time perspective will occur between the several socio-economic levels. Measurement will be effected through administration of a time concepts test and pictorial sequencing.

H_7: There is a significant difference in temporal perspective between socio-economic levels as determined by the Questions Test.

H_8: There is a significant difference in temporal perspective between socio-economic levels as determined by the Wechsler Intelligence Scale for Children, "Picture Arrangement" subtest.

Assumptions

Several assumptions appear implicit to this study dealing with socio-cultural variation in the perception of time. Such assumptions constitute necessary considerations after which empirical investigation is undertaken.

Assumption I: Joint measurement of temporal sense and perspective approaches a measure of temporal perception.

Piaget (1967, p. 84) maintains that "Time is manifested in two ways: through the successive order of events and the duration or interval between ordered events." Correspondingly, it is assumed that temporal sense and perspective constitute dimensions of time and, given adequate instrumentation, furnish a measure of temporal perception. Such a generalization should not imply exclusion, only specification. That is, temporal events may be multidimensional; however, for purposes of this study, only temporal sense and perspective will receive consideration. Both of these dimensions jointly constitute an effective measure of temporal perception.

Postulate I-A: Temporal sense constitutes a dimension of temporal perception.

Temporal sense is concerned with accuracy of estimation of time interval. Estimation of duration usually refers to the ability to discriminate (verbal estimation) or reproduce stimuli or intervals between stimuli. Bateman (1968) suggests that the ability to judge time intervals appears related to chronological age and maturation.

Postulate I-B: Temporal perspective constitutes a dimension of temporal perception.

Temporal perspective involves the long range perception of time in terms of past, present, and future events. This involves a conception of time as an unending continuity in which the past blends into the present and the present into the future. This concept of time is concerned with a sequential ordering of events in terms of existing relationships.

Assumption II: The development of temporal perception involves biological, activity and conventional time components.

Biological or physiological time involves the most primitive or the earliest awareness of time (Bateman, 1968). Activity time evolves at a later stage of development based on an awareness of time in relation to specific activity; i.e., "nap time," "time to go to school," etc. Conventional time incorporates vocabulary, measurement, succession, duration, and estimation (Bateman, 1968).

Assumption III: The development of time concepts is a gradual, even and continuous process; among children

of similar socio-economic background time concepts develop in a uniform sequence and at the same relative time.

As a generalization, children below the age of eight do not appear to benefit from practice in estimation of duration. "From age 8 to 14 this ability seems to steadily improve and by age 14 children perform much like adults (Bateman, 1968, p. 70)." In terms of grade level, Bateman (1968) observes that students have a satisfactory comprehension of our conventional time system by grade six. In sum, the development of time concepts appears relatively complete by age sixteen.

Definition of Terms

Webster's Dictionary (1961, pp. 2394-5) offers several definitions of time, including "a period during which something exists or continues: an interval compressing a limited and continuous action, condition, or state of being: measured or measurable duration." In actuality, these definitions of time reflect a similarity in their common emphasis on "amount."

The concept of time is manifested in several ways: ". . . through the successive order of events and the duration or interval between ordered events (Piaget, 1967, p. 84)." Piaget has thus identified two dimensions of time, that of temporal sense (duration) and perspective (succession). For purposes of clarity and to provide an operational

baseline by which objective study can be undertaken, the following definitions are proposed:

Temporal perception: a discriminal process associated with the judgment of time events (Underwood, 1966).

Literature suggests at least two dimensions of temporal perception, including temporal sense and perspective. These dimensions may be defined in the following terms:

Temporal sense: estimates of interval or duration of time (Banks and Cappon, 1962).

Temporal perspective: the long range perception of time in terms of past-future events (Thor, 1962).

For purposes of clarity, a distinction is herein made regarding temporal perspective and a related concept of temporal orientation.

Temporal orientation: the relating of behavior primarily to the far future, the immediate future, the present, or the past (LeShan, 1952); a "dominant" orientation with respect to time; i.e., the "past," the "present," or the "future."

For study purposes, the following definitions may be utilized in relation to differences in ethnic origin:

Mexican-American: also "Spanish-American," "Latin-American," or "Chicano;" Burma (1954) defines as a mixture of both Anglo and Mexican cultures and belonging primarily to American-born Mexicans; includes subjects of Mexican-American surname.

Anglo-American: an American or citizen of the United States of English origin or descent; for study purposes, subjects of Anglo or other non-Mexican-American surname.

The foregoing terms dealing with ethnic origin are frequently employed within the community-at-large. Tuck (1946) suggests that while such classifications are ethnologically incorrect; i.e., "Mexican-American," "Anglo-American," these seem to give less offense than other characterizations and constitute the best compromise under the circumstances.

CHAPTER II

HISTORICAL DEVELOPMENT OF RESEARCH IN THE PERCEPTION OF TIME

Studies of time perception, the estimation of amount of time elapsed or filled, have a long history. For a variety of reasons, investigators have shown a persistent interest over many years in the perception of time. Underwood (1966) points out that the primary interest of most modern experimental work is the attempt to determine what cues or events are used by a subject to measure temporal duration when the "obvious mechanism" is eliminated; i.e., counting, tapping, etc.

Review of existing research suggests considerable variation in studies dealing with perception of time. Developmentally, the evolution of time schema is progressive and continuous. The perception of temporal events appears to be acquired within a social context.

Studies bearing on a possible relationship between social class, culture group membership, and time relations are reviewed. A relationship appears to exist between the development of temporal orientation and socio-economic status.

Handling and treatment of time necessarily involves both motivational implications and learning. These several aspects will be subsequently reviewed.

Selected Research in Time

The selective capacity of the human organism, that is, differential responding to varying stimuli, presupposes a discriminal process. The study of the discriminal processes represents one of the oldest areas in which experimental methods have been applied in psychology. The perception or judgment of temporal events represents but one of many phenomena commonly associated with discriminal processes.

The investigation of the perception of temporal events was one of the first psychophysical phenomena to be investigated prior to the turn of the present century. Subsequently, interest in this discriminal process declined, however, Kidd and Rivoire (1966) report that apparent interest has been renewed in the experimental psychology of time perception. In part, this may be attributed to the evolvement of effective methods and theories as well as the subsequent development of accurate and precise timing devices.

Fraisse (1963) lists some 566 references dealing with temporal perception. A brief topical review of these studies indicates that most are relevant to attempts to understand the perception of time.

Numerous explanations of temporal perception have been advanced over the years. For example, there have been reports that time perception varies as a function of body temperature (Bell and Provins, 1963); level of metabolic activity and time of day (Thor, 1962); memory loss (Frankenhaeuser, 1959); length of interval (Underwood, 1966); occupation (Gulliksen, 1927); movement (Piaget, 1946) and numerous studies centering upon surgical and drug effects.

Thor (1962) reports the use of a questionnaire designed to measure time perspective in a sample of 120 undergraduate college students. This was done at 6 times of day for each group of students in an effort to determine if the hour of day tended to influence estimates of past-future events. A Time Perspective Questionnaire was deemed suitable for use as a measure of perspective by college undergraduate students. Past items were given first; i.e., date of Louisiana Purchase, following which future items were presented; i.e., date of first man on the moon. Findings of the study tended to support a hypothesis of a diurnality in time perspective. It was reasoned that "the diurnal metabolic cycle is assumed as the causative agent in producing the obtained systematic diurnality in time perspective (Thor, 1962, p. 421)." The author concluded that past and future events of the questionnaire appeared less distant at mid-day than at early morning or late afternoon/evening hours.

In a subsequent study by Baldwin, Thor, and Wright (1966) the influence of time of day at which estimates are made was not supported. However, this latter study was essentially a replication of McDougall's early work in perception of time and used a technique of verbal estimation of actual duration under several different conditions. This represents a deviation from the earlier perspective study by Thor (1962) involving past-future events. Methodologically there appears to be considerable variation in these two studies. It may well be, as is certainly suggested in the foregoing studies, that several different dimensions of temporal perception are involved.

In another study centering upon subjective estimates of temporal duration and the importance of time to an individual, Grossman and Hallenbeck (1965) report no relation between the importance of time and its subjective speed as determined by the Time Metaphor Scale.

Banks and Cappon (1962) turned their attention to the effects of reduced sensory input in which sensory stimulation is minimized. Although this study reported a small sample (15 subjects), there is suggestion that reduced sensory input during an experimental interval adversely influences accuracy of estimates.

> It can therefore be concluded that a 90-minute interval of reduced sensory input distorts the time sense, as shown by almost universal underestimation. However, there is no clear relationship between such distortion

and changes in feelings about time passage (Banks and Cappon, 1962, p. 74)."

Platt, Eisenman and DeGross (1969) have observed a relationship between both Birth Order and Sex to future time perspective. For example, in the instance of impersonal future extension both Birth Order and Birth Order x Sex interaction were significant, with "firstborn" and "only child" subjects having greater future time perspective than "later-borns," especially among females. Correspondingly, females tended to possess greater future time perspective. For directionality, a highly significant Birth Order x Sex interaction indicated that "later-born" females saw the passage of time in a more active way than other subjects, especially "later-born" males.

Developmental Considerations

When we examine the apprehension and growth of time concepts of children, we are in effect tracing the evolution of primitive action-time or event-time through to the cognized equal-interval and continuous time concept of contemporary society. Except in instances of pathology, the evolution of time schema is progressive and proceeds from the primitive to sophisticated. As Bateman (1968, p.3) points out, ". . . with small children, the temporal idea is marked by a concrete and effective character-of-action." That is, ordering of events in time seems to be related to

rather specific manipulative activities such as estimation of time interval according to distance walked; tearing off month from calendar, etc.

As the child's mastery of space strengthens, so does his corresponding mastery of time. The child appears to move from the personal or egocentric experiential time to the universal, objective schema (Bateman, 1968). Accordingly, Bateman (1968) suggests that little disagreement actually exists between theorists as to how time concepts develop. The order in which such concepts evolve can be predicted in light of observational and/or inferential data. Thus the following eight steps in the development of time concepts from infancy are offered. These steps do not appear incompatible with other positions, notably that of Piaget (1967):

1. Immediate frustration when need is not gratified.
2. Suppression of need and of emotional reaction to the experience of frustration.
3. Development of anticipation of later gratification on the basis of (a) past experiences; (b) imagination of gratification.
4. Projection into the future, expectancy.
5. The distinction between reality and non-reality experience makes expectancy possible.
6. Development of symbolization via words.
7. Development of the time sense expressed by conventional language--now, later, today, tomorrow, etc.
8. The internalization of conventional time divisions and the acquisition of the abstract notion of time as a continuous, evenly flowing substance from the past into the future (Bateman, 1968, p. 11).

Lewin (1948) indicates that the young child lives within a temporal present. The child's goals are immediate, subject to change, and substitution. With maturation, a "past" accumulates as the "future" unfolds and the man, in varying degrees, becomes aware of both. Correspondingly, deferred goals are established which become attainable only in a future removed in time.

Fraisse (1963) has observed that our bodies develop and change continuously under the action of time. "We live in the rhythm of day and night. Our nervous centers register the duration which elapses between a gratification and the signal which preceded it. Every event we experience is given as it were a temporal sign by its concomitance with some habitual change (Fraisse, 1963, p. 288)." Kidd and Rivoire (1966) point out that the initial helplessness of the child with regard to temporal events is gradually replaced through learning occurring in the environment. Gradual modification takes place

> . . . through conditioned schedules permitting limited delay and postponement. . . . However, this type of scheduling provides no mastery over time. . . . Time becomes uniquely human when the child employs temporal concepts or abstractions to perceive directly the stimulus dimensions of succession and duration [perspective and sense] (Kidd and Rivoire, 1966, p. 450).

The child passes from strictly rhythmical response to the cognition of temporal events and concept attainment. Existent cognitive classes facilitate subsequent temporal perception and learning.

Fraisse (1963) points out that the perception of temporal events is acquired within a social context. The perception of time appears to be a function of socialization experiences dating from early childhood.

An individual's group membership may promulgate distinctive experiences which generates attitude and value formation contributing to set. Perception of temporal events would thus appear to vary according to one's attitudes and values which contribute to set-filtered percepts. In sum, the current perceptions of any person are governed by past experiences acquired largely through the process of "growing up" within a particular cultural setting.

Studies of Class, Culture, and Temporal Relationships

Fraisse (1963) has compiled a bibliography consisting of 566 studies and related research pertaining to perception of time. A topical review of this bibliography reveals several studies having been devoted to the perception of time and social class (Ellis, 1955; LeShan, 1952). LeShan's (1952, p. 589) research involved social class and time orientation and represented ". . . an attempt to examine one of the possible differences between members of social classes in America. . . . It concerns the perceived relationship of the individual and his goals in time." LeShan's (1952) hypothesis that there are different personal

time orientations in different social classes drew support. An interesting implication, according to the researcher, centers on the importance of the problem of goals and methods of instruction in the educative process.

Breeskin's (1967) unpublished dissertation reports a small, positive relationship between time estimation of interval (sense) and father's education level. There is suggestion in this finding that accuracy in sense of time is related to socio-economic level. Occupation is influenced by one's level of education and, correspondingly, appears to provide a reliable index of socio-economic status (Ilg and Ames, 1965; Reiss, Duncan, Hatt, and North, 1961). A relationship appears to exist between the development of perception of temporal events and socio-economic status. There is still further suggestion that socio-economic level constitutes an important variable influencing both type and amount of experiences antecedent to perceptual development.

Fraisse (1963) suggests that the intensity of temporal pressure of societies varies as a function of the complexity of the social relations network. In other words, the more complex the social interactions within a particular culture, the greater the pressure of time upon the individual members. There would appear to be little respite from such temporal pressure. Sleep, daydreaming, and escape into fantasy tend to free the individual from

the demands of reality and particularly social time. However, as Fraisse points out, though temporal pressure is constricting, it is also the framework within which our personality is organized.

There have been a number of reports of cultural variation in the perception of time. In some cases, these cross-cultural studies report differences in sense of time, time perspective, or both. Sherif and Sherif (1956) suggest,

> In venturing into the broad area of cultural variations, the starting point is relatively simple but basic phenomena in which various features of social life in different cultures provide compelling anchorages (Sherif and Sherif, 1956, p. 67).

These authors suggest that the handling and treatment of time represents one such basic phenomenon which is subject to cultural variation due to social anchorages. Obviously, these anchorages influence the experience and behavior of the individual group member. The cultural anchorages which influence the perception of time by individual members include the following:

> . . . periodicity of events in the economic life may serve as anchorages in reckoning time. . . .
> . . . events in nature which recur with some regularity are taken as anchorages for time reckoning. . . .
> . . . devices for reckoning the duration of events (Sherif and Sherif, 1956, pp. 67-8).

This point of view regarding cultural variation is supported by Fraisse (1963, p. 170) who reports that, ". . . our temporal perspectives bear a relationship to each of the

groups to which we belong and in which both our experiences and their frames of reference have their origin. . . ." Each of us as members of the human race rarely live completely apart, one from the other. We are each members of several groups within the larger cultural group. The experiences of the individual within the context of family, peer, or other group memberships tend to influence subsequent perceptions.

Sherif and Sherif (1956) report variations in the handling and treatment of time between several cultures. Specifically, these differences in perception stem from differing anchorages within respective cultures. For example, there are reports of time reckoning based on economic life and activities within the Wagiriama of British East Africa who perceive time as a function of weekly marketing days. In other cultures, events in nature which recur regularly are taken as anchorages influencing the perception of time. The blossoming of certain plants are taken as reference points for marking time by the Andamanese people. In yet other cultures, primitive time-keeping devices are used in the computation of passage of time.

Bateman (1968) indicates that there is an observable order in the acquisition of time concepts in individuals and societies. Just as the words that primitive people use to express time really represent nothing more than particular events, or concrete time-of-action, when

one examines the acquisition and growth of time concepts in younger children, a similarity is noted in that primitive action-time constitutes the first stage. Subsequently, equal-interval and continuous time concepts evolve from earlier time-of-action (Bateman, 1968).

In summary, the weight of evidence seems to suggest an observable order or pattern in the acquisition of temporal concepts. It should be pointed out, that as existing societies differ in their handling and treatment of time, such differences appear to be transmitted to individual group members.

Motivation, Learning and Time

Research in the perception of time necessarily includes motivational implications arising from phenomenological variations. This is to say, phenomenal differences in the perception of temporal events appears related to a general class of events considered as motivational; e.g., morale, goal establishment, etc. The term motivation is a generic one that refers to the needs, goals, or desires that provoke the organism to action. From a cognitive point of view, learning is facilitated if there is a state or condition of need existent within the organism. A necessary antecedent to concept formation is thus motivation which appears to involve phenomenal variations in the perception of time. Lewin (1948) suggests that the morale of a group is directly influenced by the future time

orientation of individual group members. LeShan (1952) considers temporal orientation instrumental to the establishment of plans and goals of the individual. In a similar vein, Mussen, Conger, and Kagan (1963) view as the basic motivational pattern of lower-class children the philosophy of "immediate gratification." From this point of view, lower-class children find difficulty in establishing goals related to a future orientation. Such groups show propensity for immediate realization of goals in a present orientation. This suggestion is related to Smart's (1967) findings that alcoholics develop a different time orientation than is usual in non-alcoholics. Specifically, alcoholics seem to live in an "extended present," deficient in a future time orientation. It is theorized that this may partially account for the willingness of excessive drinkers to "run the risk" of deferred or delayed punishments for drinking; i.e., they may be incapable of fully realizing the physical and social delayed effects of alcoholic drinking.

Underwood (1966) has observed that the role of time factors in learning is frequently taken for granted. However, with possibly no exceptions, the longer we practice on a specific task, the more proficient we become. In somewhat different terms, learning time has been shown to be a very accurate predictor of the amount learned ". . . in paired-associate and free learning, and the prediction is

independent of the rate of presentation and the length of the list (Underwood, 1966, p. 498)."

Sherif and Sherif (1956) suggest that perceptual structuring can be considered the prototype of all psychological processes including learning, remembering, and decision-making. Gooddy (1958) has suggested that the passage of time is essential for perception. For example, if an individual is unable to differentiate between when he is being pricked with a pin and when he is not, a complete and accurate description of the percept of having been pricked (memory) is largely impossible. This author likewise maintains that temporal awareness is as important as spatial awareness for perception.

With regard to the child's development of perception, Strauss and Kephart (1955) are in essential agreement with Gooddy (1958). These authors maintain that there are primarily two dimensions to the child's perceptual world, including the spatial and the temporal, and that these are related by memory. Perceptions in a current spatial situation are stored (memory function) for subsequent comparison at a later time so that complete impressions can be made when the rest of the material is received. Perception of pattern or design appears to involve the individual's ability to translate successive impressions (temporal mode) to a simultaneous one (spatial mode).

Bateman (1968) has suggested that learning problems may be related to temporal disability.

> Educational difficulties related to temporal disabilities seem to fall into two general disability areas: (1) basic skills difficulties (primarily in reference to severe reading problems); and (2) language disorders or oral language difficulties. These two areas are by no means mutually exclusive categories (Bateman, 1968, p. 25).

Many children with learning disabilities not only have difficulty learning to tell time, but in addition seem to lack the ability to acquire a sense of time. According to Johnson and Myklebust (1967), such children may also fail to remember the sequence of letters or sounds within words and consequently misread or misspell words. These authors have found that dyslexic children are frequently unable to deal meaningfully with words in a series (e.g., days of the week), even though they may have learned the series. Apparently, similar tendencies are evident in adult aphasics who are unable to speak or read.

CHAPTER III

TEMPORAL LEARNING AND AGENCIES OF ENCULTURATION IN SPANISH-SPEAKING GROUPS

Corona is a community of approximately 26,000 persons situated approximately 150 miles north of the Mexican border and 40 miles east of the Pacific Ocean. Historically, the town's economic foundation has rested with the citrus industry, the groves acting as insulation to industry's inviting overtures (Johnson, 1962). More recently this insulation has begun to wear thin as industry arrives in increasing volume. Coincident with the arrival of industry is a corresponding population explosion which appears to represent a typical Southern California growth pattern. Despite these most recent changes, Corona retains a unique flavor of its own.

The Corona Unified School District offers education from kindergarten through grade twelve, including special adult classes. The district is comprised of 15 elementary schools, 3 junior high schools, and 2 senior high schools, enrolling approximately 12,700 students at all levels. The entire school district covers 159 square miles, with an estimated population of between 40-45,000. A recent (1968-9) ethnic survey indicates that the total

district is comprised of 22.6% Spanish surname students (elementary only, 23.5%).

"The Spanish-speaking group of Corona is a distinct ethnic division, geographically segregated, continuing to live with its language, customs, and preferences relatively intact. The same can be said of the English-speaking groups, for they have incorporated few of the features characterizing the town's Mexicans (Johnson, 1962, pp. 3-4)." Approximately 25% of Corona's population is Mexican-American and, as such, constitutes a major Southern California "barrio" (Mexican-American neighborhood). As Johnson (1962) points out, the Spanish-speaking community represents an ethnic division maintaining a geographical separation from the numerically superior Anglo community. Several concentrations of Mexican-Americans exist in proximity to this city, although the Corona barrio is the most permanent and less subject to transiency. The two major streets of Corona are perpendicular to each other and intersect in the middle of the community, forming a center for a circular boulevard surrounding the community (see Diagram 1). One street runs east-west, while the other north-south, cutting the town into quadrants (Johnson, 1962). Historically, these quadrants comprise the business and residential centers of earliest establishment. In general, the region to the north of the east-west boulevard has been dominantly Mexican-American, while that to the south has been Anglo.

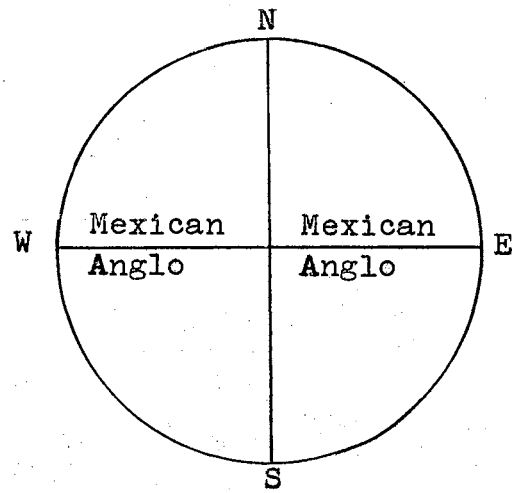

Diagram 1

Within the Mexican-American community, an internal dichotomy appears to exist in which distinct "Mexican" (or Chicano) and Mexican-American (or Latin American) subgroups occur. The Mexican subgroup is comprised of both immigrant and nonimmigrant Spanish-speaking persons. In terms of traditional norms and language, the Mexican tends to resist enculturation through "barrio" insulation which tends to promulgate a cultural isolation. For example, norms, values, and language of the Mexican subgroup are tenaciously maintained resulting in formation of an in-group. Out-groups, including Mexican-American and Anglo, are often viewed with suspicion as to motive; i.e., Mexican-Americans are watched to see what they say about "us."

Burma (1954) has likewise suggested that there are three cultures to be considered in the enculturation of the Mexican. These culture groups include the Anglo, Mexican, and the Mexican-American, ". . . which

latter is a mixture of the former two and belongs primarily to American-born Mexicans. The Mexican-American culture acts as a bridge: . . . (Burma, 1954, p. 124)." This may be portrayed diagramatically as:

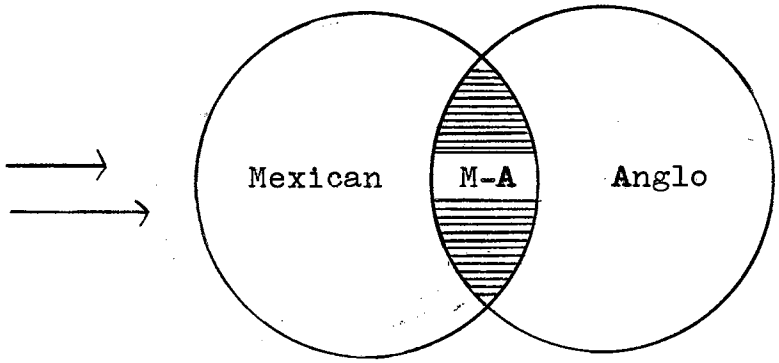

Diagram 2

The above representation of the assimilation process is significant in that the Mexican-American subgroup is confronted with a loss of anchorages or major reference points. Such a loss of anchorages directly influences the experience and behavior of individual members as new reference points are sought. Former anchorages such as values, traditional norms, and even language, are increasingly modified as assimilation occurs. Kluckhohn (1967) observes that,

> In societies undergoing change, the ordering of preferences will not be clear cut for some or even all the value orientations. In other words, great variation exists within cultures and is as important to the understanding of social process as is the fact of the differences between cultures (Kluckhohn, 1967, p. 294).

To further examine the relationship between agencies of enculturation and the learning of time, social

stimulus situations such as family membership, community organizations, and material-nonmaterial culture products have been incorporated in the following discussion.

Family Membership

Social stimulus situations are composed of people (individuals and groups) and cultural products, including material culture and nonmaterial culture.

> Experience and behavior of individuals are always in relation to a given set of stimulating conditions, whether they are social or not. Therefore, it is not sufficient to specify only influences coming from within the individual in understanding man's experience and behavior. It is also necessary to know the exact scope and properties of the stimulus situations the individual faces (Sherif and Sherif, 1956, p. 12).

The family, as a social stimulus, has lasting consequences on the experience and behavior of individual members.

Man grows in relation to others, for it is through the reflected attitudes and feelings of others that he attains knowledge and understanding of self. From the period of earliest infancy, the basic agency of enculturation is the family. This living unit provides both the training and experiences essential for growth. The child is born with nearly endless potentialities, but with almost no inborn direction. This direction is provided through the myriad experiences derived from interpersonal interaction with "significant others" in the ever-broadening

environment. These relations provide the basis for socialization and enculturation of the young child. Through these contacts he learns ways of communicating, doing, and thinking. Through the earliest years, the seat of such contacts is found to reside in the family and with the parents and siblings which compose this prime unit. Lidz (1958) has succinctly outlined the importance of this social agency in the following terms:

> The family provides the primary schooling in social living; the person's experience in all other group and interpersonal interactions rests upon the foundations constructed within the family. Knowingly or unknowingly the family has the task of transmitting the basic instrumentalities of the culture to the offspring, including ways of reasoning and reacting emotionally, and of communicating verbally and empathically (Lidz, 1958, p. 24).

The family is comprised of individuals constituting stimulus agents in the process of socialization. When one family member comes to stand in a certain capacity to another, an interpersonal relationship has begun to function. Such interpersonal relations constitute the basis for much early learning. Concepts related to time appear to be first acquired within the context of the family. In all probability, temporal learning most often occurs vicariously in conjunction with other themes. According to Bateman (1968)

> If we ask what stages a child goes through in learning to jump rope or write a composition about what he did last summer, we can outline these in a reasonably objective and

> noncontroversial fashion. But the questions of when and how a child learns about time are not so readily answerable (Bateman, 1968, p. 10).

Families dependent upon common labor or agricultural employment are probably more aware of "rhythms in nature" than strict time schedules. Relatively unenculturated Mexican groups would most likely meet these criteria regarding temporal cognition. A child in the course of development would tend to introject existing temporal norms learned within the family.

The Mexican-American culture represents a transitory shift from simple economy and traditional norms to one representing increased complexity with less emphasis upon tradition.

> Under the impact of immigration, migration, cultural conflict, urban living, and minority-group status, many old culture traits normally decline. . . . The dominant role of the father has tended to decline. The wife may remain subordinate, but the sons are more emancipated and not infrequently the eldest son supersedes the father as mentor and protector for the younger children because he knows more about the American culture. The older girls, particularly if employed, are much less subordinate than the mother, and may refuse a completely subordinate role when they become wives (Burma, 1954, p. 86).

The thesis might thus be advanced that the Mexican-American culture represents transitional temporal perception. Regardless of origin, the family represents a social stimulus facilitating the learning of time.

Community Organizations

Sherif and Sherif (1956) have described several salient features of groups in terms of the interdependence of members which tend to become increasingly stabilized into patterns linking every member. Additionally, members come to share values, standards of behavior, and norms of the group. These observations suggest that reference groups constitute a source of influence in temporal learning. Specifically, groups or community organizations may contribute to the acculturative process thereby influencing differential handling and treatment of time by the individual member.

According to Burma (1954, p. 100), "In his own country [Mexico] the rural, lower middle-class Mexican does not readily form co-operative or social organizations." However, subsequent to his arrival in the United States, changes in this respect come rapidly and radically. Almost every type and manner of organization is represented in the Mexican-American community, including religious, mutual aid, cultural, social, literary, recreational, and fraternal groups (Burma, 1954).

> Most originally were both mutual aid and recreational in theory, but the vast majority of local organizations have been in actuality social clubs of one kind or another. These local clubs sponsor dances, suppers, and other entertainments, but have no goal other than recreation. Many used to be supported by small monthly dues and paid small sick benefits. Such material benefit societies (mutualistas) were of considerable early significance, but as has been true of other such immigrant groups, they proved

> to belong primarily to a transitional phase, and today do not appear to have any important place (Burma, 1954, p. 100).

There are a number of Mexican-American organizations of national scope. A sampling of some of these groups include the "League of United Latin-American Citizens" (LULAC), "Spanish-American Alliance" (La Alianza Hispano-Americano), "Mexican-American Movement," "Community Service Clubs, Incorporated," "Unity Leagues," and the "Mexican Civic Committee." In addition, various religious groups, trade unions, and other groups are established at a clearly local level. Due to differences in composition, socio-economic status, and educational levels of members, these groups often vary in their norms, expectancies maintained for group members, and goals. For example, some Mexican-American organizations are more conservative than are other more liberally-oriented groups. Historically, these latter organizations place value on the realization of goals compatible to the acculturative process. The League of United Latin-American Citizens actively promotes the necessity of learning and using English (the official language of the organization), and fosters education, culture, and tolerance. Such attention to acculturation implies an incorporation of learnings associated with the dominant (Anglo) culture.

The Corona Council, League of United Latin-American Citizens, is comprised of members of both Mexican-American and Anglo-American descent. Correspondingly, this

membership would appear to be drawn nearly exclusively from essentially middle income groups in contrast to other local organizations. Many of these members represent those who have "broken the barrier" economically. Such individuals are more likely to consider themselves "Hispanic," "Latin-American," or "Mexican-American" in ethnic origin. In the main, such persons represent a marked degree of acculturation in contrast to other members (Chicano, Mexican) of the Spanish-speaking community. Such acculturation suggests that these individuals have moved nearer the dominant culture in their cognition of time. Group membership thus constitutes a source of reinforcement in the handling and treatment of time largely through group norms.

The "Mexican-American Political Association" (MAPA) in Corona represents a political action group in contrast to LULAC which is essentially a civic, educational, and social organization. Nevertheless, as there is a sharing of members between MAPA and LULAC, the former group more realistically represents a political arm of LULAC in this community. MAPA advocates social action and an involvement in community affairs by individual members of Mexican-American extraction. As such, this organization is alert to contemporary issues and problems facing the Mexican-American and advocates direct action when appropriate.

In contrast to reference groups which actively encourage acculturation, some organizations have adopted a "nativistic" ethos resulting in an ". . . attempt to turn

back the clock, to entrench itself in old, outmoded tradition rather than to meet the problems of the day (Tuck, 1946, p. 168)." The inference here is that orientation is cast in terms of the past with an emphasis placed upon tradition and custom. Several such organizations might include the "Sociedad Progresista Mexicana" and the "Guadalupana Society" within the Roman Catholic Church.

The "Sociedad Progesista Mexicana" is comprised of members of exclusively Mexican descent. Originally planned as an organization capable of providing a suitable burial for deceased members, this group has subsequently shifted in purpose to include social and fraternal activities. Primarily a state organization, the California headquarters are situated in Los Angeles. This organization is reportedly quite conservative in posture although interest in community service is now receiving attention.

The "Guadalupana Society," organized independently within the Roman Catholic Church, is specifically organized for "Spanish-speaking ladies" in reverence of "Our Lady of Guadalupe." Strongly committed to support of the Church, a principal objective includes furthering the education of "Spanish-speaking people wanting a Catholic education." Organized on a regional basis, the Society is well established in Arizona, New Mexico, Texas, California, and Mexico. Group meetings are conducted in Spanish although other ethnic groups are considered for possible membership. The Society is characterized by a conservativism including

advocating the speaking of Spanish in the home, learning modes of dress and State dances of Mexico, and the perpetuation of traditional aspects of the Mexican culture. Apparently, the Corona group is principally comprised of members maintaining separateness in language and custom quite distinct from acculturated individuals.

Seemingly, these members consider themselves Mexican first although maintaining strong allegiance and demonstrated patriotism to the United States. The Society provides a relatively secure climate for those members of the Mexican community preferring this cultural identification.

There exists within the Mexican-American community a variety of reference groups which directly or indirectly influence enculturation. Correspondingly, the extent of enculturation dictates culture patterns discernable in the handling and treatment of time. In some instances, attitudes regarding the relative importance of time are learned in adult groups and are indirectly conveyed to the youthful members of the Mexican-American community. In other cases, youth organizations and peer groups constitute direct sources instrumental to the learning of attitudes related to time. In sum, the implications are significant in that group memberships may promulgate or impede temporal learning.

Material and Nonmaterial Culture

Material culture is comprised of those items of the socio-cultural setting which can be observed, handled, or manipulated as physical objects.

> Buildings, playgrounds, technological products like the tools used in production (machines), means of transportation (oxcart, train, bus, boat, airplane), means of communication (books, newspapers, radio, television), furniture, cooking facilities, plumbing facilities, sleeping facilities are among these products that constitute material culture (Sherif and Sherif, 1956, p. 21).

Material culture is often closely related to the essentials of living, and as such, may tend to exert a telling influence in the formation of attitudes and conceptions of man and his environment. Attitudes toward time are often cast in terms of one's experience with material products; i.e., modes of transportation, communication, etc.

Speed of available transportation acts as a direct influence on one's perception of temporal events. This conception does not appear unrelated to Piaget's (1946) "speed of movement" explanation of temporal perception. Among those conclusions drawn from his observational experiments on time and speed are: (1) at the preoperational level children take into account only one variable at a time, speed or space. Since they cannot coordinate both, children cannot have an accurate notion of elapsed time interval; (2) at the preoperational level there can be no notion of measuring time because there is as yet no concept of conservation of speed; (3) time is a coordination

of speed, and space is a coordination of displacements (movements without speed); (4) concepts of time are dependent upon prior notions of speed (Bateman, 1968). If such conclusions are accepted as valid, then speed of travel will tend to directly influence the perception of time.

Nonmaterial culture is comprised of products of human interaction ". . . like language systems, various social organizations (e.g., family, kinship, political organizations), religion and its organization, art forms, music forms, schedules regulating vital activities, conceptions of man and the universe. One central area of nonmaterial culture is a system of values or norms (Sherif and Sherif, 1956, p. 27)."

Typically, interaction between human organisms takes place on a conceptual level; i.e., through exchange of words, conversation, written language, etc. "Interaction between individuals relies chiefly on communication. Therefore, when we speak of human interaction, communication is necessarily implied (Sherif and Sherif, 1956, p. 11)." It follows that for a sharing of concepts related to time, meaningful communication must occur. Within this society, as language proficiency and opportunities for interpersonal interaction increase, the Mexican-American is likely to incorporate new conceptions of time. In this regard, Kluckhohn's (1967) research suggests that the Mexican-American would shift increasingly to a middle-class future orientation. Language systems thus provide

the means whereby attitudes related to time may become learned.

Value orientations of peoples constitute a further example of nonmaterial culture influencing the perception of time. In this regard, value systems tend to filter percepts related to environmental events. Such value orientations vary from one sub-culture to another.

> The theory of variations rests upon these major assumptions. First, it is assumed that there are a limited number of common human problems for which all peoples at all times must find some solution. . . . The second assumption is: Although there is variability in solutions of all the problems, it is neither limitless nor random but is variability within a range of possible solutions. The third assumption, the one which provides the main key to the analysis of the variation in value orientations within cultures, is: The alternatives of all solutions are present in all societies at all times but are differentially preferred. In other words, every society has in addition to its dominant profile of value orientations, numerous variant profiles, some actually required, others permitted (Kluckhohn, 1967, p. 294).

Testing of samples of five populations, including Navaho, Spanish-American, Anglo-American, Italian-American, and Irish-American, revealed differences in value orientations related to time. For example, it was predicted that typical American middle-class rank orderings of time would result in the "future" being preferred over the "present," and the "present" preferred over the "past," (future > present > past). On the other hand, testing revealed that the Spanish-American group preferred the "present" over the "future" and the "future" over the "past," (present > future > past).

With regard to cultural values and temporal orientation, research points to a basic disagreement as to what might be considered the dominant American time orientation. Kluckhohn (1967) advises that the standard American model involves a future time and achievement-oriented individual. As indicated earlier, this author has predicted typical American middle-class rank orderings of time in terms of a dominant "future" orientation (future > present > past). On the other hand, Getzels and Thelen (1960) point out the existence of a conflict between the cultural values outside the classroom and the institutional expectations within the classroom.

> Accordingly, the child must be motivated to strive and sacrifice present ease for future attainment. But recent studies suggest that our cultural values are coming more and more to prize sociability and hedonistic, present-time orientations, rather than achievement, as goals (Getzels and Thelen, 1960, p. 73).

In this latter instance, "present" time is preferred over the "future," (present > future).

Both material and nonmaterial cultural products contribute to an enculturation process. As Burma (1954) suggests:

> Most Mexican immigrants rather quickly take on the new material culture's most obvious, external aspects, but the nonmaterial culture is acquired more slowly. This acceptance of the material culture is not always obvious to the casual observer, who fails to realize that the reason a poverty-stricken peon does not have indoor plumbing or an electric refrigerator is not that he prefers to do without, but just that he lacks the cash with which to acquire these aspects of our culture. He does cling more strongly to his nonmaterial cultural heritage, however, in that he prefers his

> old language, food habits, family organization, songs, superstitions, folklore, herbal medicine, religion, fiestas, and traditional given names (Burma, 1954, p. 124).

Assimilation of a sub-culture into a dominant culture involves changes in all areas of social life: in family patterns, religious observance, political behavior, economic orientation, and educational aspirations. The family, community agencies, and culture products may facilitate such assimilation and incorporation of concepts related to time.

CHAPTER IV

DESIGN OF THE STUDY

Research design comprises the plan, structure, and strategy of investigation conceived so as to answer relevant research hypotheses and to control variance (Kerlinger, 1965). That is, design facilitates answering research questions and allows control of experimental, extraneous, and error variances. Such a framework enables identification of tests of the relations among variables. Likewise, design suggests directionality in terms of observation-making and analysis.

Introduction

The reported research in temporal perception incorporates a 2 X 2 factorial paradigm. Several samples of sixth grade public school children were identified by ethnic origin, including Mexican-American and Anglo-American subjects (N=88). Each group was subpartitioned into two socio-economic groupings, including "above average" and "below average." Those observations made on the children, the temporal perception measure, were made independently.

		Ethnicity	
		Mexican-American	Anglo-American
Socio-Economic Level	Above Average	Temporal Perception Scores	
	Below Average		

Figure 1. Research Design in Temporal Perception

The research design incorporates comparative methodology emanating from a method of discovering causal connections.

> /John Stuart/ Mill's Method of Agreement rules that, 'If two or more instances of the phenomenon under investigation have only one circumstance in common, the circumstance in which alone all the instances agree, is the cause (or effect) of the given phenomenon (Van Dalen, 1966, p. 222)'.

The foregoing "Method of Agreement" thus assumes finite causality and the principle of determinism, that every natural event or effect has a necessary and adequate cause. Extending this analysis to research dealing with temporal perception, variation in the handling and treatment of time between groups suggests the existence of independent variables contributing to this effect.

The several independent variables under consideration include socio-economic level and ethnicity. At issue here is the question as to whether temporal perception varies as a function of these socio-cultural variables. The several dimensions of temporal perception, sense and perspective, comprise the dependent variables. The

measures of temporal sense and perspective must be made independently and through utilization of appropriate subtests. Table I, "Test Battery," identifies instrumentation utilized in data collection. Sense of time incorporated both verbal estimates and reproduction of intervals of time. Measures of temporal perspective included Sturt's (1925) Questions Test and the "Picture Arrangement" subtest of the Wechsler Intelligence Scale for Children. Length of time required to administer this battery was approximately 40 minutes per subject.

TABLE I

TEST BATTERY

Dimension and Tests	Author
I. Temporal Sense	
1. Method of absolute judgment	
Verbal Estimation	Underwood
2. Method of adjustment	
Reproduction	Underwood
II. Temporal Perspective	
1. Time-words, symbols, and dates	
Questions Test	Sturt
2. Pictorial sequencing	
WISC Picture Arrangement	Wechsler

Measures of Temporal Sense

Sense of time involves estimates of interval or duration. Bateman (1968, p. 70) describes "estimation of duration" as the ". . . ability to reproduce or discriminate very short stimuli or intervals between stimuli." In this fashion, Bateman (1968) has specified the several unique features of temporal sense, including estimates of time intervals and their reproduction.

In terms of developing logic in the child, Piaget (1967) has identified a logic of verbalization and a logic of action. The logic of action is more profound and more primitive. "It develops more rapidly and surmounts the difficulties it encounters more quickly, but they are the same difficulties of decentration as those which will appear later in the field of language (Piaget, 1967, p. 79)." Sense of time may incorporate these several aspects of developing logic in the child. Verbal estimation and reproduction of interval, as measures of temporal sense, bear relation to a logic of verbalization and action, respectively.

Underwood (1966) in an experiment involving both verbal estimates and reproductions, obtained the following major results: (1) practice has a direct influence on verbal estimates, stage of practice has little influence on reproduction; (2) individual differences are far greater for the verbal estimates than for the reproduction measures; and (3) there is essentially a zero correlation between the

verbal estimate and the reproduction. Underwood's study utilized college-age subjects (N=60) and attempted to answer the question as to how the two kinds of measurements change as a function of stage of practice. In the present study, these several techniques have been incorporated as measures of sense of time involving a sample of sixth grade school children (N=88).

Verbal Estimation

The generalized name for any procedure in which a single stimulus is presented to a subject with a request for a judgment about some characteristic of the stimulus is the method of absolute judgment. The judgments are said to be absolute in the sense that no other stimulus is presented for comparison; the subject must make his judgment by referring to some "internal" measuring stick derived from past experiences. The subject is presented with an interval delimited by "begin" and "stop" and is then required to provide a verbal estimate of elapsed time.

In the present study, a procedure similar to that reported by Underwood (1966) was utilized. An interval was presented the subject, a verbal estimate was received which was followed immediately by a reproduction of that interval. Four distinct intervals were used, including 8, 12, 19, and 32 seconds. Each stimulus was presented six times with block randomization being used to determine the ordering.

Verbal estimates and reproduction were individually administered and included the following instructions:

> In the following tests, you will be required to provide a verbal estimate of the length of an interval of time and then be asked to reproduce that same period of time with a stop watch. In other words, you will be presented an interval of time, for example, five seconds, and then be asked to guess how much time you think passed from when I say 'begin' until I say 'stop.' After providing a guess as to how much time has passed, you will be given the stop watch so that you can show me how much time you think actually passed by starting and stopping the watch yourself. Remember, you will first guess how much time has passed from the time I say 'begin' until I say 'stop;' secondly, you will be given the stop watch so that you might start and stop the watch yourself in guessing how much time has passed. Please do not look at the face of the watch; keep the watch face down at all times. Let's try one example (Test Battery, Appendix A).

As is apparent in the foregoing instructions, verbal estimation requires knowledge of specific concepts relative to temporal measurement; i.e., "second," "minute;" 60" = 1', etc. In instances where the subject was uncertain as to the concept of "second," and provided estimates in "minutes," he was reminded to furnish estimates in "seconds." If the subject persisted in providing estimates in "minutes," the examiner accepted these and recorded such estimates in "seconds."

Preliminary testing revealed that some subjects, in the absence of other appropriate anchorages, reverted to counting, particularly during verbal estimation. All subjects were subsequently advised to refrain from counting and to rely exclusively on best estimates of elapsed time.

Reproduction

This test consists of presenting a standard stimulus to the subject and asking him to match or reproduce that stimulus in some manner. The generalized name for this method is that of adjustment. By appropriate signal, the examiner delimits a given interval; immediately following, the subject attempts to reproduce the length of the interval by issuing appropriate signals, in this case, through use of a stop watch. Thus, the examiner indicates "start," at the same moment starting a stop watch, and after an appropriate interval, indicates "stop." After the subject has provided a verbal estimate of elapsed time, he is given the stop watch and requested to reproduce a similar interval.

This second measure of temporal sense was specifically selected owing to the reportedly low correlation between it and the other measure of temporal sense, verbal estimation. Further, the method of reproduction appears to furnish scores which are less variable than those obtained through verbal estimation. As Underwood (1966, p. 54) expresses it, ". . . individual differences, as indexed by standard deviations, are far greater for the verbal estimates than for the reproduction measure." Ostensibly, it would appear that these several measures are tapping different aspects of the same dimension; namely, temporal sense.

Measures of Temporal Perspective

Temporal perspective has been defined as the long range perception of time in terms of past-future events (Thor, 1962). The several aspects of temporal perspective include the past, present, and future. Bateman (1968, p. 12) defines the "present" as incorporating the perception of simultaneity or ". . . the present is as long as we can make something seem to be all here at once." Further, that the "past" assumes memory or recall ability and the "future" an anticipatory function.

By way of distinguishing between perspective and orientation, Getzels and Thelen (1960) suggest that motivation for achievement is in conflict with changing orientation.

> It is expected by the school that the child will work hard in the classroom in order to achieve to the fullest extent of his potentiality. Accordingly, the child must be motivated to strive and sacrifice present ease for future attainment. But recent studies suggest that our cultural values are coming more and more to prize sociability and hedonistic, present-time orientations, rather than achievement, as goals. In this sense, the criteria of worth in the classroom and in society at large are incongruent. . . (Getzels and Thelen, 1960, p. 73).

The proposition is thus advanced that dominant culture values are in transition. Getzels and Thelen are suggesting a shift from deferred (future time) to immediate, hedonistic gratification (present time).

Initial concern was directed to an identification of instruments capable of furnishing valid estimates of

perspective. The several measures finally adopted included the Questions Test (Sturt, 1925) and the "Picture Arrangement" subtest of the Wechsler Intelligence Scale for Children (Wechsler, 1949).

From the outset, it was not anticipated that these instruments would yield significant orientational differences; i.e., present > future; future > past, etc. Rather, as these measures seemingly incorporate the several aspects of time perspective, variations may be ascribed to individual differences in the handling and treatment of time.

Questions Test

Sturt (1925, p. 43) suggested that the "scheme of conventional time" represents the work of ages and that "the ordinary inhabitant of a civilized country learns to use this scheme during childhood, and by the time he reaches maturity, should be master of the whole complicated arrangement of hours, days, and years." The manner after which the child comes to handle and treat time has been the subject of considerable research. In this same spirit, Sturt undertook several experiments with primarily an educational aim although designed to illustrate the development of individual knowledge of time. Specifically, this author sought to investigate:

> (i) The child's understanding of ordinary time-words and symbols such as are used in everyday life.

> (ii) His power to form the conception of a universal time scheme extending into the past and future, and his ability to use the dates which symbolize this scheme.
>
> (iii) His knowledge of the characteristics of definite epochs in the time scheme, and his ability to place these epochs roughly in their correct order.
>
> (iv) The matter and methods used by the child in thinking about historical data.
>
> (v) The importance attached by children to time in comparison with other elements in their experience (Sturt, 1925, pp. 45-6).

Sturt's (1925) Questions Test was intended to illustrate both (i) and (ii) above.

The author administered the Questions Test individually to all younger children. However, for one set of older children, ages eight through ten, this test was given in class as a group test.

The Questions Test format adopted for study purposes was essentially after Sturt (1925), although several questions were modified so as to provide greater clarity. The Questions Test, as adopted, appears in the "Test Battery," Appendix A.

Picture Arrangement Test

The "Picture Arrangement" subtest of the Wechsler Intelligence Scale for Children was selected as providing a measure of temporal perspective. This subtest utilizes a technique of pictorial sequencing. The "Picture Arrangement" subtest, in spite of local origins, seems readily

understood by persons of diverse cultural backgrounds. As Wechsler (1958, p. 184) observes, "this is attested by the fact that in the foreign adaptations of our Scales, the Picture Arrangement items have been generally reproduced with negligible modifications."

The order of presentation is indicated by printed number on the backs of the pictures. The correct order for each arrangement is designated by code letters. Each set has its own time limit, and in some cases, added credit is awarded if the story is completed in less than the specified time limit. Timing commences as soon as the cards are laid out in their order of presentation. Time limits, arrangements, and time bonuses for test items are designated in the "Test Battery," Appendix A.

Saunders (1958), in a clinical interpretation of Wechsler subtest profiles, suggests that,

> Picture Arrangement (PA) is the remaining subtest that is regarded primarily as tapping an innate dimension, after the fashion of Digit Span and Block Design. Just as BD /Block Design/ can be related to the tendency of an individual to focus his attention within a spatial framework, Picture Arrangement may be seen as somewhat analogously related to his tendency to focus his attention within the temporal framework, whose "dimensions" are past, present, and future (Saunders, 1958, pp. 7-8).

The "Picture Arrangement" subtest incorporates sequencing ability which is a time-oriented skill. Sequencing necessitates the ordering of events in time thus requiring awareness of simple succession or consecutiveness.

Sample

Two groups of sixth grade public school children were identified by ethnic origin, including Mexican-American and Anglo-American subjects (N=88). Each group was divided internally into "above average" and "below average" socio-economic groupings, "average" being defined as that point on the Duncan Scale equivalent to the district mean socio-economic score (35) derived from random sampling. The dimensions of time constitute the dependent variables under study and include temporal sense and perspective. Control variables include chronological age, grade placement, physical condition, sex, and mental ability.

The subjects ranged between 11 and 12 years of age. The very nature of the experimental question dictated this choice in that the learning of concepts related to time appears well established by this stage of development. The instruments used in collection of data seem particularly appropriate to this age. That is, the several tasks required of subjects appeared within the range of abilities for children of this age group. The control of academic level insured exposure to experiences common to most sixth grade children. Obviously, this factor assumes significance in the instance of age-grade discrepancy.

Children handicapped by serious physical defects were eliminated, since such infirmities can affect

performance in unpredictable ways. Subjects were drawn so as to ensure control of the sex variable (Male = 43; Female = 45).

In a "Pupil Ethnic Survey," (Table II), conducted within Corona Unified School District, approximately 24% of all elementary school children were of Mexican-American surname. On a total district basis, approximately 23% of all school children were of Mexican-American descent. As ethnicity constituted an independent variable, Mexican-American and Anglo subjects were determined on the basis of surname and available records of enrollment. With the identification of Anglo and Mexican-American groupings, internal division in terms of socio-economic level was effected.

Socio-economic level, based on occupation of the principal wage earner in the subject's family, and the determination of mental ability, receive consideration in the discussion that follows.

Duncan Socio-Economic Scale

The Duncan Socio-Economic Scale (Reiss, et al., 1961) was developed through a research grant established with the University of Chicago by the United States Public Health Service. The scale was developed, in part, as the outgrowth of the North-Hatt NORC (National Opinion Research Center) study on the measurement of occupational status.

The NORC occupational prestige scores have been published since 1947. They have been used widely as a method of ranking occupations in terms of social standings. Researchers have experienced problems in the utilization of this scale, due to certain variables that were inherent to the scale. First, ratings were only for less than one-half of the total labor force. This necessitated the use of a supplemental scale to cover all occupations found in the sample of most studies.

TABLE II

CORONA UNIFIED SCHOOL DISTRICT
PUPIL ETHNIC SURVEY 1968-9

Elementary School	Total Pupils	Spanish Surname	% Spanish Surname
Adams	391	105	26.8
Coronita	821	216	26.3
Eastvale	385	76	19.7
El Cerrito	444	126	28.4
Garretson	702	190	27.1
Highland	191	36	18.8
Home Gardens	592	169	28.5
Jefferson	455	120	26.4
Lincoln	636	214	33.6
Norco	651	110	16.9
Parkridge	561	166	29.6
Riverview	625	54	8.6
Sierra Vista	656	63	9.6
Vicentia	667	157	23.5
Washington	776	207	26.7
Total Elementary	8,553	2,009	23.5
Total District	14,058	3,179	22.6

Second, the scale gave an index score without consideration or correction for possible bias in sampling and weighting involved in the averages. Finally, no age adjustment was used to establish the index scores. This created problems due to education and economic factors of early entries vs. late entries to a given occupation.

In the development of the present scale, Reiss, et al. (1961) felt the first step was to insure that the problems encountered in the NORC scale could be alleviated. The question of possible bias was attacked first. The NORC scale was developed by using five categories to describe the respondents' ratings by an arbitrary weighted summation procedure. The five categories include: (1) excellent; (2) good; (3) average; (4) somewhat below average; and (5) poor. It was discussed that the least ambiguous prestige-rating categories are the first two; i.e., excellent and good. Respondents seem to be less willing to make or are less capable of making negative judgments than positive ones.

Adjustments were made for the differences that occur among occupations in relationship to age. The basic assumption being that two occupations differing in their age composition would be expected to have different average incomes. Also, two occupations differing in no way except age composition will have different distributions by number of school years completed.

The final problem of the NORC scale was resolved by obtaining a socio-economic index for each of the 270 occupation headings listed in the detailed occupational classification of the 1950 census.

The rating scale was used to scale the occupations of principal wage earners in families of each subject. The range of scores for this rating scale is from 0 to 99 and includes professional, semi-professional, clerical, skilled and unskilled labor categories.

The Mexican-American and Anglo samples were divided internally into two socio-economic groupings, "above average" and "below average," with "average" defined as that point on the Duncan Scale equivalent to the district mean scale score (35) determined from a random sample of 735 subjects (Table XV, Appendix B). Table XVI, Appendix B, depicts a three-way classification of socio-economic status. Each of the elementary schools within the system is analyzed in terms of numbers of subjects appearing at each socio-economic level by ethnic grouping. Computer-assisted random selection of subjects was accomplished on the basis of 50 students per school across the first six grade levels. From an original 750 subjects, 15 were dropped from the sample due to lack of available information, resulting in a total sample size of 735. On the basis of ethnic origin, this sample would appear representative in that 21% of the subjects were Mexican-American, while recent survey (Table II) indicates that the district total of Mexican-American

surname students is 22.6¢. Inspection of the Mexican-American sample, depicted in Table XVI, Appendix B, suggests a relative absence of Mexican-Americans in "average" and "above average" socio-economic classes for the Corona area. Mexican-Americans at these levels constitute only 3.1% of the total sample and only 14.8% of the Mexican-American sample. Ultimately, a decision was made to utilize two socio-economic groupings, "above average" and "below average," with "average" identified as equivalent to the district socio-economic mean.

Otis Mental Ability Test

Mental ability or level of intelligence represents a characteristic in which subjects differ markedly. Intellectual functioning, as a state of the organism, mediates learning and may constitute a direct influence on the handling and treatment of time and time-related concepts. To control the potential influence of intelligence on the dependent variable, the Mexican-American and Anglo samples were equated on mental ability (90-110 I.Q. points). Otis Mental Ability Test scores were available for fourth and sixth grade students throughout the school system and were utilized as measures of intelligence.

The Otis Quick-Scoring Mental Ability Tests consist of three forms, designated Alpha, (Grades 1-4); Beta, (Grades 4-9); and the Gamma, (High Schools and Colleges). The purpose of these examinations is to ". . . measure

mental ability - thinking power or the degree of maturity of the mind (Otis, 1954, p. 1)." Obviously, it is not possible to measure mental ability directly. That is, it is only possible to measure the effects of mental ability in terms of acquired knowledge and skills. In the construction of these tests, the principal aim has been for the most part to choose a type of question which depends as little as possible on formal schooling and as much as possible on the thinking processes.

The tests are self-administering as it is necessary merely to pass out the booklets, provide the pupils time to study the directions, and then allow them to proceed with the taking of the examination. Testing time for each of the several tests varies from 20-35 minutes in length.

Thorndike and Hagen (1961) have described the Otis Quick-Scoring Mental Ability Tests in the following terms:

> These have been among the most widely used tests in the public schools. Reliability is satisfactory. Evidence is presented that the scores have value in predicting school achievement. The tests are extremely easy to administer and score. They give a single over-all IQ. Primarily, they test verbal ability. The Alpha test requires no reading, but the other two levels do require reading (Thorndike and Hagen, 1961, p. 574).

Otis (1954) points out that there are several possible purposes of mental ability tests. Included in his review of principal purposes is that of research involving the use of two or more groups of equal mental ability or brightness. In equating the Mexican-American and Anglo samples on

mental ability, a possible source of variance within and between samples was reduced.

CHAPTER V

PRESENTATION OF FINDINGS

"Clarity in the large comes from clarity in the medium scale; clarity in the medium scale comes from clarity in the small. Clarity always comes with difficulty (Tukey, 1969, p. 88)." Statistical analysis facilitates the reduction of data to manageable and understandable form. The principal purpose of such analysis is that of inference-making from available data.

This chapter will present findings of the study. Such findings will be organized and presented in relation to the hypotheses for the study. The hypotheses presented herein are "null" in form. That is, each alternative proposition has been translated into a "null" or "no difference" statement for purposes of testing.

Introduction

The problem under study predicts that differences exist between ethnically diverse samples of school children in the handling and treatment of time. In addition, differences in temporal perception are predicted between several socio-economic levels. The null hypothesis represents

a statistical proposition which states that there is no relation between the several variables. If the statistical null proves untenable, acceptance of the operational alternative would be indicated.

Statistical Results

Subjects who came from the same ethnic group were internally divided into "above average" and "below average" socio-economic classes. These samples constituted the basis for subsequent data collection and analysis. Group means and standard deviations are reported for the several instruments in accompanying tables. The t-test was utilized in determining that value by which the statistical significance of the mean difference was judged. Appendix C, "Statistical Treatment," describes several variants of the standard formula which include both pooled and separate variance t formulas.

Tables used to present the results of statistical computations have been placed below and immediately following commentary relative to each hypothesis. Column headings indicate group identification, sample size (N), standard deviation (S.D.), mean scores, and the t statistic for each test. Each table is followed by an identification of probability (p), and significance (S) or non-significance (NS).

S refers to a significant t-test at the .05 level or less on that value representing the mean difference.

NS refers to a non-significant t-test.

Restatement of the Hypothesis

Each hypothesis has been restated in the "null" for purposes of statistical testing. The t-test was used in testing all major hypotheses for possible significance. Hypotheses 1 through 4 were tested for ethnic variation in temporal sense and perspective; hypotheses 5 through 8 relate socio-economic level to possible differences which might occur along the several dimensions.

Hypothesis 1

There is no significant difference in temporal sense between Mexican-American and Anglo-American subjects as determined by Verbal Estimation.

The null hypothesis is rejected. According to Table III, a significant difference was obtained between ethnically diverse samples on the sense of time measure. Acceptance of the operational alternative is indicated.

TABLE III

A COMPARISON OF VERBAL ESTIMATION SCORES OF FOUR INTERVALS BY ETHNIC SAMPLE

Group	N	S.D.	Mean Score	t
Mexican-American	44	18.84	38.81	2.02
Anglo-American	44	13.06	31.84	

$p_S = < .025$

Hypothesis 2

There is no significant difference in temporal sense between Mexican-American and Anglo-American subjects as determined by Reproduction.

The null hypothesis is rejected. According to Table IV, a significant difference was obtained between the several samples in terms of temporal sense. Acceptance of the operational alternative is indicated.

TABLE IV

A COMPARISON OF REPRODUCTION SCORES OF FOUR INTERVALS BY ETHNIC SAMPLE

Group	N	S.D.	Mean Score	t
Mexican-American	44	2.70	15.43	2.09
Anglo-American	44	2.04	16.50	

$p_s = < .025$

Hypothesis 3

There is no significant difference in temporal perspective between Mexican-American and Anglo-American subjects as determined by the Questions Test.

The null hypothesis is accepted. No significant difference was obtained between the several ethnic samples in terms of time perspective as determined from a concepts test. The Questions Test, involving time concepts and

symbols, did not result in a significant difference in mean raw score as depicted in Table V.

TABLE V

A COMPARISON OF QUESTIONS TEST RAW SCORES BY ETHNIC SAMPLE

Group	N	S.D.	Mean Score	t
Mexican-American	44	2.50	19.43	1.47
Anglo-American	44	1.85	20.11	

$p =< .10$
NS

Hypothesis 4

There is no significant difference in temporal perspective between Mexican-American and Anglo-American subjects as determined by the Wechsler Intelligence Scale for Children, "Picture Arrangement" subtest.

The null hypothesis is accepted. No significant difference was obtained between the samples in terms of temporal perspective as determined from sequencing behavior. According to Table VI, the obtained "t" statistic fails to reach significance at the 5% level.

TABLE VI

A COMPARISON OF PICTURE ARRANGEMENT RAW SCORES BY ETHNIC SAMPLE

Group	N	S.D.	Mean Score	t
Mexican-American	44	7.24	26.06	1.48
Anglo-American	44	8.35	28.52	

$p = < .10$
NS

Hypothesis 5

There is no significant difference in temporal sense between socio-economic levels as determined by Verbal Estimation.

The null hypothesis is accepted. No significant difference was obtained between the "above average" and "below average" socio-economic samples in terms of sense of time. Verbal Estimation, a technique involving estimates of "empty" intervals, did not result in a significant difference in mean score.

TABLE VII

A COMPARISON OF VERBAL ESTIMATION SCORES OF FOUR INTERVALS BY SOCIO-ECONOMIC STATUS

Group	N	S.D.	Mean Score	t
Above Average	44	18.02	34.31	.517
Below Average	44	14.94	36.13	

NS

Hypothesis 6

There is no significant difference in temporal sense between socio-economic levels as determined by Reproduction.

The null hypothesis is accepted. No significant difference was obtained between the several socio-economic samples in sense of time. Reproduction, a technique involving the physical production of an interval of time, did not result in a significant difference.

TABLE VIII

A COMPARISON OF REPRODUCTION SCORES OF FOUR INTERVALS BY SOCIO-ECONOMIC STATUS

Group	N	S.D.	Mean Score	t
Above Average	44	2.08	15.79	.646
Below Average	44	2.81	16.13	

NS

Hypothesis 7

There is no significant difference in temporal perspective between socio-economic levels as determined by the Questions Test.

The null hypothesis is accepted. No significant difference was obtained between the several socio-economic groupings in time perspective as determined from the

Questions Test. According to Table IX, the obtained "t" statistic fails to reach significance at the 5% level.

TABLE IX

A COMPARISON OF QUESTIONS TEST RAW SCORES BY SOCIO-ECONOMIC STATUS

Group	N	S.D.	Mean Score	t
Above Average	44	2.48	19.86	.380
Below Average	44	1.93	19.68	

NS

Hypothesis 8

There is no significant difference in temporal perspective between socio-economic levels as determined by the Wechsler Intelligence Scale for Children, "Picture Arrangement" subtest.

The null hypothesis is accepted. No significant difference was obtained between the samples in terms of temporal perspective as determined from sequencing behavior. According to Table X, the obtained "t" statistic fails to reach significance established at a 5% level.

TABLE X

A COMPARISON OF PICTURE ARRANGEMENT RAW SCORES BY SOCIO-ECONOMIC STATUS

Group	N	S.D.	Mean Score	t
Above Average	44	8.11	27.13	.190
Below Average	44	7.71	27.45	

NS

Adjunct Findings

The Questions Test was administered individually and orally to all sixth grade subjects included in this study. An example of the test format, instructions to subjects, and scoring criteria has been included in Appendix A, "Test Battery."

Table XI, "Questions Test Results," represents an item-difficulty scale modeled after Guilford (1950). Any such scale is relative to the general ability of the group, including their median ability and their dispersion of ability. The steps taken in scaling items included:

1. Identification of proportion of group passing an item, and

2. Determination of corresponding z score from tables; if proportion was greater than .50, a negative sign was given to z; if less than .50, a positive sign.

TABLE XI

QUESTIONS TEST RESULTS

	Questions Ordered by Difficulty		Ethnic Group				Total	
			Mexican-American		Anglo-American			
			% Passing	z*	% Passing	z	% Passing	z
1.	(1)	Age	100.0		100.0		100.0	
2.	(18)	Time school ends	100.0		100.0		100.0	
3.	(2)	Birthday: month-day	97.7	-2.00	100.0		98.8	
4.	(17)	Time school begins	100.0		97.7	-2.00	98.8	
5.	(19)	School on Saturday	97.7	-2.00	97.7	-2.00	97.7	-2.00
6.	(14)	Columbus: mother	93.1	-1.50	100.0		96.5	-1.80
7.	(9)	Year	95.4	-1.70	97.7	-2.00	96.5	-1.80
8.	(21)	When 14 you older	95.4	-1.70	95.4	-1.70	95.4	-1.70
9.	(21)	When 14 mother older	93.1	-1.50	97.7	-2.00	95.4	-1.70
10.	(7)	Month	95.4	-1.70	90.9	-1.35	93.1	-1.50
11.	(3)	Morning/Afternoon	86.3	-1.10	93.1	-1.50	89.7	-1.25
12.	(4)	Day of week	84.0	-1.00	90.9	-1.35	87.5	-1.15
13.	(14)	Columbus: Grandmother	81.8	-0.90	90.9	-1.35	86.3	-1.10
14.	(13)	Time for someone at house	72.7	-0.60	97.7	-2.00	85.2	-1.05
15.	(22)	Time been talking	79.5	-0.85	84.0	-1.00	81.8	-0.90
16.	(11)	Day in other town	81.8	-0.90	77.2	-0.75	79.5	-0.85
17.	(8)	Day of month	75.0	-0.70	77.2	-0.75	76.1	-0.72
18.	(10)	Year born	75.0	-0.70	72.7	-0.60	73.8	-0.63
19.	(12)	What time now	79.5	-0.85	68.1	-0.47	73.8	-0.63
20.	(6)	Season	50.0	0.00	72.7	-0.60	61.3	-0.30
21.	(15)	Columbus: Christ	56.8	-0.15	56.8	-0.15	56.8	-0.15
22.	(16)	How long since the holidays	47.7	+0.05	56.8	-0.15	52.2	-0.05
23.	(20)	How long till holidays	52.2	-0.05	43.1	+0.17	47.7	+0.05
24.	(5)	Walk around room	40.9	+0.25	50.0	0.00	45.4	+0.13

*It is usually undesirable to scale items when p exceeds .97 or is less than .03, owing to the uncertainty of z in these regions.

Any item with a negative sign is easier than the item of median difficulty for the group; any item with a positive sign is more difficult than the item of median difficulty and is passed by less than 50% of the subjects (Guilford, 1950).

In Table XI, "Questions Test Results," the questions are arranged in order of increasing difficulty based on per cent passing for total sample. In addition, the per cent passing each question has been determined for both Mexican-American and Anglo samples. Questions may be identified by number appearing in parentheses to the left of Table XI.

To arrange the questions in an order of difficulty, and thus gain some notion as to the order of the growth of knowledge relative to time, is difficult. Results of testing appear in essential agreement with those of Sturt's (1925) investigation. Although some exceptions occur, the following observations may be made relative to the total sample. The duration questions are clearly the most difficult; e.g., Q. 5 was answered correctly by only 45% of the total sample. Qs. 16 and 20, also dealing with temporal duration, were answered correctly by approximately 50% of all subjects. According to Sturt (1925, p. 50), the difficulty of Qs. 16 and 20, ". . . seemed to be partly due to their inability to perform the necessary calculations, such as would be made by an adult if he could not tell 'off-hand' the length of time before a certain event."

Next in degree of difficulty were those questions involving the time of day. As Sturt (1925, p. 51) has observed, "Q. 12 is probably too hard for most adults; the man who can tell the time correctly without looking at his watch being generally regarded as something rather out of the common." Qs. 17 and 18 represent exceptions to Sturt's earlier findings relative to questions involving time of day. Both Mexican-American and Anglo subjects appear to exhibit increased awareness as to the beginning and ending times of school.

The season of the year tended to provide both groups difficulty although approximately 23% fewer Mexican-American, as contrasted to Anglo, answered correctly.

Questions 11 and 13 produced results indicating that approximately 80% or more of the total sample had conceptualized simultaneity of time. Apparently most of those children included within the several samples were quite aware of the universal nature of time. The Mexican-American sample, however, experienced difficulty with Q. 13; i.e., "Time for someone at house," in contrast to the Anglo sample. As Sturt (1925, p. 52) observes, ". . . even at 10 years of age the fact that time is (practically) the same in different English towns is not realized in all cases."

Most children realize quite early that the sequence of time in the future for others is the same as for themselves. This latter observation appears borne out in the

fact that 95% of the total sample correctly responded to Q. 21, (a) and (b).

Figure 2, "Judgment of Duration of Time Intervals as a Function of the Duration of the Intervals Presented," depicts the relationship between length of interval and estimates of judged duration of interval. Judgments were provided for four different intervals presented six times each. The means for each of the six judgments per interval were determined for all subjects and then the sample means for each of the four intervals were determined from these. This procedure was followed for both Verbal Estimation and Reproduction phases of testing. Table XII, "Means of Four Intervals by Method and Ethnic Sample," summarizes results.

TABLE XII

MEANS OF FOUR INTERVALS BY METHOD AND ETHNIC SAMPLE

Group	Method	Interval Means (sec.) 8	12	19	32
Mexican-American	Verbal Estimation	20.5	29.3	41.2	63.8
	Reproduction	8.7	12.3	16.5	24.5
Anglo-American	Verbal Estimation	17.2	24.5	33.6	52.0
	Reproduction	9.5	13.3	17.8	25.5

Certain features of Figure 2 appear significant and will herein receive attention. First, it is clear that the longer the interval, the longer the judged interval. This

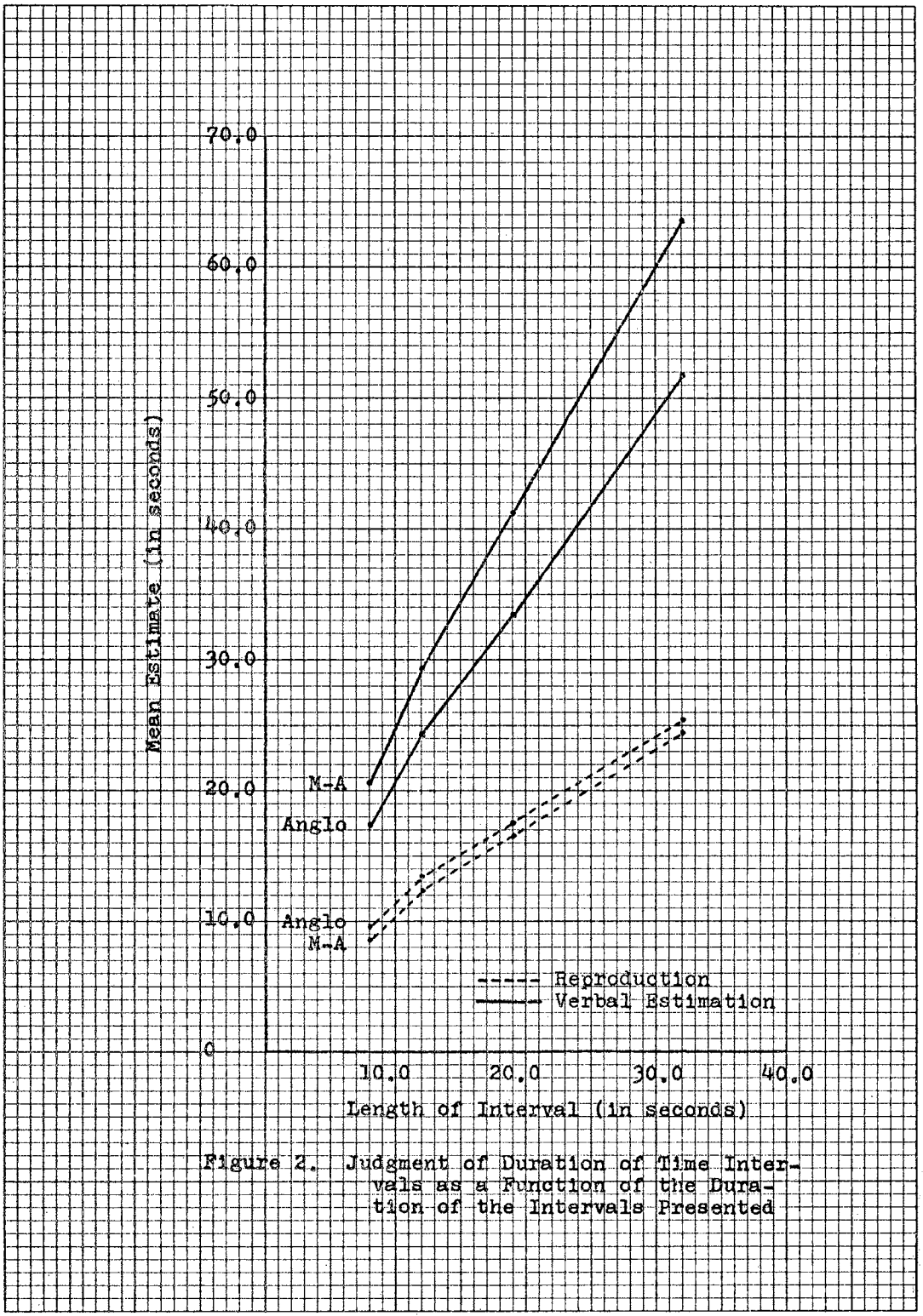

Figure 2. Judgment of Duration of Time Intervals as a Function of the Duration of the Intervals Presented

observation holds regardless of the method of attack; e.g., verbal estimation, reproduction. Secondly, as is apparent from the graph, accuracy of discriminations varies as a function of the magnitude or duration of the stimulus. In general, the less the magnitude of a stimulus, the better the discrimination. Judgments of the eight second interval appear more accurate than corresponding judgments of the 32 second interval.

As is apparent from the graph, reproductions were more accurate than verbal estimates for all intervals. It would appear that the reproduction of a previously presented interval is less difficult than furnishing a verbal estimate of that interval. Such verbal estimation requires conceptualization of units of time (seconds) largely derived from prior experience. Underwood (1966, p. 49) observes that verbal estimates involve absolute judgments ". . . in the sense that no other stimulus is presented for comparison; S must make his judgment by referring to some 'internal' measuring stick which, presumably, he has built up by his past experiences."

Finally, it should be pointed out that in terms of verbal estimates, the Mexican-American sample consistently over-estimated each of the four intervals and were correspondingly less accurate in their judgments than the Anglos. With respect to reproductions, the Mexican-American sample provided greater accuracy in the two shortest intervals (8

and 12 seconds); the Anglos were more accurate in the longer intervals (19 and 32 seconds).

CHAPTER VI

CONCLUSIONS, LIMITATIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter will focus on the conclusions, limitations, implications and recommendations for future study and instruction. At this point, attention will turn to possible relationships between conceptualizations and available data. Such relationships are crucial to the development of understanding and to the control of instructional processes. The value of the data and of the conceptualization are relative to each other - each should contribute to the development of the other.

Introduction

The theoretical foundation for the study suggests that the perception of temporal events is learned in association with socialization experiences accompanying normal development. The study undertook examination of sociocultural variation in the perception of temporal relationships. Central to such an explanation of perceptual variation are the variables of socio-economic class and ethnic background. Differences existing between subjects in terms of class and ethnicity were scrutinized as independent

variables contributing to variation in the handling and treatment of time. The basic questions posed by this study ask what effect does the socio-economic class background of an individual have upon his perception of temporal events? What effect does one's ethnic background have on temporal perspective or sense of time of the individual? This chapter will include conclusions in reference to these and other questions posed for the study. Statements will be made to identify what has been found in relation to initial expectancies and discussion of findings will be presented in reference to the hypotheses tested. There are other implications that can be drawn from the data, but these will be made in following sections. Finally, recommendations will be offered with respect to future study and instruction.

Conclusions

The present study proposed to explore the question of socio-cultural variation in the perception of time. Specifically, what differences occur in the perception of time for each of several samples identified in terms of socio-economic status and ethnic origin?

In light of reports of cultural differences in the handling and treatment of temporal duration and differing perspective and orientation, hypotheses were established which predicted significant differences between diverse ethnic samples. Each research hypothesis was framed in

terms of instruments or procedures used to measure the several variables of temporal sense and perspective.

The sixth grade Mexican-American and Anglo school children included in this study differed significantly on the several measures of sense of time. In terms of Verbal Estimation, a significant difference was obtained between the Mexican-American and Anglo samples ($t = 2.02$, $p = < .025$). The Mexican-American sample consistently overestimated each of the four intervals (8, 12, 19, 32 sec.) and were less accurate in their judgments than the Anglos. Reproduction, an additional sense of time measure, correspondingly resulted in a significant difference between the ethnic groups ($t = 2.09$, $p = < .025$). In comparison to the Anglo sample, the Mexican-American subgroup produced higher standard deviations on both the Reproduction and Verbal Estimation measures. Based on these results, the Mexican-American sample reflected greater variability in sense of time as indexed by standard deviations reported in the findings.

The Questions Test, involving awareness of time concepts and a "universal time scheme extending into the past and future," revealed no significant difference between Mexican-American and Anglo samples in terms of temporal perspective. The "Picture Arrangement" subtest of the Wechsler Intelligence Scale for Children appears related to the subject's ability to focus attention within a temporal framework. The dimensions of such a framework include the

"past," "present" and "future." The Picture Arrangement measure revealed no significant difference between Mexican-American and Anglo samples with respect to time perspective. Based on the foregoing findings, sixth grade Mexican-American and Anglo school children do not differ significantly in time perspective or the long range perception of time in terms of past-future events.

Intra-sample analysis revealed a significant difference between "bilingual" and "non-Spanish-speaking" Mexican-Americans in terms of temporal perspective (X^2 = 4.11, $p = < .05$). A greater proportion of "bilingual" Mexican-Americans scored "below norm" on the "Picture Arrangement" test. As this measure represents a non-verbal, performance type instrument, such a difference could not reasonably be ascribed to differences in verbal abilities. In keeping with a theory of socio-cultural variation in the perception of time, such differences may be related to different stages of enculturation or social change within the Mexican-American sample. Extent of enculturation may determine differences in time perspective which, in turn, influence performance on this test of sequencing behavior. These and other observations will be subsequently discussed in the following section, "Recommendations for Future Study."

In an effort to isolate and identify the significance of socio-economic status in determining group differences in temporal perception, (a) above average and (b)

below average socio-economic groupings were identified. Such identification would permit examination of the potential influence of socio-economic factors in temporal perception.

No significant difference was obtained between the "above average" and "below average" socio-economic samples in terms of sense of time as measured by Verbal Estimation. Reproduction, an additional sense of time measure, correspondingly resulted in no significant difference between the several socio-economic groupings. Based on these results, sixth grade school children drawn from "above average" and "below average" socio-economic levels do not differ significantly in sense of time.

It was theorized that a significant difference would be obtained between the several socio-economic groupings with respect to temporal perspective. However, the Questions Test results produced no such difference between the "above average" and "below average" socio-economic samples. Correspondingly, the "Picture Arrangement" measure revealed no significant difference between the several socio-economic samples with respect to time perspective. Based on these findings, sixth grade school children drawn from differing socio-economic levels do not differ significantly in temporal perspective.

Limitations

The reported study was geographically restricted and was primarily suburban in nature, including few industrial environments. The sampling does not include metropolitan or rural areas.

Subjects for this research were randomly drawn from those sixth grade elementary school children meeting sampling requirements. However, random selection was not possible for the "above average" SES Mexican-American sample, due to the small number of possible subjects.

The study was limited to sixth grade subjects which created a basic limitation with respect to sampling the elementary school population and sharply limited the generalizability of findings.

The socio-economic class of the students was determined and these were assigned to either "above average" or "below average" groupings. The "average" socio-economic score was derived from random sampling of the district based on parental occupation. The rationale for a district mean was based on a relatively low socio-economic index within the Mexican-American community. Correspondingly, the socio-economic scale score defined as "average" for this school district may be well below average for other regions.

Implications

The following implications emanate from study findings and relate to the theory of socio-cultural variation in the perception of time. Such a theory suggests that the perception of temporal events is learned in association with socialization experiences accompanying normal development. These experiences occur in relation to agencies of enculturation or social stimulus situations, including family membership, community organizations, and material-nonmaterial culture products.

In light of reports of socio-cultural variation in the perception of time, it was anticipated that Mexican-American and Anglo subjects would differ significantly in terms of temporal sense and perspective.

Of immediate interest was the obtained difference between Mexican-American and Anglo samples in terms of temporal sense. The several samples of sixth grade school children differed significantly on both the Reproduction and Verbal Estimation measures. Results suggested that the Mexican-American sample was generally more variable than the Anglo sample. It should be pointed out that verbal estimates and reproductions of "empty" intervals are frequently inaccurate at this stage of development. Nevertheless, it may be theorized that the Mexican-American culture attaches less importance to conventional time; i.e.,

measurement, duration, estimation, etc., with a resulting decrease in accuracy of sense of time.

Although no significant difference was obtained between the Mexican-American and Anglo samples with respect to temporal perspective, intra-sample analysis revealed a significant difference between "bilingual" and "non-Spanish-speaking" Mexican-Americans on the Picture Arrangement measure. As is subsequently discussed in the "Recommendations" section, such a difference may be related to stage of enculturation or social change. It may be theorized that bilingual Mexican-Americans represent a lesser degree of enculturation than non-Spanish-speaking Mexican-Americans. This latter subgroup may have adopted anchorages more closely approximating those of the dominant culture, including norms relating to temporal perspective.

Research suggests that time orientation, the relating of behavior primarily to a given dimension of time, may vary according to social class. In this study, no significant difference was obtained between the several socioeconomic levels in terms of either temporal sense or perspective. In contrast to orientation, temporal sense and perspective appear relatively unaffected by social class.

Recommendations

In light of the preceding discussion relative to conclusions, limitations, and implications portions of this

chapter, the following recommendations for future study and instruction may be made.

Recommendations for Future Study

It will be recalled that the presentation in Chapter III was concerned with agencies of enculturation in Spanish-speaking groups. The assimilation process was depicted as representing several distinct cultures, including the Mexican, Mexican-American, and the dominant "Anglo." It was further pointed out, that in contrast to the Mexican and "Anglo" cultures, the Mexican-American subgroup was frequently confronted with a loss of anchorages during the process of social change. Such a loss of anchorages directly influences the experience and behavior of individual members as new reference points are sought. Former anchorages, including values, norms, and even language, are increasingly modified as assimilation occurs. Frequently, in societies undergoing change, as much variation exists within cultures as between cultures due to these factors. Within the Mexican-American group such differences appear represented in different stages of enculturation. Such staging contributes to a theorized dichotomization in which distinct "Chicano" and "Latin American" subgroups occur. Although other descriptive classifications or categories might have been employed, such identification constituted the best compromise under the circumstances.

Such staging as may exist within the Mexican-American sample may be related to such factors as bilingualism, viz., of or pertaining to the use of two languages, and socio-economic level. A difference approaching significance was obtained between "bilingual" and "non-Spanish-speaking" Mexican-Americans in terms of socio-economic level, ($X^2 = 3.64$; $p = < .10$). A greater proportion of bilingual Mexican-Americans were drawn from "below average" SES; non-Spanish-speaking Mexican-Americans were drawn principally from "above average" SES. Further study appears needed before a more definitive statement might be offered relative to stage of enculturation and language and socio-economic factors.

A concept of "enculturation stages" exhibits some further utility when related to observed variations in temporal perspective within the Mexican-American sample. Although no significant differences occurred between the Mexican-American and Anglo samples on the Picture Arrangement measure, Table XIII depicts a significant difference between "bilingual" and "non-Spanish-speaking" Mexican-Americans in terms of Picture Arrangement scaled scores.

The Picture Arrangement subtest represents an essentially non-verbal, performance type instrument, and appears related to the subject's ability to focus attention within a temporal framework. The dimensions of such a framework include the "past," "present," and "future," which are incorporated in sequencing behavior tapped by the test.

On the basis of the foregoing analysis, a significant difference exists between bilingual and non-Spanish-speaking Mexican-Americans in terms of temporal perspective. Such observed variations may be related to different stages of enculturation or social change within the Mexican-American sample. It may be theorized that bilingual Mexican-Americans represent a lesser degree of enculturation than their non-Spanish-speaking counterparts. The latter subgroup may have adopted anchorages more closely approximating those of the dominant "Anglo" culture, including norms relating to temporal perspective.

TABLE XIII

A COMPARISON OF BILINGUAL AND NON-SPANISH-SPEAKING MEXICAN-AMERICANS WITH RESPECT TO PICTURE ARRANGEMENT TEST PERFORMANCE

	Mexican-American Group	
Scale Scores	Bilingual	Non-Spanish-Speaking
At or Above Norm*	7	9
Below Norm	22	6

*Norm = scaled score 10

$X^2 = 4.11 \quad p = < .05$

No significant difference was obtained between "bilingual" and "non-Spanish-speaking" Mexican-Americans with respect to Questions Test performance, ($X^2 = 1.12$).

The difference obtained between bilingual and non-Spanish-speaking Mexican-Americans on the Picture

Arrangement measure of temporal perspective, suggests need for additional study. Particular attention may be given to differences in "dominant" orientation; i.e., "past," "present," or "future." To what extent are differences in perceptual view or mental set related to a particular orientation?

Future study effort might well be directed to identifying the developmental unfolding of temporal sense and perspective. Bateman (1968) specifies three stages in the development of temporal appreciation, including physical time, activity time, and conventional time. In all likelihood, temporal sense and perspective have necessary antecedents related to these stages. Investigation may reveal that each of these abilities follows an essentially parallel course of development through successive stages.

In what fashion might "learning through play" and parental instruction be utilized in augmenting early temporal learning? Does such early learning make a difference in terms of subsequent temporal awareness? Subsequent investigation may be devoted to an identification of home practices and routines which contribute to differentials in temporal learning.

Recommendations for Instruction

Experiences which give a true appreciation of time furnish invaluable training. Some children have very little

such appreciation for time when they enter school. If they do not have it then, school offers an excellent opportunity for instruction in this area.

Mager (1962) has suggested that the preparation of instruction should be directed to the achievement of objectives which are clearly and unequivocally stated. Selection of appropriate objectives may follow from research relative to individual or group differences.

If the hypotheses pertaining to differences in sense of time for Mexican-American and Anglo groups are, in fact, valid, then there are various implications which may be of instructional importance. As previously suggested, the selection of instructional objectives would be made in relation to these obtained differences. On this basis, Mexican-American subjects may profit from instruction devoted to estimation of duration or sense of time. Within limits, the subject may be trained to make judgments of temporal duration which correspond well to true durations (Underwood, 1966). Such instruction may be both formal and informal, with the result of focusing the student's awareness on temporal durations, and, incidentally, on temporal schema in general. Bateman (1968) has suggested several activities related to estimation of duration as summarized in Table XIV.

With respect to the difference which appeared between bilingual and non-Spanish-speaking Mexican-Americans in terms of temporal perspective, results suggest that the

bilingual sample would profit from instruction. Such teaching would focus on time perspective and incorporate sequencing activities. Bateman (1968) has suggested the following content as illustrative of areas in which whole developmental "units" could evolve.

1. Say these numbers--3, 7, 2, 9, 4, 1.
2. Which letter comes first in the word "top?" What letter is last?
3. Tell me ten things you did this morning. Tell them in the right order.
4. What comes next? ABCD-___, 2,4,6,___, "_"_"___.
5. Put these 4 cards in order to tell a story (Bateman, 1968, pp. 36-7).

TABLE XIV

ACTIVITIES RELATED TO TIME ESTIMATION

Time Concepts Objective	Illustrative Activities		
	Past	Present	Future
Perception of Time Estimation of Duration	How long to build a pyramid? How long is a second?	How fast did he run the 100 yard dash?	How long would it take to walk around the block?

A great deal may be taught concerning conventional time, including vocabulary, measurement, succession, duration, and estimation (Bateman, 1968). For example, there are two related but different aspects of estimating duration of time. Children learn to estimate how much time has elapsed and also how to look at or think about a task and

judge how long it would take to complete it. The extent of formal, systematic instruction in time will vary considerably, but there appears to be general agreement that appreciation of time is important and worthy of specific teaching.

A SELECTED BIBLIOGRAPHY

Baldwin, R. O., D. H. Thor, and D. E. Wright, "Sex Differerences in the Sense of Time: Failure to Replicate a 1904 Study." Perceptual and Motor Skills, 22:398, 1966.

Banks, Robin and D. Cappon. "Effect of Reduced Sensory Input on Time Perception." Perceptual and Motor Skills, 14:74, 1962.

Bateman, Barbara D. Temporal Learning. San Rafael, California: Dimensions Publishing Company, 1968.

Bell, C. R. and K. A. Provins. "Relation between Physiological Responses to Environmental Heat and Time Judgments." Journal of Experimental Psychology, 66:572-579, 1963.

Breeskin, J. "The Development of Time Estimation in Children." Dissertation Abstracts, 27:3267, 1967.

Burma, J. H. Spanish-Speaking Groups in the United States. Durham, North Carolina: Duke University Press, 1954.

Corona Unified School District. "Pupil Ethnic Survey, Comparison 1967-8 with 1968-9." (Lithographed.) Corona, California: 1968.

Ellis, L. M., et al., "Time Orientation and Social Class: An Experimental Supplement." Journal of Abnormal and Social Psychology, 51:146-147, 1955.

Fraisse, P. The Psychology of Time. New York: Harper and Row, 1963.

Frankenhaeuser, M. Estimation of Time: An Experimental Study. Stockholm: Almqvist and Wiksell, 1959.

Getzels, J. W. and H. A. Thelen. "The Classroom Group as a Unique Social System," pp. 53-82. Yearbook of the National Society for the Study of Education, Chapter IV. Chicago: The National Society for the Study of Education, 1960.

Gooddy, W. "Time and the Nervous System; the Brain as a Clock." The Lancet, pp. 1139-1144, 1958.

Grossman, J. S. and C. E. Hallenbeck. "Importance of Time and Its Subjective Speed." Perceptual and Motor Skills, 20:1161-1166, 1965.

Guilford, J. P. Fundamental Statistics in Psychology, New York: McGraw-Hill Book Company, 1950.

Gulliksen, H. "The Influence of Occupation upon the Perception of Time." Journal of Experimental Psychology, 10:52-59, 1927.

Hall, E. T. The Silent Language. Greenwich, Connecticut: Fawcett Publications, 1959.

Ilg, Frances L. and Louise B. Ames. School Readiness, New York: Harper and Row, 1965.

Johnson, B. E. "Ability, Achievement and Bilingualism: A Comparative Study Involving Spanish-Speaking and English-Speaking Children at the Sixth Grade Level." (unpub. Doctoral dissertation, The University of Maryland, 1962).

Johnson, Doris J. and H. R. Myklebust. Learning Disabilities, Educational Principles and Practices. New York: Grune and Stratton, 1967.

Kerlinger, F. N. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc., 1965.

Kidd, A. H. and Rivoire, J. L. Perceptual Development in Children. New York: International Universities Press, 1966.

Kluckhohn, Florence. "Variations in Value Orientations as a Factor in Educational Planning." Behavioral Science Frontiers in Education. Eds. E. M. Bower and W. G. Hollister. New York: Wiley, 1967, pp. 293-314.

LeShan, L. L. "Time Orientation and Social Class." Journal of Abnormal Social Psychology, 47:589-592, 1952.

Lewin, K. Resolving Social Conflicts. New York: Harper and Brothers, 1948.

Lidz, T. "Schizophrenia and the Family." Psychiatry, 21: 21-27, 1958.

Mager, R. F. Preparing Instructional Objectives. Palo Alto, California: Fearon Publishers, 1962.

McClelland, D. C. "The Importance of Early Learning in the Formation of Motives." Current Research in Motivation. Ed. R. N. Haber. New York: Holt, Rinehart and Winston, Inc., 1966, pp. 428-441.

Mussen, P. H., J. J. Conger and J. Kagan. Child Development and Personality. New York: Harper and Row, 1963.

Otis, A. S. Otis Quick-Scoring Mental Ability Tests: Manual of Directions for Beta Test. New York: Harcourt, Brace, and World, 1954.

Piaget, J. Les Notions de Mouvement et La Vitesse Chez L'enfant. Paris: Presses University de France, 1946. (Translation).

Piaget, J. Six Psychological Studies. New York: Vintage Books, 1967.

Platt, J. J., R. Eisenman, and E. DeGross. "Birth Order and Sex Differences in Future Time Perspective." Developmental Psychology, 1:70, 1969.

Popham, W. J. Educational Statistics. New York: Harper and Row, 1967.

Reiss, A. J., Jr., O. D. Duncan, P. K. Hatt, and C. C. North. Occupations and Social Status. New York: The Free Press of Glemcoe, Inc., A Division of the Crowell-Collier Publishing Company, 1961.

Saunders, D. R. "An Outline of Gittinger's Personality Theory as Applied to the Wechsler: I. The Subtests Considered Separately." (Research Memorandum, Society for the Investigation of Human Ecology, 1958), 12 pp.

Sherif, M. and Sherif, C. W. An Outline of Social Psychology. New York: Harper and Row, 1956.

Smart, R. G. "Future Time Perspectives in Alcoholics and Social Drinkers." Proceedings, 75th Annual Convention APA, 2:191-192, 1967.

Strauss, A. S. and N. C. Kephart. Psychopathology and Education of the Brain-Injured Child. New York: Grune and Stratton, 1955.

Sturt, Mary. The Psychology of Time. New York: Harcourt, Brace and Company, 1925.

Thor, D. H. "Time Perspective and Time of Day." Psychological Record, 12:421, 1962.

Thorndike, R. L. and Elizabeth Hagen, Measurement and Evaluation in Psychology and Education. New York: John Wiley and Sons, 1961.

Tuck, R. D. Not With the Fist. New York: Harcourt and Brace, 1946.

Tukey, J. W. "Analyzing Data: Sanctification or Detective Work?" American Psychologist, 24:83-91.

Underwood, B. J. Experimental Psychology. New York: Appleton, Century, Crofts, 1966.

Van Dalen, D. B. Understanding Educational Research. New York: McGraw-Hill, 1966.

Webster's Third New International Dictionary of the English Language, Unabridged (3rd ed.). Springfield, Massachusetts: G. and C. Merriam Company, 1961.

Wechsler, D. Wechsler Intelligence Scale for Children. New York: The Psychological Corporation, 1949.

Wechsler, D. The Measurement and Appraisal of Adult Intelligence. Baltimore: Williams and Wilkins, 1958.

A P P E N D I C E S

APPENDIX A

TEST BATTERY

Instructions to Subjects

"You are about to take a test concerned with time. This test is divided into four parts, including a questionnaire, picture arrangement, judgment of length of intervals, and the reproduction of these same intervals. The test will not take long; remember to do your very best."

"Before beginning, I would like to obtain some information which will assist me in the evaluation of your answers. These questions are for my information only. Please think through your answer completely before answering."

General Information Here

"The first test consists of questions concerned with ideas about time. Take as much time as you need in answering but please think through your answer completely."

Questions Test Here

(NOTE: For the following "Picture Arrangement" test, begin with directions from the WISC manual appropriate "For

Subjects 8 and Older, Not Suspected Mental Defectives." Thereafter, proceed as in usual administration.)

Picture Arrangement Here

"In the following tests, you will be required to provide a verbal estimate of the length of an interval of time and then be asked to reproduce that same period of time with a stop watch. In other words, you will be presented an interval of time, for example five seconds, and then be asked to guess how much time you think passed from when I say 'begin' until I say 'stop.' After providing a guess as to how much time has passed, you will be given the stop watch so that you can show me how much time you think actually passed by starting and stopping the watch yourself. REMEMBER, YOU WILL FIRST GUESS HOW MUCH TIME HAS PASSED FROM THE TIME I SAY 'BEGIN' UNTIL I SAY 'STOP;' SECONDLY, YOU WILL BE GIVEN THE STOP WATCH SO THAT YOU MIGHT START AND STOP THE WATCH YOURSELF IN GUESSING HOW MUCH TIME HAS PASSED. PLEASE DO NOT LOOK AT THE FACE OF THE WATCH: KEEP THE WATCH FACE DOWN AT ALL TIMES. Let us try one example." (Use a five (5) second interval, but do not give knowledge of results.)

Verbal Estimation and Reproduction Here

(NOTE: Obtain verbal estimates and reproductions for each interval.)

GENERAL INFORMATION

		Yr.	Mo.	Day
Name_____ Sex___	Date of Test	___	___	___
Address_____	Birthdate	___	___	___
School_____ Grade__	Age	___	___	___
Examiner_____				

How many brothers and sisters do you have? ____ (total no.)

Are you the oldest; the 2nd oldest; the 3rd oldest;_____; Youngest?

Are you proficient in any language other than English? Yes___ No___ If so, what language?_____

About how many clocks are there in your house?_____

About how many watches are there in your family?_____

I. TEMPORAL PERSPECTIVE

1. Questions Test

\+ - (1) What is your age?_____

\+ - (2) What is your birthdate?_____
month, day ONLY

\+ - (3) Is it morning or afternoon at the present time?

\+ - (4) What day of the week is it?_____

\+ - (5) How long would it take you to walk around this room?_____ (Estimates must be within 10 to 30 seconds to be correct.)

\+ - (6) What season is it?_____ ("winter" only)

\+ - (7) What month is it?_____ ("February" only)

\+ - (8) What day of the month is it?___ (specific no.)

\+ - (9) What year is it?_____

\+ - (10) In what year were you born?_____

\+ - (11) What day is it at Los Angeles now?_____
(Either number or day of week.)

\+ - (12) What time is it now?_____
(No more than 10 minutes latitude.)

\+ - (13) What time is it for someone at your house now?_____

(14) Christopher Columbus lived in 1492.

\+ - (a) Would your mother be alive then?_____

\+ - (b) Would your grandmother?_____

(15) Jesus Christ represents the founder of a religion or system of teachings termed Christianity.

\+ - Would Jesus Christ be alive in 1492?_____

\+ - (16) How long has it been since the Christmas holidays?_____ (Estimates must be within +/- one week to be correct.)

\+ - (17) At what time does school begin?_____
(More than one hour off is incorrect.)

\+ - (18) At what time does school end?_____
(More than one hour off is incorrect.)

\+ - (19) Will you come to school on Saturday?_____

\+ - (20) How long will it be until Easter vacation begins?_____ (Estimates must be within +/- one week to be correct.)

\+ - (21) (a) When you are 14 years old will you be <u>older</u> or <u>younger</u>?_____

\+ - (b) Will your mother be <u>older</u>, <u>younger</u>, or the <u>same</u> age?_____

\+ - (22) How long have you been talking to me?_____
(Any time exceeding +/- 5 minutes of actual working time is excessive.)

TOTAL CORRECT (Maximum 24+) _____

2. Picture Arrangement (Wechsler Intelligence Scale for Children) (Maximum 57+)

Arrangement		Time	Order	Score
A. Dog	75	1 2		0 — 1 ABC — 2 ABC
B. Mother	75			0 — 1 OYT — 2 TOY
C. Train	60			0 — 1 IR ON — 2 IRON
D. Scale	45			0 — 2 ABC
(FIGHT)				
1. Fire	45			0 — 4 — (11-15) 5 — (6-10) 6 — (1-5) 7 — FIRE
2. Burglar	45			0 — 4 — (11-15) 5 — (6-10) 6 — (1-5) 7 — THUG
3. Farmer	45			0 — 4 — (11-15) 5 — (6-10) 6 — (1-5) 7 — ORST or SORT
4. Picnic	45			0 — 4 — (11-15) 5 — (6-10) 6 — (1-5) 7 — EFGH or EFHG
5. Sleeper	60			0 — 4 — (16-20) 5 — (11-15) 6 — (1-10) 7 — PERCY
6. Gardener	75			0 — 4 — (21-30) 5 — (16-20) 6 — (1-15) 7 — FISHER or FSIHER
7. Rain	75			0 2 4 — (21-30) 5 — (16-20) 6 — (1-15) 7 — MSTEAR/ASTEMR — MASTER

II. TEMPORAL SENSE

1. Verbal Estimation

8	32	19	12	32	12	8	19	32	8	19	12
32	8	19	12	32	8	12	19	8	32	12	19

2. Reproduction

8	32	19	12	32	12	8	19	32	8	19	12
32	8	19	12	32	8	12	19	8	32	12	19

APPENDIX B

CORONA UNIFIED SCHOOL DISTRICT

SOCIO-ECONOMIC SURVEY

TABLE XV

CORONA UNIFIED SCHOOL DISTRICT ELEMENTARY SCHOOLS BY SOCIO-ECONOMIC RANK

Elementary School	Mean	Rank Order
Vicentia	42.7	1
Garretson	41.6	2
Washington	41.5	3
El Cerrito	39.2	4
Highland	36.5	5
Adams	35.4	6
Sierra Vista	35.1	7
Parkridge	34.9	8
Norco	33.5	9
Coronita	33.3	10
Riverview	33.0	11
Jefferson	32.4	12
Lincoln	31.9	13
Home Gardens	27.8	14
Eastvale	26.3	15
Total (N=735)		

TABLE XVI

SUMMARY OF SOCIO-ECONOMIC STATUS
BY SCHOOL AND ETHNIC ORIGIN
(N=735)

Elementary School	Mexican-American	%	Other	%
Vicentia (N=49)				
Above Average (67-99)	0	0	16	32.6
Average (34-66)	0	0	12	24.4
Below Average (0-33)	5	10.2	16	32.6
Garretson (N=50)				
Average Average	0	0	17	34.0
Average	0	0	9	18.0
Below Average	22	44.0	2	4.0
Washington (N=47)				
Above Average	0	0	11	23.4
Average	2	4.2	16	34.0
Below Average	8	17.0	10	21.2
El Cerrito (N=50)				
Above Average	0	0	8	16.0
Average	0	0	18	36.0
Below Average	4	8.0	20	40.0
Highland (N=47)				
Above Average	2	4.2	3	6.3
Average	0	0	18	38.2
Below Average	2	4.2	22	46.8
Adams (N=50)				
Above Average	1	2.0	7	14.0
Average	3	6.0	13	26.0
Below Average	8	16.0	18	36.0
Sierra Vista (N=48)				
Above Average	0	0	5	10.4
Average	2	4.1	17	35.4
Below Average	4	8.3	20	41.6
Parkridge (N=50)				
Above Average	0	0	5	10.0
Average	1	2.0	17	34.0
Below Average	10	20.0	17	34.0

TABLE XVI (Continued)

Elementary School	Mexican-American	%	Other	%
Norco (N=49)				
Above Average	1	2.0	5	10.2
Average	1	2.0	9	18.3
Below Average	7	14.2	26	53.0
Coronita (N=49)				
Above Average	0	0	11	22.4
Average	1	2.0	7	14.2
Below Average	12	24.4	18	36.7
Riverview (N=50)				
Above Average	0	0	4	8.0
Average	1	2.0	15	30.0
Below Average	4	8.0	26	52.0
Jefferson (N=48)				
Above Average	0	0	5	10.4
Average	0	0	17	35.4
Below Average	11	22.8	15	31.2
Lincoln (N=49)				
Above Average	5	10.2	4	8.1
Average	0	0	7	14.2
Below Average	17	34.6	16	32.6
Home Gardens (N=49)				
Above Average	0	0	2	4.0
Average	2	4.0	12	24.4
Below Average	3	6.1	30	61.2
Eastvale (N=50)				
Above Average	0	0	4	8.0
Average	1	2.0	7	14.0
Below Average	15	30.0	23	46.0
Subtotal (N=735)				
Above Average	9	1.2	107	14.5
Average	14	1.9	194	26.3
Below Average	132	17.9	279	37.9
Total (N=735)	155	21.0	580	78.9

APPENDIX C

STATISTICAL TREATMENT

Chi Square Test

The basic principle of this non-parametric technique is to test the difference between the distribution of one sample and some other hypothetical or known distribution (Popham, 1967). The chi square (X^2) is determined from the formula

$$X^2 = \frac{N\,(|AD-BC| - N/2)^2}{(A+B)\quad(C+D)\quad(A+C)\quad(B+D)}$$

where,

X^2	is the difference between observed frequencies and expected frequencies,
N	the total number of cases in a sample,
$\|AD-BC\|$	the remainder of cell cross products,
N/2	Yate's correction for continuity,
(A+B) (C+D)	the product of the sums of rows, and
(A+C) (B+D)	columns of cells

When any of the cell frequencies are small, a correction for continuity may be applied,

N/2	which consists of reducing the amount of the total number of cases by .5; the effect of such correction is to reduce the size of the chi square.

A 2 X 2 factorial design utilizes 1 degree of freedom (d.f.) derived from the formula,

$$df = (r - 1)(k - 1)$$

where,

r	the number of rows and
k	the number of columns in the contingency table.

t Test

When comparing two sets, the following standard formula will be used (Popham, 1967):

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

where,

t	the value by which the statistical significance of the mean difference will be judged,
$\bar{X}_1$	the mean of set 1,

$\bar{X}_2$ the mean of set 2,

s_1^2 the variance of set 1,

s_2^2 the variance of set 2,

n_1 the number of subjects in set 1,

n_2 the number of subjects in set 2.

There are several variants of the standard formula which may be used depending on the number of subjects, the presence of correlation between group data, and homogeneity of group variances.

F Test

Homogeneity of two variances can be determined by the F ratio in which the smaller variance is divided into the larger variance; the resulting quantity is known as F and is interpreted for statistical significance. To test the null hypothesis of homogeneous population variability, the sample variances s_1^2 and s_2^2 are used in the formula for F (Popham, 1967).

$$F = \frac{s_g^2}{s_1^2}$$

where,

F the value by which variance homogeneity will be tested,

s_g^2 the greater variance, and

s_1^2 the lesser variance.

The resulting quotient, (F), is interpreted for statistical significance using the degrees of freedom for each variance. Degrees of freedom for this test are equal to the number of subjects in the group minus one (n - 1).

Pooled Variance t Model

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{x}_1 - \bar{x}_2}}$$

where,

$$s_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{s^2}{n_1} + \frac{s^2}{n_2}}$$

and,

$$(\text{pooled})\ s^2 = \frac{\leqslant x_1^2 + \leqslant x_2^2}{n_1 + n_2 - 2}$$

Separate Variance t Model

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_{\bar{x}_1 - \bar{x}_2}}$$

where,

$$s_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{s_1^2}{n} + \frac{s_2^2}{n}}$$

Degrees of Freedom

Pooled variance formula,

$$n_1 + n_2 - 2$$

Separate variance formula,

$$n_1 - 1$$

VITA 2

James Felton Shane

Candidate for the Degree of

Doctor of Education

Thesis: TIME PERCEPTION: A COMPARATIVE STUDY OF MEXICAN-AMERICAN AND ANGLO-AMERICAN SUBJECTS INVOLVING TEMPORAL SENSE AND PERSPECTIVE

Major Field: Educational Psychology

Biographical:

Personal Data: Born in Junction City, Kansas, December 31, 1936, the son of Dr. and Mrs. C. Kenneth Shane.

Education: Graduated from Pacific High School, San Bernardino, California, in June, 1954; received the Bachelor of Science degree from Kansas State University in 1958, with a major in History; attended University of California Extension from 1961 to 1963; attended California State College at Los Angeles in 1961 and 1962; received the Master of Arts degree from California State College at Long Beach in 1965, with a major in Educational Psychology and Social Foundations; completed requirements for the Doctor of Education degree at Oklahoma State University in May, 1970.

Professional Experience: Teacher of the educable mentally retarded, from 1961 to 1964; Psychometrist, Corona Unified School District from 1964 to 1966; Instructor, Pepperdine College Auxiliary Faculty, 1965 to 1966 and summer session, 1967; graduate teaching assistant, College of Education, Oklahoma State University, 1966 to 1968; Psychometrist, Corona Unified School District, 1968 to 1969.