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PIAGETIAN THEORY EXAMINED CROSS-CULTURALLY

A Tri-Ethnic Study of Children's Responses to Piagetian Tasks
of Conservation and Combinations

by

Alma T. Beman

A THESIS SUBMITTED
IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

Thesis Director's signature:

Mary E. Sheldon

Houston, Texas

January, 1972
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INTRODUCTION

This thesis examines and evaluates the responses to certain Piagetian tasks by children in a number of societies and sub-societies. Relevant Piagetian theory and assumptions are first described and discussed. Published studies that follow Piaget's lines of thought and use his methods are then critically reviewed. As the major part of the dissertation, results of similar investigations conducted by the author among children of three ethnic groups in Houston, Texas are reported and compared with findings of other researchers. The primary concern of the author throughout has been the influence of cultural differences among different ethnic groups upon the achievement by children of competence in conservation. Hypotheses concerning the influence of such cultural differences are presented and, on the basis of the author's research as related to the research of others, conclusions are drawn regarding their validity.

As the central part of this dissertation, tests were made of a selected group of 180 children between 10 and 11 years of age in Houston, Texas. The sample consists of three culturally different groups of the same size, each with equal numbers of girls and boys: Mexican-Americans, Negro-Americans, and Euro-Americans. All are from families of approximately the same economic circumstances. The objective of this work was to examine how these children reflect their cultural backgrounds in responses to basic Piagetian conservation tasks, and the combinations task. The testing was done in 1969, with the aid of three trained but
non-professional testers, who tested fourth grade children in nine Roman Catholic parochial schools.

Piaget's theory of the growth of human knowledge not only considers environmental influences on the development of intelligence, but insists on the importance of such influences. As an initial step, this dissertation reviews Piagetian work and theory bearing on the understanding of simple Piagetian problems, and how development of knowledge may be affected by culture.

Piaget's theory of intelligence is that of a biologist fully aware of the similarities and dissimilarities of man and other animals. Man is an animal whose unique symbolic thinking results in adaptation differing in kind from that of all other living forms. Only man has culture and an environment largely of his own making. Man changes, and is changed by, his surroundings. He begins life knowing little, but the world he enters requires increasingly complex thinking. Thus the "know-nothing" infant must grow both to understand and to build on his forebears' knowledge. Yet the beginnings for all newborn infants continue to be the same. Following the formulation of Piaget, the foundation for the future complex cognition required of an adult depends, logically and psychologically, on the phenomenon of conservation. If thought is to have form or order it must rest upon an underlying web of invariants. One or more entities—physical objects, persons, or a set of relationships—must be held constant if comparison and choice are to be possible. Without such constants there are no anchor points—all becomes ephemeral. In the terminology of symbolic logic, conservation
can be considered as "identity;" without identity there can be no negation, reciprocity, or complementarity. Four related concepts, i.e., the "INRC group" is thus involved.

Piaget distinguishes logic from "structure of thought," as well as from the "process of construction (1968: 27)." The latter is the prime concern of developmental psychologists, whereas the former is seldom singled out. The structure of thought is often assumed without awareness, and therefore without recognition or realization of its creation.

For one school of logicians, logic is assumed to be an inherent property of thought, resembling concepts of the supernatural, in the sense of being inviolable and immutable. That is, to this school of logicians, "Thought is the mirror of logic." For Piaget, on the contrary, "... logic is the mirror of thought, ... (ibid: 27)," the structure which emerges after thinking, after awareness, and after sorting the tangled process of construction. For example, the derivation of a mathematical formula seems simple, once incorrect starts have been eliminated and the end result is achieved. However, deriving a formula for the first time is rarely simple or without false trials.

A homely illustration of a child's growing understanding is given by J. Bronowski (1970), writing about a child's first visit to a doctor. Because the doctor wore glasses, thereafter the child believed that any man with glasses was a physician. If the child had noted the doctor's stethoscope, i.e., conserved the "proper" constant rather than an irrelevant cue such as eyeglasses, he would have been considered
precocious. Given further experiences of meeting men with or without glasses, and with or without stethoscopes or other medical instruments, the child will learn to understand more about the proper bases by which to identify a doctor.

Bronowski's example well illustrates that identification of constants is often an arbitrary matter of convention. When assumptions are arbitrary, they may become stumbling blocks to solving any problem. Assumptions are seldom examined until experience negates "rational" thought: as, for example, when the child of Dr. Bronowski's tale receives an inoculation from a physician who does not wear glasses. Piagetian tasks and questions make it possible to show that such "lack of logic" is characteristic of children's thinking.

Piaget sees parallels between children's growing understanding of their world and the growth of human knowledge. "... In the field of the empirical sciences, the introduction of the principle of inertia (conservation of rectilinear motion) made possible the development of modern physics... the principle of conservation of matter made modern chemistry possible (1965: 23)." The idea of the conservation of matter still serves as a working tool for modern chemistry, despite the knowledge that matter and energy are sometimes interchangeable under very special circumstances.

From the preceding discussion, the importance of conservation can be inferred. Piaget states that human and animal survival would be impossible without some ability to comprehend the simplest forms of conservation, as simple as differentiation between self and non-self.
Conservation is a "... necessary condition of all experiences (ibid)."
Survival requires knowledge of objects, of their permanence, and of their qualities. Are they hard or soft, big or small? Can I move them, or are they stationary? Are they sharp or dull? Can I change them, or will they change, or mutilate me? Do objects and people appear and disappear as if by magic?

Survival also requires understanding of the permanence of selves other than the actor, an understanding that is critical for human beings if only because of the long period of human dependency. Other selves shape the physical world; they present certain objects to the young and withhold others. They say "Yes," and "No;" "Do," or "Don't."
In order to survive in a social world, a child must learn which adults to heed, which to avoid, which of his urgings will be allowed, which censured. All these bits of learning enter into the matrix of identification of a world in which to live and grow. The child must heed adults even though this may mean identifying "Hot" as "Don't touch," a social invariant quite different from "Hot" the physical invariant.

The scope of human thought is unique among species of the animal world, as is also the long period of dependency of human infants upon adults. Human thinking can encompass the past and the future, the real and imaginary, the possible and impossible. Independence of the concrete is a major characteristic of true logical thought, transcending the limitations of time and space. But is true logical thought necessary for human survival? The question may be restated: "Though necessary for survival, to what extent are primitive notions of invariance
sufficient?"

The long cumulation of human knowledge has involved many false
starts and has depended upon frequent reassessment of relevant invari-
ants. Vacillation between logic and superstition has been common.
Paraphrasing P. T. Barnum, it may be said that some human beings use
ture logical thought none of the time, some achieve it some of the time,
but no human being uses formal logic all of the time. But some under-
standing of conservation is necessary for survival, and this minimal
understanding varies, depending on the cultural environment.

Piaget used certain simple conservation tasks, such as asking
for a child's evaluation of the mass of a piece of clay, formed into
various shapes, to predict differences among children with respect to
their growing understanding of conservation during developmental stages.
The stages, as viewed by Piaget, are: the sensorimotor period, from
birth to about 18 months or two years; (b) the preoperational or intui-
tive stage, from about 2 to 7 years; (c) the concrete stage, from 7 to
11 years, and last; (d) the adolescent period, which brings with it the
emergence and use of formal logic.

In designing this tri-ethnic study of schoolchildren three
hypotheses were of prime concern. These are based on the interpretation
of Piagetian theory outlined in the preceding and following pages and
upon published studies in non-European cultures using Piagetian tasks,
for example, Hong Kong (Goodnow: 1962) and Aden (Hyde: 1959). These
studies report responses different from those recorded by Piaget, whose
subjects were Swiss. Piaget does not specify the background character-
istics of his subjects; the assumption is that his samples are randomly selected, since his studies attempt to define directions of cognitive growth, not environmental influences. I suspect that background characteristics are of minor relevance in Switzerland, with its long years of independence and cherished cultural traditions, and a stability rare in this century. In contrast, Houston is a young city; it is growing and changing at a fast rate and its citizens represent many cultural heritages. The three most numerous are European-American, Negro-American, and Mexican-American. Houston citizens also represent a broad range of economic and social statuses, with most E-A's highest, M-A's lower, and most N-A's in lowest categories. Although most M-A's of Houston have migrated to this country within one or two generations past, they bring a cultural heritage strongly influenced by the Spanish, after 300 years of contact. The Houston Negro-American is set apart from the two other groups to a greater extent, historically in early involuntary migration and resultant social fragmentation, and in continued more limited economic opportunity.

An earlier study of child's-eye views of the world conducted in Houston (Beman & Goodman, 1968; Goodman & Beman, 1970, 1971; Goodman et alia, 1971) had revealed marked differences among children of M-A, E-A, and N-A children of low economic backgrounds. In this earlier work, with samples selected from ethnically homogeneous communities, we asked children about family, community and the world beyond, about their values and their expectations for the future. E-A children viewed themselves as active participants of life, with home playing an important
part in that life; home, community, and the rest of the world, however, were seen as a setting for their own activities. Central to M-A children's views were family members and home; all else was peripheral. In contrast, the Houston Negro children were keenly aware of a very distant world beyond their neighborhood, and planned to be part of that world someday.

If the three ethnic groups would be ranged in order, it would be E-A, then M-A, and N-A; the E-A consistency stems from a merging of home and community worlds, the M-A from a close-knit identity with family and culture; fewest sources of consistency seemed to be found for the Negro children. If these same cultural groups are ordered in terms of economic level, the same order would prevail, E-A, M-A, and then N-A. Based on such an ordering of cultural groups, it would then be indicated that E-A children would most closely resemble Swiss children, M-A next, and N-A least in childhood milieu, and assumedly, therefore in cognitive functioning. However, milieux are most complex. Studies abstracting single variables for comparison, for example economic level or exposure to European influences, yield mixed results (see pages 23–35); many of these results may be confounded because different tasks and materials are used, or responses measured in different ways. Therefore, although differences were expected, the direction of differences could not be based on firm precedents.

The following hypotheses were postulated:
I. Responses to conservation tasks are sensitive to cultural differences; thus different ethnic groups will exhibit distinguishable test differences.

II. Complex Piagetian tasks will be more sensitive to cultural differences than the simpler tasks.

III. The greater the differences in cultural background from that of Piaget's original Swiss sample, the greater will be the differences in responses to Piagetian tasks, e.g., conservation and combinations tasks.
THEORY

Developmental Attainment of Conservation

Traditional theories of the development of intelligence employ three factors: (a) maturation; (b) the influence of the physical environment or experience; and (c) social transmission (Piaget, 1967: 153–4). Piaget adds to these the concept of equilibration.

Maturation refers to the rate at which species-specific biological characteristics develop, as, for example, "... myelinization of the pyramidal fissure (ibid: 118)" in infancy. Reflexes, the range of a species' sensibilities, its physical form, as well as its rate of growth, are genetically based. But the maturation of biological endowments "... simply opens up a set of possibilities, ... (ibid: 119)" that is, sets the lower and upper limits of potential development at a point in time. Within these limits, "Exercise ... appears to play a role in the acceleration or retardation of certain forms of maturation (ibid)."

Exercise is seen to incorporate two areas, the physical environment which may offer varied or few stimuli, and the way an organism reacts to the environment (experience). The organism relates to its environment in two modes, (either) assimilative and/or accommodative; in simple restatement, the organism may be said either to change or to be changed. Mental assimilation occurs whenever environmental changes are interpreted on the basis of the old and the familiar. Assimilation can become maladaptive over-assimilation if the organism persists in
relating solely to old habits, perceptions, and responses. Accommodation occurs when behavior, or thinking, are modified as a result of environmental pressures. An excessively accommodative organism will merely bend passively in the direction of the moment, whereas healthy development must be characterized by a balancing of the two modes of assimilation and accommodation.

The construction of human intelligence has ". . . three essential stages: the question which directs the quest, the hypothesis which anticipates solutions, and the process of testing which selects from them (Piaget, 1966: 94)." When habitual responses fail to bring expected results, trial-and-error behavior occurs, sets of accommodative responses. Self changes to fit external events. A base for cognitive growth is built only when the child acts to change the environment and relates new events to old in trial-and-error behavior. This continuous interplay of assimilation and accommodation is necessary, whether for perfecting coordination of sense and muscle, for developing symbolic abilities, or for understanding highly abstract relationships.

Social transmission, the third classic factor in explaining the development of intelligence, refers to parent and peer behavior (Piaget, 1926: 1965) and to the stage of knowledge of a culture (1958: 337). Social transmission includes ". . . social conditions such as the regulated exchange of information, mutual control, etc (1967: 120)." Cultural pressures intringe throughout life; they may be defined as broadly as "value systems," or they may be the way attention is focused toward or away from specific objects, persons, and behaviors. These
pressures all influence the way a child might implicate himself in his surroundings. Culturally shaped expectations will alter the extent to which a child may experiment or manipulate objects; they also influence the balance between trust in his own judgment and in that of others. A set of cultural values may place limits on a child's motivations, and stress either intrinsic or extrinsic reinforcements for problem-solving. Adult socializers of the child may either limit or accentuate attention to the concrete concerns of the here and now.

Because it seemed so important, Piaget found it necessary to add to these three traditional factors the concept of equilibration, which he defines as the way an individual relates to his environment physically and how he organizes the past and incorporates new events mentally. Equilibration stresses the close relationship and interdependence of maturation, experience, and social transmission, even though we attempt to abstract these factors as discrete phenomena. The concept of equilibration also stresses continuity in development.

In spite of Piaget's statement concerning factors which can affect cognitive growth, his data stress only similarities among Swiss children. It has often been assumed that, like findings among these children, a major focus on maturation is inherent in Piaget's theory and that development must progress in invariant order. Piaget considers intelligence a special form of adaptation. Like all other biological adaptation, it is defined as survival and growth in a consistent direction, in a specific environment, recognizing that adaptation refers to a relationship, rather than to an absolute. Yet Piaget and his Swiss
researchers do report an invariant order of appearance of different concepts of conservation.

The new-born infant is endowed with an hereditary physical structure, including the neural system with its species-specific sense-and-growth potential. The earliest action of the infant "... is limited to the exercise of reflex apparatuses, ... (Piaget, 1967: 9)," such as sucking, moving the arms and legs, turning the head. Inhelder and Piaget (1958: 345) use the expression "undifferentiated state" for infantile mental processes, which they had earlier called "childish egocentrism."

Awareness is apparent only in response to transitory internal states. Intellectual growth follows a decentering direction: the "... undifferentiated state is prior to the multiple perspectives ... (ibid: 345)," which characterize true intelligence. As a child grows older these multiple perspectives make possible an understanding of self-object, self-other, and object-object relationships. Although, in time, the ability to integrate perspectives grows, resulting in a Copernican revolution in thinking, there is no cataclysmic turnabout.

As noted earlier, Piaget has given titles to the four major stages of development in childhood: (a) the sensorimotor period (birth to about two years); (b) the period of preoperational or intuitive thought (from two to seven years); (c) the concrete stage (from seven to eleven years); and finally, (d) the emergence of the use of formal logic (the adolescent years). These titles designate dominant attainments, although they are not intended to imply exclusion of the continued
evolution of abilities acquired earlier. For example, sensorimotor coordinations represent the prime development of an infant. However, no eighteen-month-old has attained peak muscular coordinations. Piaget states, after outlining the four major developmental stages, "... needless to say, these average ages are dependent on the social and educational environment (1967: 124)."

For the stage from birth to about 2 years the most notable achievement is increasing ability to coordinate sense impressions with self's behavior (hence the adjective "sensorimotor"). In this period Piaget posits that while "... there are neither operations, properly speaking, nor logic, ... actions are already organized according to certain structures which herald or prepare for reversibility and the construction of invariants (1967: 122)." Beyond startle reactions to loud noises, or to a sudden loss of support, a young infant shows no response to the external world; transitory internal states give rise to periods of quiet and of squalling. During the first month or so, an infant begins to fix his gaze on an object placed before him (whether his own hand or a toy), but not for long. When he "... follow[s] a moving figure with the eyes and continue[s] to look for it when it disappears, or ... turn[s] the head to look in the direction of a sound, this ... constitutes the very first of those fundamental ideas of conservation ... (1968: 108-9)." Such isolated bits of behavior, occurring sporadically, are a far cry from the "conscious ability" to sort constants in many changing situations. The road to logical thinking remains long and tortuous at this age. The ability to integrate
impressions of one or many senses and motor responses clearly continues to be a sine qua non of all survival, but is the major attainment of the sensorimotor period, a "practical intelligence" necessary, but not sufficient for further development.

During the next or pre-operational stage, the dominant achievement is refinement of symbolic functions. Merely learning to speak is not sufficient for cognitive development; the criterion is the "... union of thought with language (1967: 6)." The accomplishments of this period rest on abilities achieved earlier, structures which must be attained during the sensorimotor period. For example, simple imagery extends the scope of permanence of object; a child will now search for a toy even after it is hidden. No longer is "out of sight" also "out of mind." Rather than attempting to crawl under a low piece of furniture to trace the direct path of a ball, a two-year old goes around the furniture to intercept it, demonstrating his ability to imagine a path hidden from direct view.

The ability to use words (to say "ball" as well as to find a ball) also adds new dimensions to a child's world. This ability helps maintain a notion of the object; saying the word can also attract social intervention or participation, thus multiplying the potential for new experiences. Simple representations in this pre-operational period are primitive forms of behavior which lay a foundation for the more sophisticated symbolic ability which can develop later. Evidence of representations early in the pre-operational period are rare and sporadic, isolated instances of symbolic or imitative play, a few words, some drawings.
These representations occur, at first, in close juxtaposition to the event or object symbolised. For example, as the child approaches school age he imitates more and more elaborately. A common game of "make-believe" is "baby-go-to-sleep," modeled on baby's own sleep ritual. He might next reenact someone else's temper tantrum, seen a day before. Still later, he may include the conversation of two parties to an argument, and eventually describe the whole scene verbally. Each "single" isolated behavior becomes part of a repertoire, and, in turn, is incorporated into new patterns of behavior. The complexity of material, the distance from a model in time and place, and the flexibility of adopting another person's perspective, all increase continuously in optimal development. The resulting observable behavior may be seen as wholly new, but its emergence rests on past maturation, experience, and social transmission.

Even during the concrete stage of seven to eleven years, "... operations are not as yet concerned with propositions or verbal declarations but with objects themselves ... (1967: 124)." Symbols are used in a limited manner. The nature of the limitations is most apparent when behavior is compared with later developments. At this stage, objects can be arranged in order of size, but in the absence of the objects, a child can rarely deal with "if, ... then" propositions. Hence the term "concrete" for this developmental stage.

The development of the understanding of conservation now becomes most apparent when children give judgments of equality or inequality in actual circumstances they confront. Such judgments are often
inconsistent, and are often reversed when situations differ only slightly. This vacillation occurs, whether the conservation be of discrete physical quantities of mass, weight, volume, time, space, or motion. Progressive understanding of specific concepts ("horizontal decalages") comes with age and experience. Piaget reports that children in Switzerland develop understanding of specific conservations at fairly uniform ages. For some years, scholarly interpreters of Piaget had assumed that a set order of specific concepts was necessary to Piagetian theory [e.g., Wohlwill; 1962] but this assumption now seems unwarranted. Barbel Inhelder, Piaget's closest collaborator, recently reported:

The general succession of stages [sensorimotor, pre-operational, etc.] seems to be confirmed by all authors, but the relationship between different tasks and substructures, apparently requiring the same mental structure, is still far from adequately explored; what is more, the experimental findings on this point are difficult to interpret (in Sigel and Hopper, 1968: vii).

The last stage of development occurs somewhere during early adolescence.

4) Finally, at around eleven to twelve years new operations appear by means of the progressive generalization of preceding operations and become stabilized at around fourteen to fifteen years. (Piaget, 1967: 125)

The most abstract and general statement about reasoning so far formulated is embodied in symbolic logic, a scholarly line of thought only about one hundred years old. This optimal development of logical thought is the understanding and application of the many possible combinations of the INRC group, i.e., identity, negation, reciprocity, and complementarity. While such understanding is hardly inevitable,
... if one ignores these operations it seems to me that one can understand neither Euclid, or Newton, nor Einstein, nor the child, because cognitive development is a continuous building of new transformational structures and not the making of cameras or talking machines. (Piaget, 1967: 532)

The ability to use formal logic which is "... applicable to any kind of content, ... (1967: 147)," appears to be the peak human attainment at this point in the evolution of human thought, but independence of the manipulation of objects is never complete, for "... intelligence [only] tends towards [italics supplied] ... the assimilation of the whole of reality ... , which frees from its dependence of the initial hic and nunc (1958: 9)." The initial "here and now" must continue to be an important part of the existence of every human being.
Conservation and Combinations

In order to trace children's growing comprehension of the world, Piaget and his co-workers in Geneva designed many tasks, ranging from simple to complex. These tasks deal with many concepts: conservation of quantity, both continuous and discrete, conservation of time, speed, space, length, and number. One of these sets of tasks, used in the present study, is described by Piaget as follows:

The child is given two balls of modeling clay of the same dimensions and weight, then one ball is transformed into a cake, a sausage, etc.

The child is then asked (a) if the balls still contain the same amount of clay, (b) if they are the same weight, and (c) if the volume is still the same. (For the volume experiment the ball of clay is immersed in a glass of water and the subject is asked whether the cake or the sausage, etc., 'will take up as much space' in another glass of water.) (1967: 123).

Various other tasks, using different materials and questions, illustrate different applications of conservation. In the task just described, a child in a transitional stage will reverse his judgment of "equal" if a "sausage" is rolled out further to become a "snake."

Throughout the concrete stage of seven to eleven years, a child's view of conservation seems first to consist of notions which are highly specific to a situation. Only gradually do these become integrated and generalized. Until seven or eight years of age, Swiss children judge a fixed quantity as different as its shape changes or differs. Generally, developed conservation of weight appears at age nine or ten and conservation of volume around eleven or twelve years. "... Thus, up to the age of 11 or 12 a particular logical form is still not
independent of its concrete content (1967: 147)."

Logic is the rationale Inhelder and Piaget use to explain the progressive development of the three conceptions of the nature of matter—from mass to weight to volume. Learning or knowing that a transformation of a shape does not change a mass requires an understanding of how increased length is compensated for by diminished thickness. To conserve weight, a child must know that density and weight are independent, as well as being able to coordinate these two dimensions. The volume-by-displacement test calls for understanding "... the relation between the weight of the object ... and an equivalent volume of water ... (1969: 21)."

The ideas of Piaget and his co-worker outlined in the preceding pages seem reasonable and useful. However, they are based on assumptions of logic and on observations of children in one stable and homogeneous culture. They may also be negatively criticized for their implicit assumption that involvement in the tasks is equal among all children. Piaget seems to ignore the clear distinction which he, himself, makes between logic and the construction of thought.

The apparent paradox of an invariant order of attainment of understanding of the concepts within one developmental stage, the concrete, is evident when we read that 75 per cent of Swiss subjects attain understanding of each concept at the ages given, and that:

... she [Barbel Inhelder] was able to show the order of acquiring concepts of conservation of substance, weight, and volume recurs in its entirety in mental deficients; the last of these three contents (present only in slightly deficient cases) is never found without the first, while the conservation
of substance occurs without conservation of weight and volume, and that of substance and weight without that of volume (Piaget, 1968: 154).

It should be remembered that Piaget's data are generally presented as group percentages, and not as individual patterns of development. Like variations in the cultural background of Swiss children, the latter are not of particular interest to him.

The demands of combinations tasks contrast with those of simpler conservation problems. In the task used in this author's work the child is asked to find a system of forming pairs of items, to put all possible non-redundant pairs on display. Piaget reports that most Swiss subjects can solve this problem, using poker chips of six colors, at about the same developmental stage as they conserve in the volume-by-displacement task, i.e., around age 11 or 12. In order that the child can devise such a scheme of action, it is explained that

... a method or a way of proceeding ... on some occasions is adopted spontaneously without conscious or explicit decision and on others used intentionally when the subject is faced with problems whose solution requires a systematic table of combinations (Inhelder & Piaget, 1958: 313).

The combinations task described, though complex, is a useful instrument in studying the concrete period. It requires coordination of sense and movement, perceptions, a repetition of action (but not perseveration), some conception of a plan with an expected end result, plus ability to hold all of this in memory. Though tied to objects and to one's own actions, internal processes must operate to unite the whole into a scheme, whether these processes are explicit or only intuitive. The crucial difference between simple conservation and
combinations, or factorial tasks seems to lie in the greater necessity of coordinating thought and action for combinations.

It is reasonable to conclude that the skills needed for the simpler conservation tasks are crucial for survival in any setting. It also seems reasonable to expect that performance in the more complex tasks should be more sensitive to cultural influences, since these tests are applicable only after a child reaches an age when environment has already played an appreciable influence on his development. Therefore, the more an environment (physical and/or social) differs from the Swiss "norm," the greater the differences which might be expected in the results of the tests. In short, among the three conservation tasks, that which tests understanding of volume, (the last attained in the developmental series for a child), should show greatest variation cross-culturally, and the combinations task should be more variable in different cultures than any of the conservation tasks.

Speculations such as these have not been a major concern of Piaget. However, a large body of literature amassed by other researchers in many cultures is directly relevant to the questions implied by the hypotheses I have stated in the preceding paragraph. These questions may be simply stated as: (a) what are the similarities and differences found in response to Piagetian tasks among children of different cultures; and (b) what conditions are associated with these differences?

The chapter which follows reviews and appraises published cross-cultural research relevant to these questions.
RELATED RESEARCH

Cross Cultural Studies

On first acquaintance with non-conservation it seems incredible that any child would maintain an "aberrant position (Flavell, 1963: 377)." Yet studies in England (Lovell & Ogilvie, 1960), Africa (Price-Williams, 1961), Australia (De Lemos, 1969), The United States (Elkind, 1961; Goldschmid, 1968; Uzgiris, 1964), and Lebanon (Za'rour, 1971), all show that there is a change from non-conserving to conserving responses during childhood. These children progressively attain conservation, and most of them attain specific concepts in an order roughly similar to that found in Switzerland.

If attainment of understanding as measured by each specific task devised in Geneva occurred at a uniform age in all cultures, one might assume that the construction of understanding is due simply to maturation, relatively independent of environmental influences. Accordingly, research on this subject might appropriately be a concern of biologists. Such an age:stage isomorphism has, indeed, been one interpretation of Piagetian theory (e.g., Wohlwill, 1962), but as this dissertation attempts to demonstrate, this interpretation appears to be unsound.

Two kinds of changes in the task:age relationships as found in Geneva are possible. One is maintenance of the same relative difficulty level, but earlier or later conservation of mass, weight, and then volume. Secondly, in some groups, mastery of specific concepts may be
attained in an order which upsets the relative difficulty level as found in Switzerland. An example would be a child, or group of children, conserving weight before mass.

Published studies show variation among children in rates of development. Some point to an earlier attainment than that found by Piaget (Smedslund, 1959; Price-Williams, 1961; 1969). Others indicate that the tested children conserve later (Goodnow, 1962; 1964; Hyde, 1959). Some children, and some groups, even reverse the order which would be predictable from Genevan data (De Lemos, 1969; Hyde, 1959).

Hyde (1959) . . . found no strong evidence for the global quantity-weight-volume decalage; in particular, she found a number of subjects who departed from the predicted sequence by conserving weight, but not global quantity, volume, but not weight, and the like (Reported in Flavell, 1966: 377).

Individual patterns of response are necessarily masked when only group averages or percentages are reported. Nevertheless, even within this method of reporting, Goodnow (1962) reports that in two of her groups the percentage conserving dropped as the age of the subjects—a most unexpected result.

Many factors have been examined by researchers to try to understand the association between milieu and the understanding of conservation. These factors include years of schooling, level of technology of a culture, economic status, identification with a subculture, and the "... role [of] specific cultural experience ..." (Price-Williams, 1969)."

Schooling has understandably been given special emphasis. It is an easily measured variable, yet one of broad dimensions, as
"schooling" may take many forms. It might result in "down-playing the evidence of one's own experience (Goodnow, 1964: 580)," or it might encourage exploration and experimentation, which would expectedly encourage the integration of notions about the environment into an orderly pattern.

In Hong Kong, the United States, and in Mexico (Goodnow, 1962; Sigel and Mermelstein, 1965; Price-Williams, 1969), years of schooling was found to have little effect on simple conservation tasks which are mainly perceptual in nature (although the use of rote-learned "scientific" reasons for judgments may have hindered one of Goodnow's samples in Hong Kong). Contrasted with these findings, in New Guinea, Prince (1968) compared conservation responses of students of different schools: one using a modern math program based on concepts of symbolic logic, one emphasizing measurement, a Teachers' College where European influence is long-established, and a Mission School training teachers in the pidgin vernacular. Prince found that the "measurement" students conserved earlier than did the students of symbolic logic. The group characterized by longer European influence conserved more often than the students of the Mission school. Prince also found a smoother curve of rising percentages with greater age where European influence was greater. In Italy, Peluffo (1962) divided subjects into groups according to age and length of residence in Genoa after migrating from less industrialized areas. The greatest rise in percentage of children conserving was found from 8 year olds to 10 year olds when city residence was longest; in the group with most recent in-migration, the percentage dropped from 9
to 10 years. Peluffo attributes earlier attainment, and subsequent higher percentage attaining conservation, to a learning approach which stresses relations between concepts.

Yet boys of the Tiv society of Nigeria (Price-Williams, 1961), without formal schooling, and living in a simple culture, appeared to attain conservation of quantity as early as or earlier than Swiss children (even though the exact ages of the Tiv children could not be determined).

A simple technology apparently did not hamper the rate of conservation development of young (6 to 8 years) Tiv boys, but length of residence in a large city did result in more conserving responses for Italian children of comparable age. The "leveling" Peluffo found associated with simple milieu in his country was also found in New Guinea, where Prince related it to a shorter time of contact with European culture—especially in subjects as old as 18 years. In a later (1967) study, Peluffo attributes the influence of simpler milieux and less schooling to a failure to integrate many variables, a "notional" rather than a "figural" (page 197) approach to Piagetian tasks.

In discussing differences in cultural backgrounds in a general sense, without reference to specific societies or cultures, Bruner offers an interpretation closely resembling that of Peluffo:

... there is a greater push toward hierarchical connections in technical cultures than in those that are less technical. The hypothesis is based on the assumption that there are fewer compelling reasons in the less technical society for connecting events beyond their immediate contextual settings, such as money value, abstract cause-and-effect relations, or the intricate uniform time of work periods (1966: 324).
Price-Williams' (1969) study in Mexico provides a dramatic illustration of the effects of "specific cultural experience," comparing conservation responses of potters' sons and non-potters' sons in two villages. In both towns potters' sons show markedly earlier conservation. No other marked differences are reported for the background of potters or non-potters in either village. The major cultural difference in the potters' families is that pottery making is a "cottage industry," in which the sons are involved at an early age. The sons of non-potters have no such systematic contact with economic activities until later in life. Comparisons between groups can rarely be as clear cut in cultural differences that might affect development.

In her study in Aden, comparing European, Arab, Indian, and Somali children, Hyde (1959) found only age and community to be significant variables in attainment of competence in conservation; no significant differences could be related to differences in sex, schooling, or economic level. A number of studies attempt to deal with economic levels as an influencing factor. Almy and Chittenden (1966) classified urban Northeast U.S. subjects into mid and low economic levels, according to the economic status of the communities in which they attended school. Beilin (1966), and Rowland (1970), also working with American children in the East, dichotomized economic levels using the social level of the parent as their criterion of judgment. Differences reported by these studies do not show a consistent pattern: Beilin found an inverse relationship between economic level and conservation in White subjects and a positive one in Black (although neither was statistically
significant). Children from Goodnow's Milieu 4, from the group of lowest socioeconomic status in Hong Kong, were found to "... fall especially far below ... (p. 8)" on conservation of space, weight, and volume. Using a series of thirteen different conservation tasks, Rowland could find no significant differences related to economic status. However, Rowland does find significant differences attributable to subcultural identity and with sex; Blacks conserved more often than Puerto Ricans and girls more competently than boys. Almy and Chittenden report that low economic level relates to late attainment of competence in attainment of conservation (p. 99). It may be possible to reconcile the discrepancy between Rowland's data, which finds no differences related to economic levels, and Almy and Chittenden's, which does. Rowland's samples are all from an inner city area and appear to represent a smaller range of social classes.
Task Specificity

Research cited so far deals with relative ages of attainment of competence in conservation and comprehends different concepts, materials, and questioning procedures. It now seems appropriate to review work which examines the influence a change of task material has on judgments of equality or inequality.

In the United States, Uzgiris (1964) found that children might judge equality for one material, but then judge inequality when the material was changed, e.g., when questioning concerned the conservation of substance but the material was changed from plasticine to metal cubes, and then to plastic wire.

Furthermore, a comparison of the percentage of Ss giving only one or two conservation responses for substance, weight, and volume at the various grade levels across different materials indicates a greater preponderance of such responses when the respective conservation schemata are being formed (in Sigel and Hooper, 1968: 47).

Goldschmid and Bentler (1968) also reported similar variations, when comparing responses of two samples in the United States. A validation study, using ten conservation tasks, failed to replicate exactly a scale of difficulty found in an earlier study (Goldschmid, 1967). In these two studies, however, the conservation of mass, weight, and volume remained in the same order (relative to each other) when using clay, the classic test material. Waddell reports (Dasen, n.d.) that eight subjects in New Guinea could conserve length when presented with a familiar material (twisted lengths of tobacco), but not when an unfamiliar material (milled wooden sticks) was used. Zimiles (1966) and
Feigenbaum (1963) find that American children conserve discrete entities more competently when only a few items are displayed and that they gain mastery in conservation more readily if they first deal with small items than if first presented with large ones.

Summarizing these studies, it seems evident that different kinds of test procedures evoke different responses. This study uses standardized administration of two types of tasks, conservation using plasticine clay, and a combinations task using poker chips. A review of studies using these tasks, only, follows; this will afford a firmer basis for comparison of results in different cultures, and a better understanding of the effects of different environmental factors.
Mass, Weight, Volume, and Combinations

In view of the results of the research discussed in the two preceding chapters, it now becomes appropriate to review studies of the conservation of mass, weight, and volume including work that suggests the need to restrict the experimental tasks to a single test material, i.e., plasticine clay. Table I summarizes relevant results obtained by authors whose work has been reviewed here and also includes data from several other researchers. It will be noted in Table I that the methods of scoring and reporting vary, in accordance with the goals and techniques of the specific research.

From study-to-study criteria for determining competence in conservation also vary; for example, Goodnow (1962) classified a child as "conserving" if he judged two pieces of clay as equal after one was changed in shape. Elkind (1961), working in Massachusetts, uses a sum of conserving responses, three possible for each task; he asks whether balls of clay will be the same if changed in shape, if they are the same after a ball becomes a "sausage"--and then asks for a reason for the answer given. Elkind then reports the percentage of total conserving responses possible, for each age in his sample.

In Table I an attempt is made to record data in a form as consistent as possible. In spite of the irregularities mentioned, these data appear to allow the following conclusions: (a) age is the best single predictor of whether a child will conserve mass, weight, and volume. Most group percentages show a progressive drop in the three tasks, in the sequence as listed, at any given age; (b) mental
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>Mass</th>
<th>Weight</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>De Lemos, 1969</td>
<td>Australia</td>
<td>—</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Elcho, 10 yrs</td>
<td>—</td>
<td>73%</td>
<td>11%</td>
</tr>
<tr>
<td></td>
<td>Hermannsburg, 10 yrs</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elkind, 1961</td>
<td>Massachusetts, Gr I-VI</td>
<td>72%</td>
<td>72%, 9 yrs</td>
<td>23%, 11 yrs</td>
</tr>
<tr>
<td>Goodnow, 1962</td>
<td>Hong Kong, 10 yrs</td>
<td>—</td>
<td>70%</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>European</td>
<td></td>
<td>65%²</td>
<td>58%²</td>
</tr>
<tr>
<td></td>
<td>Anglo-Chinese School</td>
<td>—</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low-income, fullschool</td>
<td>—</td>
<td>62%³</td>
<td>50%³</td>
</tr>
<tr>
<td></td>
<td>Low-income, semischool</td>
<td>—</td>
<td>62%</td>
<td>60%³</td>
</tr>
<tr>
<td></td>
<td>No Science course</td>
<td>—</td>
<td>60%</td>
<td>22%</td>
</tr>
<tr>
<td>1964</td>
<td>U.S.A.</td>
<td>Dull, 11 yrs</td>
<td>88%</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Average, 8 yrs</td>
<td>72%</td>
<td>47%</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Average, 11 yrs</td>
<td>97%</td>
<td>75%</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Superior, 8 yrs</td>
<td>100%</td>
<td>65%</td>
<td>65%</td>
</tr>
<tr>
<td></td>
<td>Average, 11 yrs</td>
<td>100%</td>
<td>78%</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>Superior, 11 yrs</td>
<td>97%</td>
<td>100%</td>
<td>75%</td>
</tr>
<tr>
<td>1962</td>
<td>Lovell &amp; Ogilvie</td>
<td>England, 8-11 yrs</td>
<td>72%, 9.6 yrs</td>
<td>—</td>
</tr>
<tr>
<td>Pignat</td>
<td>Switzerland</td>
<td>7-8 yrs</td>
<td>9-10 yrs</td>
<td>10-11 yrs</td>
</tr>
<tr>
<td>Price-Jones, 1968</td>
<td>Mexico I</td>
<td>Potters, 6-9 yrs</td>
<td>2/3, 9 yrs</td>
<td>2/3, 9 yrs</td>
</tr>
<tr>
<td></td>
<td>Non-potters, 6-9 yrs</td>
<td>2/3, 6 yrs</td>
<td>2/3, 9 yrs</td>
<td>2/3, 9 yrs</td>
</tr>
<tr>
<td></td>
<td>Mexico II</td>
<td>Potters, 6-9 yrs</td>
<td>all, 6 yrs</td>
<td>all, 6 yrs</td>
</tr>
<tr>
<td></td>
<td>Non-potters, 6-9 yrs</td>
<td>1/3, 9 yrs</td>
<td>1/3, 9 yrs</td>
<td>1/3, 9 yrs</td>
</tr>
<tr>
<td>1970</td>
<td>Sagittae</td>
<td>Gr I-VI</td>
<td>72%, 7.5 yrs</td>
<td>75%, 10.9 yrs</td>
</tr>
<tr>
<td>Vernon</td>
<td>England, 10.5-11 yrs</td>
<td>95%</td>
<td>—</td>
<td>55%</td>
</tr>
<tr>
<td></td>
<td>West Indies</td>
<td>78%</td>
<td>—</td>
<td>44%</td>
</tr>
</tbody>
</table>

¹Percentages and ages as given are extrapolated from published data.
²Tes leaves used, rather than plasticine.
³Percentages conserving at later ages were smaller.
age has greater influence than chronological age, suggesting that "implication" of the subject in the task has influence on responses; (c) variations exist that relate with ethnic affiliation and thus with cultural differences. The greatest contrast is between European and non-European groups; (d) attainment of competence in conservation of volume varies more than of weight, and of weight more than of mass, and (e) three studies (De Lemos, 1969; Prince, 1968, and Goodnow, 1962) fail to find a smooth increase of percentage of subjects conserving as the age of groups increases.

Hyde (1959) also had similar results in her Aden study. De Lemos writes that though there is "... a general tendency for conservation to be achieved with increasing age, this did not necessarily show a uniform progression, particularly in the Hermannsburg (Australia) group where some of the younger age groups showed performances equal to or better than those of the older age groups (1969: 260)." (The Hermannsburg sample of aborigines had experienced longer contacts with Europeans than had the Australian aborigines in the Elcho Island sample, and included some children resulting from intermarriage with Europeans).

In cross-cultural research, the combinatorial task devised by Piaget has been used far less extensively than simple conservation tasks. Responses to the combinatorial test seem to vary more directly with social and cultural environments, as well as with measurements of intelligence than do responses to conservation tests. Goodnow (1964) found a high relationship between success in the combinations task and
scores in the Ravens' Matrices and the Wechsler-Bellevue tests. She also found an increase in the percentage of successes with each added year of age for all milieux in her Hong Kong work. However, the European sample at age 10 succeeded less often than the Chinese boys attending "Anglo" schools at this age, but the European boys exceeded all groups by age 13.

A summary of results of a 1962 study (Peluffo, 1967) in Italy lists groups in order of the per cent of subjects who solved the combinations task; "analphabet" adults of Sardinia were lowest, then 11-year-old children of agricultural workers, followed by children of Sardinian clerks and professors (1967: 195). Highest percentages solving the problem were found among sons of workers of Genoa; some factor in the complexity of Genovese life facilitated solution for workers sons, but this factor was lacking in simpler Sardinia. In another study (1966) Peluffo found that adults who had completed elementary school solved the combinations problem less often than children still in their last year of elementary school. Peluffo concludes that adults tend to become adapted to the milieu in which they live, and, consequently, combinations success is less probable in an underdeveloped milieu, or when formal schooling is lacking.

Conservations of mass, weight, and volume are clearly part of practical intelligence; they relate more to everyday living in any environment, than does the ability to solve the combinations task. Conservations make simpler cognitive demands than combinations tasks. Conservation of volume and the combinations task are solved at about
the same stage in development by Swiss children; these same children attain the mastery of the three concepts in an orderly progression.

In other societies, the circumstances with regard to conservation and combination differ from those reported for Switzerland. Are the circumstances as reported for Switzerland a function of Swiss culture, and conditions elsewhere also similarly related to cultural variations? Assuming that the answer very likely admits culture to be at least an influencing factor, I have broadened the question to ask whether or not a cross-cultural comparison using Piaget's tests will reveal clear differences that might reasonably be regarded as reflecting cultural differences. A report follows of the results of testing three culturally different groups of children in Houston.
METHOD

Sample

The sample was selected from fourth grade children of nine parochial schools in many areas of Houston, Texas. These parochial schools include children of three ethnic backgrounds, Mexican-American (hereafter also called "Mexicans" or "M-A's"); European-Americans (Euro-Americans or E-A's); and Negro-Americans (Negroes or N-A's).

The sample consisted of 180 children; 60 from each ethnic group, evenly divided by sex. An attempt was made to make the entire sample as uniform as possible in age. The average age of the Mexican males and of Negro males and females was 10.4 years; Mexican females and Euro-American males and females averaged 10.3 years. Thus, such differences as might be noted among groups in the responses to tests should not be attributable to age. Insofar as possible the sample was also selected for uniformity in economic background. Centers (1949) classification of occupations was used (see Appendix A) to assess the level of the major wage earner of each family. The distributions of occupational level of major wage earners do not differ significantly among the children's families in the three ethnic groups.
Backgrounds of Children Tested: Cultural Factors

Parents of children were interviewed to provide information on the backgrounds of the children (see Appendix B). Information and data about parents of the sampled children are summarized in Table II; some characteristics on the background of the three ethnic groups are fairly similar, in addition to the close ages of the subjects. Similarities include like family economic backgrounds and urban residency, plus having the same religious affiliation. There are variations in terms of languages spoken, the composition of the family and the educational level of the parents.

Bilingualism was the rule among the Mexican parents and children. Some Euro-Americans were bilingual, about one-half of the parents and one-fourth of these children speaking either Czech or German. Over one-half of the Negro-American parents and about one-eighth of the children spoke "Creole" French, learned during a rural childhood in French-speaking regions of Louisiana.

Extended families that include grandparents are most common in Mexican-American homes (9 of 19 non-nuclear families) and no N-A families include grandparents. The Euro-Americans have the largest number of complete nuclear families unbroken by death or divorce and have few extended or single-parent families.

A review of the years of parents' schooling shows that N-A parents have the least, a median between 8 and 8.5 years for both parents. The median for each E-A parent is higher, and about the same for both parents, just over 10 years. Medians for N-A mothers and fathers differ.
TABLE II

HOUSTON CHILDREN FAMILY BACKGROUND:
GENERAL INFORMATION AND DATA

<table>
<thead>
<tr>
<th>Ethnic Groups</th>
<th>M-A</th>
<th>E-A</th>
<th>N-A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mdn Years of Schooling, Fathers</td>
<td>08.12</td>
<td>10.89</td>
<td>09.25</td>
</tr>
<tr>
<td>Mdn Years of Schooling, Mothers</td>
<td>08.48</td>
<td>10.40</td>
<td>10.40</td>
</tr>
<tr>
<td>Mdn Years of Schooling, (City of Houston)*</td>
<td>06.10</td>
<td>12.50</td>
<td>09.50</td>
</tr>
<tr>
<td>% Rural Background, Mothers</td>
<td>03.00</td>
<td>21.00</td>
<td>39.00</td>
</tr>
<tr>
<td>% Rural Background, Fathers</td>
<td>01.00</td>
<td>27.00</td>
<td>45.00</td>
</tr>
<tr>
<td>% Parents who are Bilingual</td>
<td>96.00</td>
<td>51.00</td>
<td>56.00</td>
</tr>
<tr>
<td>% Children who are Bilingual</td>
<td>76.00</td>
<td>23.00</td>
<td>13.00</td>
</tr>
<tr>
<td>% Families who own Homes</td>
<td>57.00</td>
<td>67.00</td>
<td>25.00</td>
</tr>
<tr>
<td>% Children who have Never Moved</td>
<td>35.00</td>
<td>62.00</td>
<td>22.00</td>
</tr>
<tr>
<td># Children in Families of Males, Lo SES</td>
<td>05.07</td>
<td>03.67</td>
<td>04.00</td>
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<td># Children in Families of Males, Hi SES</td>
<td>05.47</td>
<td>05.20</td>
<td>03.73</td>
</tr>
<tr>
<td># Children in Families, Females, Lo SES</td>
<td>04.47</td>
<td>03.21</td>
<td>04.33</td>
</tr>
<tr>
<td># Children in Families, Females, Hi SES</td>
<td>04.80</td>
<td>04.31</td>
<td>03.53</td>
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<tr>
<td>Avg # Visits to School in Year</td>
<td>03.21</td>
<td>04.41</td>
<td>04.52</td>
</tr>
<tr>
<td>% Mothers Making 5 or more Visits</td>
<td>26.00</td>
<td>52.00</td>
<td>74.00</td>
</tr>
<tr>
<td>Avg Hours/Day Spent in Homework</td>
<td>01.86</td>
<td>00.75</td>
<td>01.80</td>
</tr>
<tr>
<td>Mdn Hours/Day Spent in Homework</td>
<td>00.33</td>
<td>00.75</td>
<td>00.83</td>
</tr>
<tr>
<td>% Mothers who Help with Homework</td>
<td>63.00</td>
<td>55.00</td>
<td>42.00</td>
</tr>
<tr>
<td>% Parents Hoping Child Finishes College</td>
<td>82.00</td>
<td>83.00</td>
<td>100.00</td>
</tr>
<tr>
<td>% Parents Expecting Child will Finish Coll.</td>
<td>58.00</td>
<td>69.00</td>
<td>92.00</td>
</tr>
<tr>
<td>Avg # Publications Taken in Home</td>
<td>01.56</td>
<td>02.81</td>
<td>03.07</td>
</tr>
<tr>
<td>Avg # Places of Interest Visited</td>
<td>04.11</td>
<td>05.31</td>
<td>04.70</td>
</tr>
</tbody>
</table>

*1965 estimates by Des Jarlais and Goodman.
The N-A mothers, at 10.4 years, are approximately the same as E-A mothers, and exceed N-A fathers by slightly over one year. Parents of children in the three samples were also compared in years of formal education with their respective ethnic groups in the entire city of Houston. Both Mexican parents have about two more years of schooling than the median for M-A's in the city and both Euro-American parents approximately two years less than the Houston median for E-A's. Negro-American fathers have slightly fewer years of public school than the all-city median for N-A's, whereas Negro mothers have about one year more.

One additional characteristic of family background was given special attention as a possible conditioning factor, the number of occupations held by the parents. As shown in Table III, families with two parents in the home were classified under the following headings: (a) father the only wage earner; (b) father holds two jobs; (c) father holds two jobs and mother works; or (d) father and mother both work. (All single-parent families were placed in a separate category.) These classifications revealed a number of trends. Negro parents hold more than one job much more commonly than do parents of the other two groups. Some Mexican fathers hold two jobs. Among the Euro-Americans, the father is usually the only source of support.

Despite the efforts described here to select samples of uniform background circumstances, differences undoubtedly exist, in addition to those noted in the foregoing paragraphs. It seems reasonable to state only that serious effort was given to select samples as uniform as
<table>
<thead>
<tr>
<th>Two-Parent Families</th>
<th>Ethnic Groups</th>
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<tbody>
<tr>
<td>Father, only, works</td>
<td>M-A</td>
</tr>
<tr>
<td>Father holds 2 jobs</td>
<td>26</td>
</tr>
<tr>
<td>Father holds 2 jobs, Mother works</td>
<td>7</td>
</tr>
<tr>
<td>Father and Mother work</td>
<td>5</td>
</tr>
<tr>
<td>Single-Parent Families, Other</td>
<td>10</td>
</tr>
<tr>
<td>Total*</td>
<td>57</td>
</tr>
</tbody>
</table>

*Lack of complete data on parent interviews results in slightly different "n's" from the total "n" in each group.

possible. Compared with information and data disclosed in other published studies, it does appear likely that the present studies exhibit somewhat less sample variation both on an in- and among group basis.
**Procedure**

Children were interviewed and tested in rooms in their own schools by three female assistants who were members of the respective ethnic groups. Selection of assistants identified with the ethnic groups being tested was made with the judgment that the use of same-identity testers facilitates communication and children's motivation (Katz, 1969). The testers, non-professionals, were trained for their tasks, first by using each other as subjects and then working with children of one school (used only for pre-testing). Each experimenter was given identical instructions (see Appendix C). The Houston procedures for the conservation tasks was modeled closely after Elkind's (1961) procedure, using plasticine clay of three different colors, one for each conservation task. The combinations procedure was the same as employed by Goodnow (1962). The testers for this study were also supplied with the testing materials and protocol forms.

Testers were instructed that in their contacts with children no reference should be made to what was expected of the children, and were told that they might normally expect to find some children who were unable to perform the tasks. The first meeting between child and tester was devoted to four TAT stories, so planned to establish a friendly, game-like atmosphere. About two or three weeks later the conservation and combinations tests were given to the children.

The experimenters kept a record for each child (see Appendix D); noting: (a) if a child wished to "fix the clay" before each conservation task in order to "make the balls the same"; (b) whether equality was
predicted by the child before the clay ball was made into a "sausage"; (c) and whether the child judged the ball equal to the sausage, after one of the pieces was changed in shape; and lastly (d) a written recording of reasons given by the child for his judgment. All scoring was done by university students majoring in Psychology, either seniors or recent graduates.

Testers recorded the number of trials a child needed on the combinations task. The child was first given stacks of poker chips of three colors, then of four colors before he proceeded, without help to attempt to complete the task using six colors. The data collected also includes a schematic diagram of the child's final attempt with the six colors; an example of the ideal solution is included in Appendix D.
Scoring

The protocols allow different methods of analysis and comparison. A scoring similar to the one Elkind used in his 1961 study is possible: one point for each conserving prediction, judgment, and reason, and zero for each non-conserving response. A score of three would be attained if: (a) if a child predicted that changing one of the clay balls into the form of a sausage did not change its mass; (b) stated that the mass of the two shapes were identical after the sausage had actually been formed from the ball; and then said (c) that irrespective of the shape a given amount of clay was formed into, the volume was constant. This procedure provides for a maximum score of nine—three for each conservation concept.

Since questioning procedures such as those used by Goodnow and Elkind differ from the classic Piagetian "clinical method," there is some question about criteria used to classify whether or not children are "conservers."

Some authors merely use as a basis of judgment whether or not a child judges equality. Most of Goodnow's 1962 data is so reported. Although asking a "prediction" question first, as was done in following Elkind's procedure, may increase the probability of judgment responses which follow, it is believed that the protocols used in this study allow a rough comparison with the Hong Kong results.

For the combinations task, Goodnow reports data in two ways: (a) the percentage of subjects who could follow a system for the first 5 pairs, i.e., the chips of the first color paired with each of the
other 5 colors; and (b) the percentage who could continue, and complete the task to form 15 pairs. Use of the simpler 5-pair-criterion proved unfeasible for the Houston sample, because such a large proportion of subjects could continue a system beyond the first 5 pairs (4 pairs using the second color, 3 pairs using the third color, and so on). It may be that the nature of the pre-trials in Houston with 3 and 4 colors offered more help than given by Goodnow, although every attempt was made to replicate her procedure.
**Hypotheses**

For convenience, the hypotheses previously mentioned in the Introduction, are herewith repeated:

**Hypothesis I:** Responses to conservation tasks are sensitive to cultural differences; thus different ethnic groups will exhibit distinguishable test differences.

**Hypothesis II:** Complex Piagetian tasks will be more sensitive to cultural differences than the simpler tasks.

**Hypothesis III:** The greater the differences in cultural background from that of Piaget's original Swiss sample, the greater will be the differences in responses to Piagetian tasks, e.g., conservation and combinations tasks.
RESULTS

Conservation and Combinations

The scores for the three conservation tasks were summed and averaged, as shown in Figure I. Average scores were: E-A's, 5.73; M-A's, 4.82; and N-A's, 4.78. Analysis of variance of the summed scores, comparing culture, sex, and socioeconomic level as main effects, indicates insignificant differences (see Appendix E). Of these, only culture approached statistical significance: \( F = 2.28, 2 \text{ df, } p < .10 \).

When each individual conservation task was considered, in comparing the same main effects of culture, sex, and socioeconomic level, differences were significant for culture only. Mass and culture are \( F = 16.90, 2 \text{ df, } p < .001 \); weight and culture, \( F = 2.83, 2 \text{ df, } p < .06 \); and volume and culture, \( F = 3.88, 2 \text{ df, } p < .02 \) (see Appendix F).

Figure II shows that the responses of the Houston sample of Euro-Americans resembles those of Elkind's Massachusetts sample.

Plotting the percentage of total mass, weight, and volume conserving responses for each Houston ethnic group, as shown in Figure III, highlights the differences found among the groups. While the summed scores for the three tasks did not differ significantly, two types of differences are seen here: (a) the M-A and N-A percentages vary less across three tasks than those for E-A's; and (b) percentages of conserving responses for N-A's are slightly higher for weight than for either mass or volume. The order of increasing difficulty for E-A children is mass, followed by weight, and then volume. M-A's show the same
SUMMED AVERAGE CONSERVATION SCORES (MASS-WEIGHT-VOLUME) FOR HOUSTON ETHNIC GROUPS
PERCENTAGE EURO-AMERICAN CONSERVING RESPONSES:
HOUSTON STUDY AND ELKIND'S MASSACHUSETTS SAMPLE
FIGURE III

PERCENTAGE CONSERVING RESPONSES
(MASS - WEIGHT - VOLUME)
FOR HOUSTON ETHNIC GROUPS
difficulty order, but with less drop from task-to-task. The order for the N-A group differs slightly; more conserving responses are given for weight than for mass or for volume. Both M-A's and N-A's exhibit far less difference from task-to-task; the E-A's, in contrast, almost all conserve mass (90% of responses) but few conserve volume (27% of responses).

Figure IV presents the percentage of children conserving, using "judgment" as the criterion. These percentages are of mass, weight and volume for the three Houston groups, but only of weight and volume for Goodnow's five samples of age 10 Hong Kong children. In Goodnow's samples, differences in response concerning weight are slight. Only her supplementary sample falls markedly below her other groups in responses judging volume. (Differences between Goodnow's groups in judgments of both weight and volume are larger at later ages.)

In the Houston samples, Euro-Americans differ greatly from the other two groups in judgments of mass, differ somewhat less in judgments of volume, and differ still less in judgments of weight. Negro children correctly judge equality of weight slightly more often than they judge equality of the other two concepts. Both N-A's and M-A's are more successful in conserving volume than are E-A's, and the two groups vary much less markedly in performance of the three tasks than do the Euro-Americans.

Figure V illustrates the percentage of M-A, E-A and N-A children solving the combinatorial tasks to form 15 pairs. Goodnow's Hong Kong test data has also been plotted on these same ordinates for ease of
PERCENTAGE SOLVING COMBINATIONS
(15 PAIR CRITERION) FOR HOUSTON
ETHNIC GROUPS AND AGE 10 HONG KONG SAMPLES
comparison.

From the current work it can be seen that M-A's solved combinations about as often as the E-A's, i.e., 85% and 88% respectively, whereas only 60% of N-A children solved this task. However, when compared with Hong Kong children, the Houston N-A's are far more likely to succeed, as only 20% of the Hong Kong children mastered the combinations system.

The Houston results were unexpected for three principal reasons. First, many children of each Houston identity who did not conserve volume could solve combinations—yet Piaget states Swiss subjects attained both skills at about the same age. Second, though differences between Houston and Hong Kong groups in conservation of weight and volume are not widely different (see Figure IV), all Houston ethnic groups solving combinations far exceed those of the Hong Kong sample. Third, though Houston M-A and N-A's are almost equal in summed conservation scores (see Figure I), and in percentages of conserving responses for individual tasks (see Figure III), it is the M-A's and E-A's who are most alike in ability to solve combinations.

It has been anticipated that greater variations in culture would result in analogous response differentials (see Hypothesis III and relevant earlier discussion). This premise is borne out in two instances, but not in another. The two Houston minority groups do resemble each other insofar as the simple conservation tasks are concerned. With the majority Euro-Americans tested in this study there is a similarity between somewhat comparable samples in Massachusetts,
as reported by Elkind (1961). However, in looking at the combinations task achievements of the Houston groups, where similar successes might be expected to occur in view of the similarity in the conservation results, there is a definite difference between the M-A's and the N-A's, with the Mexican heritage children considerably superior to the Negroes in their ability to solve combinations. There are, indeed, many paradoxical relationships in this study between culture and conservation scores as well as between culture and success in combinations. One that arouses special interest is based on the finding that Mexican-American children are so much more successful—in spite of so many similarities with their Negro counterparts. The development of a reasonable basis for this behavior pattern proved to be one of the most challenging tasks in preparing this thesis.
TEST BEHAVIOR

Resolving the conservation-combinations-culture paradox arising from these data will be easier if three questions are first considered: (a) what are the different skills required for the two types of Piagetian tasks; (b) are background differences of the Houston children associated with performance of Piagetian tasks; and (c) did Houston subjects differ in their approach to the tasks?

Goodnow chose to differentiate between the ability to "conserve" and to solve the combinations task by theorizing that conservation depends on immediate responses and perceptual skills, but concluding that combinations requires a child "... be a tidy actor as well as a capable thinker ... (1962: 19)." That is, once a plan has been conceived, the child must be able to follow it without distraction. Goodnow's Hong Kong data indicated a relationship between the ability to form pairs in a system and performance on the Ravens' Matrices Test; this led her to conclude, "... no milieu differences on the combinatorial problem unless there are differences in intelligences between milieus (ibid: 15)."

In Houston, both M-A and N-A groups scored significantly lower than the E-A's on two IZ measures (Draw-a-Person and the Peabody Picture Vocabulary Test); a lower IQ cannot explain both Mexican and Negro children's performance on combinations, since both group's IQ scores were at approximately the same low levels, below the Euro-American group.

An examination of family composition and of economic level, as related to the two types of Piagetian tasks, may resolve the paradoxical
findings. Few Mexican-Americans or Euro-Americans failed combinations; therefore, "n's" differ markedly when dividing these groups into pass-fail segments. Differences, then, between the pass-fail segments for M-A's and E-A's may be due to chance. In the group whose results pose an important part of the paradox, i.e., the Negroes who differed most from "normally" predictable results, the 60:40 pass-fail division in the combinations data makes the results less likely to be due to chance. A set of unequal segments results, too, when each Houston ethnic group is divided into two parts based on whether a child's family is nuclear, or not. An examination of economic level, and of family composition, will assist in understanding the cognition-environment relationships.

It was established earlier (see Appendix E) that economic level differences of summed average conservation scores were not statistically significant. However, if conservation summed scores are analyzed comparing nuclear versus non-nuclear families, it is quite easy to differentiate: these data are shown graphically in Figure VI. The average summed scores of N-A children of nuclear families are higher than those of non-nuclear families (a difference of 1.36). This is greater than the differences for both M-A's (children of nuclear families score only .75 higher), and for the E-A's (children from nuclear families scored .80 lower).

Figure VII indicates that both economic level and nuclear family relate to percentages of Negro children who can solve the combinations task.

Behavior in the testing situation also distinguishes Negro
FIGURE VI

COMPARISON OF AVERAGE SUMMED CONSERVATION SCORES (MASS-WEIGHT-VOLUME) BY FAMILY COMPOSITION FOR HOUSTON ETHNIC GROUPS
Comparison of combinations success and background cultural factors for Houston ethnic groups
children from the others. The data record of "prediction" and judg-
ment" responses gives a measure of consistency for each task, for each
subject. Figure VIII shows the percentage of children of each group
who give no conservation responses, either "prediction" or "judgment"
for each task. "No conservation" responses are most numerous among
the Mexican children—ten give no conserving responses of any kind for
any of the three tasks. The number of "no-conservation" responses in
the E-A group is a function of the task, an obverse of the difficulty
level Piaget found in Swiss subjects.

Figure IX graphs the percentages of children of each Houston
group who were inconsistent in giving conserving responses for the
indicated tasks on "prediction" or "judgment;" that is, a child might
predict equality of the two pieces of clay, before one "ball" was
changed into a "sausage," but then, after the change, say the two
pieces of clay were not equal. Inconsistent responses rise in number
in the E-A results for the volume task—where "transitional" conserva-
tion, at age 10, is predicted by Piaget. N-A's exceed both other
groups in inconsistency in mass and weight, not in volume.

The record of when each child wanted to "fix the clay," before
each task, to make the two pieces equal was analyzed in two ways; it
was established that there were no significant differences between the
three cultures to want to "fix the clay;" then an analysis of variance,
with manipulation "scores" arranged in five categories: (a) children
with a zero score; (b) children conserving mass; (c) those conserving mass
and weight; (d) those conserving mass, weight, and volume; and (e) those
PERCENTAGE NON-CONSERVING RESPONSES
(MASS-WEIGHT-VOLUME)
FOR HOUSTON ETHNIC GROUPS
PERCENTAGE INCONSISTENT RESPONSES (MASS–WEIGHT–VOLUME) FOR HOUSTON ETHNIC GROUPS
conserving in patterns "reversing" the Piagetian sequence.

Differences in a tendency to "fix the clay" are highly significant (F = 8.82, 4 df, p < .01; see Appendix G); children who conserved mass, only, average most manipulation "scores"; then came children conserving in "reversal" patterns, followed closely by the "no-conserving-response" group, next the mass-weight group, and the mass-weight-volume group indicating least need to reassure themselves that the two clay balls were originally the same. Dependency on touching the clay seems to be characteristic of children conserving at a level lower than expected of ten-year-olds, and of children conserving in a pattern not generally found for Swiss children. Most "no-conservation" children are Mexican (14 of 22), and most children in the "reversal" category are Negro (21 of 39).

In the combinations task each child was encouraged to work with the poker chips so as to figure a way to form all pairs--first with three colors, then with four colors. (If the child did not understand, or said that he did not, he could try again, as often as he wanted.) Only N-A children requested more than two pre-trials; more than one-fifth wanted three or more trials with three colors; and more than one-sixth, using four colors. The results were unaffected by whether children eventually solved the problem or not.

The Negro children differ from the Mexican and Euro-Americans in their test behavior; they tend to give some kind of conserving response, but also reverse equality responses more often; they give conserving responses in "reversal" patterns more often; they have more
combinations pre-trials, yet solve the problem less often. The children's approach to problem-solving focuses on concrete experience, yet they seem to fail to integrate relevant variables.
Conclusions

The results of the study and analyses of the findings, lead to the conclusions stated below:

(1) Hypothesis I states, "Conservation tasks are sensitive to cultural differences; thus different ethnic groups will exhibit distinguishable test differences."

a. In summed average scores, of the three conservation tasks, M-A's and N-A's score only slightly lower than do E-A's. In an analysis of variance only the relationship between culture and test performance approaches statistical significance (p < .10); sex and economic level do not produce statistically significant relationships. Neither result supports the tested hypothesis.

b. Analysis of variance of scores for each individual conservation task (mass, weight, and volume), was significant statistically only for culture as an independent variable, not for sex or economic level. Consequently, using this criterion, the hypothesis is valid.

c. There is a definite variation in pattern of achievement of conservation between the three groups. Differences in the percentage of conserving responses, from mass, to weight, to volume, are less for M-A and N-A groups than for E-A's. M-A's drop slightly from
task to task; N-A's reverse difficulty level, giving more conserving responses for weight. Percentages for mass conservation show both M-A's and N-A's below the E-A's, but both these groups give more conserving responses than E-A's in the volume task. Consequently these data support the hypothesis, if pattern of achievement is the criterion.

Differences among Houston cultural groups support the same conclusions for conservation data, whether the criterion of conservation used is equality judgments only, or a percentage of prediction-judgment-reasons score.

(2) Hypothesis II states, "Complex Piagetian tasks will be more sensitive to cultural differences than the simpler tasks."

a. Analysis of each conservation task indicates that the largest difference between the three ethnic groups is in the achievement of conservation of mass (obtained earliest in Swiss samples); differences between Houston groups are less on volume, and least on weight. Thus, assuming the Swiss order represents a simple to complex order, the hypothesis is unsupported in this comparison.

b. The N-A group solves the combinations task less often than M-A's and E-A's. Piaget states that Swiss subjects can solve the combinations task at about the same age as they can the volume task. One would then
expect that M-A and N-A, who conserve in about the same percentages, would then solve combinations in about the same numbers; and since E-A's give fewer conserving responses to volume, that they would solve combinations less often. The hypothesis, then, in this comparison, is not confirmed.

(3) Hypothesis III states, "The greater the differences in cultural background from that of Piaget's original Swiss sample, the greater will be the differences in responses to Piagetian tasks, e.g., conservation and combinations tasks."

a. M-A's and N-A's average scores for individual conservation tasks are nearly the same, with E-A's slightly higher (and this latter Houston ethnic group is close in results to Elkind's Massachusetts sample). M-A's and N-A's show less variation than the E-A's in percentage of conserving responses from task-to-task. (Again, the E-A's percentage results for each task are similar to Elkind's sample.) Thus quantitative conservation data show greater similarity between samples whose ethnic heritage has been one of lower social and economic status; this is the result in spite of the fact the three sample groups are equivalent on most easily observed measures, such as occupational level of the major wage earner, urban living,
similar religious affiliation, and some bilingualism.

b. Houston E-A's and M-A's solve the combinations task at essentially the same level, and their successes are appreciably more numerous than the N-A's (although the N-A's did solve at much higher levels than Goodnow's Hong Kong children). The fact that M-A's solve combinations as often as E-A's, but conserve in patterns similar to the N-A's requires explanation.

The analysis in the next section proposes to interpret some of the anomalous findings in this section.
DISCUSSION OF RESULTS

Behavior in the testing situations suggests an over-assimilative approach to tasks by the Houston Mexican children, and an over-accommodative approach by their Negro counterparts. I believe that lack of equilibration explains the data of this study better than other alternatives.

The role of maturation cannot be assessed in this single-age sample. The data support the view that social transmission, i.e., culture, teaches a child how to relate to his environment, which, in turn, shapes his responses to specific tasks. For example, two children of the same age, in the same physical environment, can experience that environment in different ways if one habitually rejects the new and unfamiliar, and the other searches widely for signals telling him how to change his behavior to fit the situation.

Culture, as it relates to cognition, provides the principal basis for my explanation of the results. I conclude that differences in test responses reflect the way an ethnic group teaches its children to deal with the world. While there are individual differences in results within each group, there are also discernible patterns of responses for Mexican-American children, Negro-American children, and Euro-American children.

From Piaget's work, Goodnow abstracted three kinds of familiarity to explain culture-cognition differences: "... familiarity with certain objects; familiarity with certain operations; and familiarity with
certain operations as applied to certain objects (in Elkind and Flavell, 1969: 458)." Before continuing this examination of equilibration as it applies to this study's results, it is useful to examine the relationship of Goodnow's "familiarities" to the results of this study, and to demonstrate that they are less probable than explanations based on the equilibration concept.

The first familiarity, with objects, could be the reason why the total summed average conservation scores do not differ significantly among Houston ethnic groups. Conservation of matter (whether of mass, weight, or volume) is patently necessary for everyday survival, however its understanding is internalized. But it would be absurd to theorize that an understanding of mass and weight is less necessary for Mexican and Negro children than for Euro-Americans.

The marked drop in percentages for volume conservation in the results for European-influenced children is consistently found, whether the locale is Houston, Eastern Massachusetts (Elkind, 1961), or in Hermannsburg, Australia (De Lemos, 1969). Is this a result of some specific lack of knowledge, common to all European-influenced subjects? To explain these similarities in test results in widely separated parts of the world requires finding common cultural denominators. To find these commonalities will require detailed information about specific competencies encouraged, or discouraged, within the family in European influenced groups, which are absent in whole or part from non-European groups. Negro-American results on weight conservation also pose a problem for investigation. At first examination one might guess that N-A's
conserve weight more often than mass or volume because of greater familiarity with jobs involving manual labor. Yet Mexican-American children do not conserve weight in as high percentages, in spite of the fact that the M-A parents are also heavily employed in manual jobs. It is unlikely that E-A's, who conserve weight more often than either M-A's or N-A's, have greater familiarity with jobs involving lifting and carrying. Aside from the Houston test results indicating need for more research in this area, it is apparent that trying to explain differences in test results in terms of object familiarity is limited in value.

Goodnow suggests that skills in operations such as counting and ordering are associated with living in societies with complex technologies. Greater familiarity with counting and ordering might possibly explain why all Houston groups solve combinations in greater percentages than did the Hong Kong children. But it is improbable that a greater familiarity with counting and ordering would explain why M-A children solve combinations more often than do N-A children, since both groups have similar urban environments, and schooling.

The third familiarity, "certain operations as applied to certain objects" is similar to Peluffo's hypothesis, developed in working with Italian subjects "... that a low cultural level does not stimulate a way of thinking in which several variables are taken into consideration and integrated in a single function according to a multiplicative scheme (1967: 197)." It is also consistent with Bruner's observation about a "... push toward hierarchical connection..."
(1966: 324)," characteristic of complex technological cultures. Data show that most children influenced by European background or schooling conserve each task in proportions inversely related to an order of task complexity based on logico-mathematical criteria; in these samples it is also shown that with greater age, the percentage of children solving more difficult tasks increases. It is then inferred that these study samples have developed a firmer foundation for the ability to apply formal reasoning in the future. Yet there are no data to support the inferred assumption that European-influenced children conserving in these patterns will actually be able to use logical principles, in time. Conversely, there is no empirical reason to assume that M-A and N-A children who do not conserve in "normal" patterns will not, in time, be able to use formal logic.

Each "familiarity" may explain specific facets of these data, but I am convinced that a more basic rationale is required to incorporate the whole of the study. Cultural patterns are more encompassing than specific familiarities in the development of cognition, and have an influence to the extent that cultural differences limit access to stimuli or force environmental pressures on a child. An explanation based on different approaches to the environment must consider data such as the Negro children's vacillating decisions about equality from question to question, and the consistency of the Mexican-American children, in giving all conserving or no-conserving responses for each task.

Over-assimilation, over-accommodation, or some equilibration
between the two modes appears to me to be the more basic explanation, and agrees better with the body of Houston data than any explanation based on specific knowledge. Such an explanation can be shown to relate to: (a) differences between presentation of conservation and combinations tasks in the testing situation; (b) similarity between M-A and N-A children in conservation patterns, but between M-A and E-A in solving combinations; and (c) data from interviews with parents.

Conservation responses depend on past attainment; the tester asks for decisions about equality, with no suggestion that a child should figure out an answer. There are no guides to how to respond, and children probably do so in whatever manner is habitual. In contrast, there are guides in combinations, and the tester supplies them; attention must be focused and sustained; focused on the relationships between many objects and on one's own actions, and then sustained over three changing fields. The relevant variables must be held in memory and sifted from irrelevant changes, i.e., with added colors. To arrive at a systematic solution a child must observe the tester and change his thought and action to fit the problem. Unlike the conservation tasks, the tester draws attention to relevant variables, in essence offering an opportunity to learn. If a child has failed to conserve because he habitually ignores most stimuli, pre-trials help him, because they constitute a demand to attend to the situation.

When referring to psychological operations, assimilation and accommodation are different ways of handling stimuli. The basic difference between them is that in assimilation one changes the stimuli,
and in accommodation one is changed by the stimuli. In mental assimilation there is a barrier between the subject and the environment, whether due to biological immaturity, to learned avoidance, or to decisions that some stimuli are important, others extraneous. Flavell says that assimilation "... can be riotously autistic (1963: 65)." Shutting out all stimuli is an extreme example of over-assimilation; selecting stimuli from the total within an environment and suppressing others is an adaptive assimilative procedure, helping to impose order on chaotic arrays. An over-assimilative child would tend to miss stimuli which others perceive.

The Mexican children's responses in conservation suggest an over-assimilative approach; more give no conserving responses for each task (ten M-A children give no equality responses at all) ... as if, for them, no relevant stimuli impinged. When attention is called to relevant stimuli by a training or testing procedure, a child's attention is drawn beyond self, to object-self relationships. That is, combinations pre-trials encourage trial-and-error accommodating. In combinations pre-trials the tester is showing that new stimuli must be noted, and behavior changed accordingly. Training sessions force accommodation and a resultant change in behavior. There is, then, more nearly an equilibration between the Mexican childrens' habitual over-assimilation, and accommodation, and they can solve combinations as often as can the Euro-Americans.

Accommodation stresses a change of mental operations, or of any behavior, a yielding to environmental pressures. Accommodation can be
"slavish, naively realistic (Flavell, 1966: 85)." There is little discrimination among stimuli in over-accommodation; there is less probability, then, to order features of a situation into an hierarchy, or to integrate principles from one situation to apply in another. The within-task conservation inconsistencies suggest that Negro children are over-accommodating; the larger number of inconsistent children on mass, the first task, appear to be trial-and-error responses. Expectation of an unpredictable environment results in attempt to change behavior to fit whatever may come, with little attempt to sort stimuli, using some and rejecting others. Anything may be important. The result is a failure to relate similarities from one situation to another or to impose any order on the environment. Combinations pre-trials guide children to trial-and-error behavior, but the Negro children are already using this approach, they are already over-accommodative. Thus, in spite of pre-trials, they fail to complete combinations successfully. Their own actions are just one more set of unpredictable, subject to change with changes in situations. Their diffuse attention results in inability to note and retain similarities; they may have perceived a plan, momentarily, but adding more colors of poker chips is distracting, and a change in number of colors means a change in behavior.

A concept of equilibration seems to explain test presentation and behavior. Such a concept of equilibration must also be related to the sociocultural backgrounds of these children. Cultures are complex. They develop in response to social and physical influences making different demands. In turn, cultural patterns shape the behavior of the
young. Each Houston group has been exposed to common religious, educational, and urban influences. However, each approaches this common ground from a different vantage point, bringing different sets of traditional values, and different expectations. (See Appendix A for results of Parent Interviews.)

The Mexican-American heritage has several dominant values which are relevant for early child development (Diaz Guerrero, 1955; Ramirez, 1969; Goodman et alia, 1971). A respect for persons is based on an hierarchy of age; older siblings are accorded greater respect than younger, grandparents more than parents (Goodman et alia, 1971). Gaining respect with age also means, for children, assuming responsibility for younger family members. Family loyalties are strong. The focus of achievement is for and through the help of the family. There is a continuing loyalty to the cultural heritage . . . witness the high percentage of bilingual parents and children, and a stated preference that children not associate with children of other backgrounds. There are fewer activities or interests beyond the home, in comparison to the other two groups. Husbands are informed about political issues, but few wives are. Few Mexican mothers work. The families are not totally traditional, however; many parents interviewed (37%) feel that husbands should help with housework—hardly a picture of traditional machismo. Children are expected to move beyond traditional occupations and to achieve better educations than their parents. Yet occupational aspirations include very few positions of high prestige. The most important concern for the Mexican-Americans of this sample is home and the people in it. It is as
if home assumes an assimilative function, a haven from the world beyond.

The Euro-Americans' major focus is on children's activities—almost a child-centered milieu. "Children should be seen and heard;" when family decisions are to be made, children have a voice; they may make noise when there are guests present; they take dance and music lessons, and visit places of interest in the city more than Mexican children. Leadership is approved in children—but not competition. In spite of the importance placed on children's activities, few Euro-American parents expect that their children will hold professional positions later in life. There is less concern at home about children doing homework each day; parents claim their children spend fewer hours on homework than do either M-A or N-A parents. Although children's activities are important, the Euro-American parents do not pride themselves in permissiveness; firm rules are very important, but within the boundaries of these rules the children have latitude. Data from interviews with Euro-American parents suggest that these parents approach child-rearing in the same way Hess and Shipman (1965) found in studying middle class American parents; activities are important for themselves, explanations are given in terms of the familiar, and new experiences are related to the old. There is little thrust for upward mobility, and a relaxed, easy-going attitude toward the young; children seem to have more room to find their own level, or equilibration.

There is little need in this dissertation to dwell on historical, social, and economic forces which continue to bear on the Negro-American (Billingsley, 1968; Frazier, 1966; Rainwater, 1966). Parameters found
in this study which distinguish this sample of Negro parents from the Mexican-Americans and Euro-Americans include: (a) a larger percentage of parents who have migrated to the city; (b) fewer families who own their homes; (c) concomitant to the small number who own homes, there are more within-city moves; (d) there is a greater discrepancy in years of schooling between mothers and fathers; (e) more mothers work, and more fathers hold more than one job; and lastly (f) evidence of a strong thrust for upward mobility. More than half (51%) of the Negro parents have specialized training beyond public schooling, and more than half the mothers work; more parents belong to social organizations, and in most of the homes (63%) both parents are informed about political issues. The Negro-American parents have the highest expectations for their children's schooling, and expect many more high prestige occupations for their children than do either of the other two groups. Leadership and competition are held to be important for children's success.

The Negro-American parents of this sample are notably different from the others, too, in the greater discontinuity in their lives and in their striving toward a prestigious model of success. Their behavior conforms to goals in the tenor of the American success dream, with an emphasis on money but with little stress on rewards which are intrinsic to either interpersonal relationships or to activity for its own sake. Many of these parents moved to the city, and adopted a new way of life; they expect their children, in turn, to learn still another change in their living patterns.
A pattern of over-assimilation in the M-A's, of over-accommodation in the N-A's, of more latitude to choose when to accommodate or when to assimilate for the E-A's, seems to recur whether the data is from test results, from children's test behavior, or from parent interviews.

A general evolutionary trend in human cultures is from simple to complex, with increased differentiation and integration both requisite for evolution. With increasingly complex technology, man becomes better able to make his own environment. For some this means increased opportunities to decide when to assimilate and when to accommodate. This is the ability to achieve equilibration between the two modes. But this general trend does not occur at the same time for all groups. Measurement of child rearing practices to the extent to which they force, permit, or prevent experimentation with the environment may well provide one tool for unravelling milieu-development relationships. This work supports such a thesis.
APPENDIX A

Center's Occupational Classifications

<table>
<thead>
<tr>
<th>Code</th>
<th>Variable</th>
<th>Occupational Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Farm Laborers</td>
<td>All non-owning non-renting farm workers (except men who work on their own fathers' farms)</td>
</tr>
<tr>
<td>1</td>
<td>Unskilled Manual Workers</td>
<td>Garage laborers, sweepers, porters, janitors, street cleaners, construction laborers</td>
</tr>
<tr>
<td>2</td>
<td>Farm Tenants</td>
<td>All farm tenants and sharecroppers</td>
</tr>
<tr>
<td>3</td>
<td>Semi-skilled Manual Workers</td>
<td>Truck drivers, machine operators, service station attendants, waiters, countermen</td>
</tr>
<tr>
<td>4</td>
<td>Skilled Manual Workers</td>
<td>Carpenters, machinists, plumbers, masons, printers, barbers, cooks, including foreman</td>
</tr>
<tr>
<td>5</td>
<td>Farm Owners and Managers</td>
<td>Any person who owns or manages a farm, ranch, grove</td>
</tr>
<tr>
<td>6</td>
<td>White Collar</td>
<td>Clerks and kindred workers, salesmen, agents, semi-professional workers, technicians</td>
</tr>
<tr>
<td>7</td>
<td>Small Business</td>
<td>Small retail dealers, contractors, proprietors of repair shops employing others; includes both owners and managers</td>
</tr>
<tr>
<td>8</td>
<td>Professional</td>
<td>Physicians, dentists, professors, teachers, ministers, engineers, lawyers</td>
</tr>
<tr>
<td>9</td>
<td>Large Business</td>
<td>Bankers, manufacturers, large department store owners and managers, large farm and ranch owners</td>
</tr>
<tr>
<td>X</td>
<td>Unknown</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>Unemployed</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX B

PARENT INTERVIEW AND DATA*

Statement of Purpose

This is a study of experiences which fourth graders from this community have had before they entered school, and which they now have outside of school. We hope that the information we obtain will make it possible for us to help improve the kinds of experiences which schools provide for children.

This study is being conducted by Rice University with the cooperation of Sister ___________ and the chancery.

Name______________________ Address______________________
Relationship to child________ Date interviewed______________
Interviewer__________________ Approximate age of interviewee____

1. How many adults (i.e., over 20 and not a sibling of child in question) live at home? Mrs. __________? (Interviewers were instructed to insert specific names when asking questions.)

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

0 = mother and father, grandparents and other relatives
1 = mother and father and grandparents
2 = mother and father and other relatives
3 = mother and father of child only
4 = mother of child only
5 = mother of child and grandparents
6 = father of child and grandparents
7 = grandparents only
8 = other

* Three Mexican-American, two Anglo and one Negro household could not be reached for interview, after repeated tries (three or more).
2. Where did you spend the most time during the first fifteen years of your life?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = large city (greater than 25,000)</td>
<td>38</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>1 = small city (5,000-25,000)</td>
<td>6</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2 = small town (up to 5,000)</td>
<td>11</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>3 = country (few families together)</td>
<td>2</td>
<td>12</td>
<td>23</td>
</tr>
<tr>
<td>4 = completely isolated</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3. Where is that?

<table>
<thead>
<tr>
<th></th>
<th>0</th>
<th>0</th>
<th>0</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = Houston</td>
<td>21</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>1 = Texas</td>
<td>25</td>
<td>31</td>
<td>7</td>
</tr>
<tr>
<td>2 = Louisiana</td>
<td>0</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>3 = U.S. not Texas or Louisiana</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>4 = Mexico</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4. How about Mr. _____, where did he spend the most time when he was a child?

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>2</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>0 = large city (greater than 25,000)</td>
<td>41</td>
<td>25</td>
<td>11</td>
</tr>
<tr>
<td>1 = small city (5,000-25,000)</td>
<td>9</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2 = small town (up to 5,000)</td>
<td>4</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>3 = country (few families together)</td>
<td>1</td>
<td>15</td>
<td>24</td>
</tr>
<tr>
<td>4 = completely isolated</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

5. Where is that?

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>2</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>2</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>0 = Houston</td>
<td>15</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>1 = Texas</td>
<td>22</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>2 = Louisiana</td>
<td>0</td>
<td>3</td>
<td>32</td>
</tr>
<tr>
<td>3 = U.S. not Texas or Louisiana</td>
<td>1</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4 = Mexico</td>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

6. How long has your child lived in Houston?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>1</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0 = 7-9 years</td>
<td>42</td>
<td>50</td>
<td>52</td>
</tr>
<tr>
<td>1 = 5-7 years</td>
<td>6</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2 = 3-5 years</td>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3 = 1-3 years</td>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4 = less than a year</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
7. How many times have you moved since ____ was born?
(in or outside city of Houston, i.e. total number of moves)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = no times</td>
<td>12</td>
<td>22</td>
<td>14</td>
</tr>
<tr>
<td>1 = once</td>
<td>19</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>2 = twice</td>
<td>10</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>3 = three times</td>
<td>11</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4 = four times</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5 = five times</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>6 = six times</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7 = seven times</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8 = eight times or more</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

8. How many times have you moved within the city of Houston since ____ was born?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = no times</td>
<td>17</td>
<td>24</td>
<td>16</td>
</tr>
<tr>
<td>1 = once</td>
<td>16</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>2 = twice</td>
<td>15</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>3 = three times</td>
<td>8</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>4 = four times</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5 = five times</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>6 = six times</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7 = seven times</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8 = eight times or more</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

9. Do you own this house/apartment or rent?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = own</td>
<td>33</td>
<td>40</td>
<td>15</td>
</tr>
<tr>
<td>1 = rent</td>
<td>23</td>
<td>11</td>
<td>16</td>
</tr>
<tr>
<td>2 = living in someone else's place</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3 = other (specify)</td>
<td>0</td>
<td>4</td>
<td>25</td>
</tr>
</tbody>
</table>

10. How often has ____ changed schools since the 1st grade?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = no changes</td>
<td>41</td>
<td>52</td>
<td>38</td>
</tr>
<tr>
<td>1 = one time</td>
<td>9</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>2 = two times</td>
<td>3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>3 = three times</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>4 = four times</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5 = more than four times</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
11. Why did ____ change schools?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = no change</td>
<td>39</td>
<td>53</td>
<td>38</td>
</tr>
<tr>
<td>1 = change in residence</td>
<td>13</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2 = wanted him in Catholic school</td>
<td>1</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>3 = not doing well at other school</td>
<td>2</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4 = misbehaving</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5 = couldn't afford other school</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6 = teachers were against him</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7 = other (specify)</td>
<td>2</td>
<td>2</td>
<td>10</td>
</tr>
</tbody>
</table>

12. Why do you have ____ in a Catholic school now?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = better education</td>
<td>13</td>
</tr>
<tr>
<td>1 = religious training</td>
<td>30</td>
</tr>
<tr>
<td>2 = stricter environment</td>
<td>10</td>
</tr>
<tr>
<td>3 = friends are in this school</td>
<td>0</td>
</tr>
<tr>
<td>4 = other (specify)</td>
<td>2</td>
</tr>
</tbody>
</table>

13. What kind of work does Mr. ____ do?
   (get ample and specific description of job duties, i.e. what does he do in his work?)

14. Does he have more than one job?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = No</td>
<td>42</td>
</tr>
<tr>
<td>1 = Yes</td>
<td>13</td>
</tr>
</tbody>
</table>

15. Do you work, Mrs. ____? What do you do?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = does not work</td>
<td>37</td>
</tr>
<tr>
<td>1 = domestic worker</td>
<td>4</td>
</tr>
<tr>
<td>2 = clerical</td>
<td>10</td>
</tr>
<tr>
<td>3 = teacher</td>
<td>2</td>
</tr>
<tr>
<td>4 = nurse</td>
<td>1</td>
</tr>
<tr>
<td>5 = other (specify)</td>
<td>1</td>
</tr>
</tbody>
</table>

16. Until what grade did you attend school, Mrs. ____?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = none</td>
<td>3</td>
</tr>
<tr>
<td>1 = some elementary</td>
<td>15</td>
</tr>
<tr>
<td>2 = completed elementary</td>
<td>3</td>
</tr>
<tr>
<td>3 = some junior high</td>
<td>12</td>
</tr>
<tr>
<td>4 = completed junior high</td>
<td>15</td>
</tr>
<tr>
<td>5 = completed high school</td>
<td>6</td>
</tr>
<tr>
<td>6 = some college</td>
<td>3</td>
</tr>
<tr>
<td>7 = completed college</td>
<td>0</td>
</tr>
</tbody>
</table>
17. Have you had any other type of training (such as trade school, barber school, beautician, etc.)?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>0 = Yes</td>
<td>15</td>
<td>14</td>
<td>30</td>
</tr>
<tr>
<td>1 = No</td>
<td>41</td>
<td>44</td>
<td>27</td>
</tr>
</tbody>
</table>

18. How far did Mr. _____ go in school?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>0 = none</td>
<td>3</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 = some elementary</td>
<td>15</td>
<td>3</td>
<td>13</td>
</tr>
<tr>
<td>2 = completed elementary</td>
<td>7</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>3 = some junior high</td>
<td>8</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>4 = completed junior high</td>
<td>9</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>5 = completed high school</td>
<td>7</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>6 - some college</td>
<td>1</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>7 = completed college</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

19. Does Mr. _____ have any other type of training (such as trade school, barber college, etc.)?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>3</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>0 = Yes</td>
<td>25</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>1 = No</td>
<td>29</td>
<td>27</td>
<td>29</td>
</tr>
</tbody>
</table>

20. Are you getting an education now? (i.e. going to adult education, night school, etc.)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0 = presently not furthering education</td>
<td>57</td>
<td>56</td>
<td>46</td>
</tr>
<tr>
<td>1 = adult education</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2 = night school</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3 = correspondence courses</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 = other (specify)</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

21. (Omit for Anglo-Americans) What Negro-American papers and Mexican-American magazines do you have at home most of the time?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>58</td>
<td>39</td>
</tr>
<tr>
<td>0</td>
<td>38</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
22. What Houston papers and other papers and magazines do you have at home regularly? (Numbers refer to how many are taken.)

<table>
<thead>
<tr>
<th>N</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>no response</td>
<td>0</td>
<td>0</td>
<td>5</td>
</tr>
<tr>
<td>0</td>
<td>9</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

23. This city has many attractive places to go to, such as the Coliseum, Astrodome, stores, theatres, etc. Which of these places have you and your family gone to together in the past year? (Numbers refer to how many places named.)

<table>
<thead>
<tr>
<th>N</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>no response</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>13</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>13</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

24. How many of your neighbors are you likely to visit with during the course of a week? either at your house or theirs (within 2 blocks radius, or in apartment complex)?

<table>
<thead>
<tr>
<th>N</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>32</td>
<td>19</td>
<td>33</td>
</tr>
<tr>
<td>1 = one family</td>
<td>15</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>2 = two families</td>
<td>7</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>3 = more than two families</td>
<td>13</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>

25. How often do you visit with your parents and relatives? (either personally or by telephone)

<table>
<thead>
<tr>
<th>N</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>no response</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>0 = daily</td>
<td>13</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>1 = at least once a week</td>
<td>18</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>2 = at least once a month</td>
<td>7</td>
<td>17</td>
<td>11</td>
</tr>
<tr>
<td>3 = at least once a year</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>4 = seldom</td>
<td>3</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>5 = never</td>
<td>4</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
26. How about your husband’s family?

<table>
<thead>
<tr>
<th>N = no response</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = daily</td>
<td>4</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>1 = at least once a week</td>
<td>18</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>2 = at least once a month</td>
<td>8</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>3 = at least once a year</td>
<td>16</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>4 = seldom</td>
<td>2</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>5 = never</td>
<td>6</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

27. Would you say that you are still very close to your parents and relatives?

| N = no response | 0 | 0 | 3 |
| 0 = No          | 14 | 2 | 0 |
| 1 = parents only | 7 | 1 | 1 |
| 2 = relatives only | 6 | 3 | 9 |
| 3 = both parents and relatives | 30 | 52 | 46 |

28. What clubs do you belong to, Mrs. ____?
(Numbers refer to number of clubs mentioned.)

| N = no response | 2 | 2 | 35 |
| 0               | 26 | 7 | 0 |
| 1               | 21 | 22 | 8 |
| 2               | 7 | 20 | 8 |
| 3               | 0 | 4 | 3 |
| 4               | 0 | 2 | 2 |
| 5               | 0 | 1 | 1 |
| 6               | 1 | 0 | 2 |

29. What clubs does Mr. ____ belong to?

| N = no response | 6 | 7 | 47 |
| 0 = none        | 33 | 22 | 1 |
| 1               | 15 | 7 | 6 |
| 2               | 1 | 12 | 2 |
| 3               | 0 | 8 | 0 |
| 4               | 2 | 1 | 0 |
| 5               | 0 | 0 | 1 |
| 6               | 0 | 1 | 2 |

30. Do you and your husband keep up with the local political issues?

| N = no response | 2 | 0 | 0 |
| 0 = No          | 27 | 12 | 8 |
| 1 = husband only | 19 | 43 | 4 |
| 2 = wife only   | 0 | 3 | 10 |
| 3 = both husband and wife | 9 | 0 | 37 |
31. Have you ever been involved in getting the city to make any improvements or give you better service in your neighborhood?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0 = No</td>
<td>48</td>
<td>32</td>
<td>35</td>
</tr>
<tr>
<td>1 = was committee member (specify)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2 = helped out (specify)</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3 = signed petition (specify)</td>
<td>7</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>4 = other (specify)</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

32. Are you and your husband registered to vote?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0 = both are</td>
<td>29</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>1 = husband only</td>
<td>11</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2 = wife only</td>
<td>3</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>3 = neither are</td>
<td>11</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

33. What is the teacher's name where ____ goes to school?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>7</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>1 = know</td>
<td>50</td>
<td>56</td>
<td>57</td>
</tr>
</tbody>
</table>

34. What time does ____ have to be at school in the morning?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = know</td>
<td>57</td>
<td>58</td>
<td>58</td>
</tr>
</tbody>
</table>

35. What time is school out in the afternoon?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = know</td>
<td>57</td>
<td>58</td>
<td>59</td>
</tr>
</tbody>
</table>

36. Who is ____ 's best friend at school?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>13</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>1 = know</td>
<td>44</td>
<td>51</td>
<td>56</td>
</tr>
</tbody>
</table>

37. Where does he or she live?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>15</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>1 = know</td>
<td>42</td>
<td>48</td>
<td>54</td>
</tr>
</tbody>
</table>
38. What is the most important job the school can do for a child?

<table>
<thead>
<tr>
<th>Job Description</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1 = preparing for a job</td>
<td>14</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>2 = preparing for college</td>
<td>9</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>3 = character or behavior training (teach manners, how to act, how to be decent person, etc.)</td>
<td>25</td>
<td>19</td>
<td>26</td>
</tr>
<tr>
<td>4 = make children a part of the majority culture (by teaching English and ways of Anglo middle-class world)</td>
<td>3</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>5 = other (specify)</td>
<td>5</td>
<td>8</td>
<td>0</td>
</tr>
</tbody>
</table>

39. Do you get the impression that ______ is near the top, the middle, or bottom of his/her class?

<table>
<thead>
<tr>
<th>Class Position</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = don't know</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1 = top</td>
<td>16</td>
<td>26</td>
<td>18</td>
</tr>
<tr>
<td>2 = middle</td>
<td>31</td>
<td>30</td>
<td>40</td>
</tr>
<tr>
<td>3 = lowest</td>
<td>10</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

40. Does _____ do his homework every day of the week?

<table>
<thead>
<tr>
<th>Homework Frequency</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>0 = No</td>
<td>8</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>1 = Yes</td>
<td>49</td>
<td>57</td>
<td>53</td>
</tr>
</tbody>
</table>

41. If he does, about how much time does he spend on it?

<table>
<thead>
<tr>
<th>Time Spent</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0 = no time</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = less than one hour a day</td>
<td>14</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>2 = one hour</td>
<td>26</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>3 = about two hours</td>
<td>16</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>4 = about three hours or more</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

42. How much trouble do you have getting him to do his homework? Does he do it on his own or do you have to push him or punish him to do it?

<table>
<thead>
<tr>
<th>Trouble Level</th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = no trouble</td>
<td>36</td>
<td>45</td>
<td>49</td>
</tr>
<tr>
<td>1 = has to push him (threats, reminding continually)</td>
<td>16</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>2 = has to punish him</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
43. Is there some special place where he likes to do his homework?

N = no response
0 = isolates himself from noise and activities in the house or leaves home
1 = semi-isolation (gets away from TV room)
2 = no isolation at all (Maximum noise and activity in the room)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>17</td>
<td>7</td>
<td>21</td>
</tr>
<tr>
<td>1</td>
<td>29</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>11</td>
<td>27</td>
<td>17</td>
</tr>
</tbody>
</table>

44. When he needs help on his homework, who does ______ ask more frequently?

N = no response
0 = no one
1 = mother
2 = father
3 = older sibling
4 = other relative
5 = other (specify: friend, etc.)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>24</td>
<td>32</td>
<td>37</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

45. Do your children take any music or dance lessons?

N = no response
0 = No
1 = Yes

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>43</td>
<td>35</td>
<td>42</td>
</tr>
<tr>
<td>1</td>
<td>14</td>
<td>23</td>
<td>16</td>
</tr>
</tbody>
</table>

46. Do your children know where the public library is?

N = no response
0 = No
1 = Yes

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>1</td>
<td>42</td>
<td>57</td>
<td>42</td>
</tr>
</tbody>
</table>

47. Do they ever go there?

N = no response
0 = No
1 = Yes, and on their own initiative (they asked to be taken there)
2 = Yes, but only when parents take them

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>21</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td>1</td>
<td>26</td>
<td>54</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>10</td>
<td>1</td>
<td>11</td>
</tr>
</tbody>
</table>

48. Did you teach your child to read or count or print or anything like that before he went to school?

N = no response
0 = No
1 = a little (spent at least one hour a week teaching him)
2 = some (spent more than one hour a week, but did not set time aside daily)
3 = a lot (set time aside daily)

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>11</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>31</td>
<td>14</td>
<td>43</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>31</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>11</td>
<td>3</td>
</tr>
</tbody>
</table>
49. How many times have you and Mr. _____ visited the school during this school year?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = none</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = once</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2 = twice</td>
<td>7</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>3 = three times</td>
<td>12</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>4 = four times</td>
<td>4</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>5 = five times or more</td>
<td>22</td>
<td>30</td>
<td>44</td>
</tr>
</tbody>
</table>

50. If everything would go just right, how far would you like your child to go in school?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = completion of high school</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = to business or trade school</td>
<td>10</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2 = through junior college</td>
<td>2</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>3 = through four-year college</td>
<td>38</td>
<td>45</td>
<td>6</td>
</tr>
<tr>
<td>4 = beyond college to graduate school</td>
<td>9</td>
<td>3</td>
<td>53</td>
</tr>
</tbody>
</table>

51. Realistically, now, how far do you think he will actually go?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0 = completion of high school</td>
<td>19</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>1 = to business or trade school</td>
<td>1</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2 = through junior college</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>3 = through four-year college</td>
<td>29</td>
<td>37</td>
<td>44</td>
</tr>
<tr>
<td>4 = beyond college to graduate school</td>
<td>4</td>
<td>3</td>
<td>10</td>
</tr>
</tbody>
</table>

52. College costs so much these days that it is a big sacrifice to send a child through college. What do you think would make the sacrifice worthwhile?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>0 = not worthwhile</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1 = child will be better off economically</td>
<td>36</td>
<td>36</td>
<td>56</td>
</tr>
<tr>
<td>2 = child will have more status</td>
<td>3</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>3 = child would give status to his parents</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4 = child would care for parents when they are old</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>5 = other (specify)</td>
<td>13</td>
<td>14</td>
<td>0</td>
</tr>
</tbody>
</table>

53. What kind of a job would you like _____ to have when he grows up?

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>14</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>0 = high prestige (physician, lawyer)</td>
<td>11</td>
<td>9</td>
<td>33</td>
</tr>
<tr>
<td>1 = medium prestige (teacher, engineer)</td>
<td>20</td>
<td>38</td>
<td>26</td>
</tr>
<tr>
<td>2 = medium-low prestige (clerk, secretary)</td>
<td>12</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>3 = low prestige (unskilled labor, construction)</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
For this section give interviewer a copy of items. Explain that you will read each one and ask her to tell you whether she agrees a lot, agrees a little, disagrees a lot or disagrees a little with each item. State, "I know it is hard to decide on some of these, but do the best you can."

1. The sooner a child learns that a wasted minute is lost forever the better off he will be.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>0 = agree</td>
<td>5</td>
<td>47</td>
<td>51</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>3</td>
<td>8</td>
<td>6</td>
</tr>
</tbody>
</table>

2. Some times children have good ideas, but for the most part, their ideas should not be given a lot of weight in making family decisions.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>25</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>32</td>
<td>29</td>
<td>24</td>
</tr>
</tbody>
</table>

3. It is all right for a child to learn things outside the home which may make him doubt his parent's ideas.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>13</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>44</td>
<td>36</td>
<td>46</td>
</tr>
</tbody>
</table>

4. Too many women forget that a mother's place is in the home.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>50</td>
<td>53</td>
<td>49</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>7</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

5. It is not good for a parent to treat a child as an equal, because he might lose his respect.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>44</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>12</td>
<td>32</td>
<td>19</td>
</tr>
</tbody>
</table>

6. Children should not be allowed to try hard jobs since they are likely to get discouraged if they fail.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>28</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>29</td>
<td>37</td>
<td>47</td>
</tr>
</tbody>
</table>
7. Children who are held to firm rules grow up to be the best adults.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Agree</td>
<td>41 44 37</td>
</tr>
<tr>
<td>Disagree</td>
<td>16 14 22</td>
</tr>
</tbody>
</table>

8. Children who don't try hard for success will feel that they have missed out on things later on.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>3 2 1</td>
</tr>
<tr>
<td>Agree</td>
<td>51 39 53</td>
</tr>
<tr>
<td>Disagree</td>
<td>3 6</td>
</tr>
</tbody>
</table>

9. It is more important that a child be popular in school than it is for him to make the highest grade.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>3 2 1</td>
</tr>
<tr>
<td>Agree</td>
<td>8 8 5</td>
</tr>
<tr>
<td>Disagree</td>
<td>49 50 54</td>
</tr>
</tbody>
</table>

10. Children should never argue with their parents, when they are asked to do something.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>0 1 0</td>
</tr>
<tr>
<td>Agree</td>
<td>6 8 53</td>
</tr>
<tr>
<td>Disagree</td>
<td>11 9 6</td>
</tr>
</tbody>
</table>

11. Whenever there are adults visiting, children should not participate in the conversation.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Agree</td>
<td>53 31 50</td>
</tr>
<tr>
<td>Disagree</td>
<td>4 27 9</td>
</tr>
</tbody>
</table>

12. It is a good idea for a child to have some friends whose backgrounds are different from his own.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>0 1 0</td>
</tr>
<tr>
<td>Agree</td>
<td>24 50 57</td>
</tr>
<tr>
<td>Disagree</td>
<td>33 5 2</td>
</tr>
</tbody>
</table>

13. A mother has a right to know everything going on in her child's life.

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No response</td>
<td>0 0 0</td>
</tr>
<tr>
<td>Agree</td>
<td>.0 47 51</td>
</tr>
<tr>
<td>Disagree</td>
<td>7 11 8</td>
</tr>
</tbody>
</table>
14. Discipline should be the husband's job.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>35</td>
</tr>
</tbody>
</table>

15. A child should not be allowed to rebel against his parents' demands.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

16. A child should be encouraged to be very competitive, even though this may make enemies for him.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

17. A mother should encourage her child to be a leader in activities with other children.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

18. Men should not have to do housework (i.e. do dishes, vacuum, make beds, etc.)

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

19. If parents speak a foreign language, they should encourage their children to learn it.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

20. It is more important to work and plan for the future than it is to enjoy life now.

<table>
<thead>
<tr>
<th></th>
<th>N = no response</th>
<th>0 = agree</th>
<th>1 = disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>
21. Generally speaking, girls are not as intelligent as boys.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = no response</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>0 = agree</td>
<td>16</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>42</td>
<td>50</td>
<td>55</td>
</tr>
</tbody>
</table>

22. In terms of making a living and earning money, girls are just as important as boys.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>A</th>
<th>N</th>
</tr>
</thead>
<tbody>
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<td>38</td>
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<tr>
<td>1 = disagree</td>
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23. Relatives are more important than friends.

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<tbody>
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<td>0</td>
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<td>38</td>
<td>18</td>
<td>32</td>
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<tr>
<td>1 = disagree</td>
<td>19</td>
<td>39</td>
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24. If parents have a culture of a background different to those of the majority of people in the U.S., they should try to keep it and pass it on to their children.

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<th>N</th>
</tr>
</thead>
<tbody>
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<td>0</td>
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<td>46</td>
<td>33</td>
<td>51</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>11</td>
<td>21</td>
<td>8</td>
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</table>

25. Encouraging a child to compete with his friends in school gets him to become more interested in his studies.

<table>
<thead>
<tr>
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<th>A</th>
<th>N</th>
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<tbody>
<tr>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0 = agree</td>
<td>44</td>
<td>46</td>
<td>53</td>
</tr>
<tr>
<td>1 = disagree</td>
<td>13</td>
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<td>6</td>
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APPENDIX

PERSONAL DATA SHEET

1. Your name ____________________________ Boy ___ Girl ___
2. Phone number ________________________
3. Address ____________________________________________
4. Class ____________________________________________
5. How old are you now? ____________________________
6. When is your birthday? ____________________________
7. What town and state were you born in? ______________
8. How many sisters do you have who live at your house? Circle the right number: 1 2 3 4 5 6 7
9. How many brothers do you have who live at your house? Circle the right number: 1 2 3 4 5 6 7
10. Who else lives at your house? Put a check by the right people:
    Mother _________  Uncles _________
    Father _________  Aunts _________
    Grandmother_______ Cousins _________
    Grandfather_______ Stepfather _________
11. How many bedrooms are there in your house? _____________
12. Check what other rooms there are in your house:
    Living room_________  Play room ___________
    Den _____________  Breakfast room _______
    Dining room _________  Kitchen _________
13. How many people sleep in your bedroom?
   Just one ________  Four of us ________
   Two of us ________  Five of us ________
   Three of us ________  Six of us ________

14. Check the things that your family owns:
   Car ________  Television set ________  Washing Machine ________
   Radio ________  Sewing machine ________  Telephone ________

15. Did you go to kindergarten? Yes ________  No ________

16. Last weekend, did you stay at home all weekend? Yes ________  No ________
   What did you do? ____________________________________________
   Were Mommy and Daddy with you? ________________________________

17. Is English the only language Mommy and Daddy speak at home? Yes ________  No ________
   What other language do they speak? _____________________________
   Do you speak this language, too? Yes ________  No ________

18. What kind of work does your father do? ________________________________

19. Does Mother go out to work? ________________________________
   What kind of work does she do? ________________________________

20. Is Mother usually home while you are at school? ____________________
APPENDIX C

Tester's Instructions for Houston Study of Piagetian Tasks

Directions to Tester for Giving Conservation Tasks

I. Conservation of Mass (use yellow clay, two balls about the same size).
   "Do both balls have the same amount of clay . . . is there as much clay in this ball as in this one?"
If the child doesn't think they are quite the same, ask him to "Make them the same."
Prediction question:
   "Suppose I were to roll one of the balls out into a hot dog, will there be as much clay in the hot dog as in the ball . . . will they have the same amount of clay?" (Record answer.)
Judgment question (actually roll one of the balls into a hot dog):
   "Is there as much clay in the ball as in the hot dog . . . do they have the same amount of clay?" (Record answer.)
   "Why is that?" (Record reasons in full.)

II. Conservation of Weight (use red clay, two balls about the same size).
   "Do both balls have the same amount of weight . . . does this ball weigh the same as this ball?"
If the child doesn't think they are quite the same, ask him to "Make them the same." (Put on scales to show they are the same.)
Prediction question:
"Suppose I were to roll one of the balls out into a hot dog, will there be as much weight in the hot dog as in the ball . . . will they have the same amount of weight?" (Record answer.)

Judgment question (actually roll one ball into a hot dog, but do not put on scale):
"Now, is there as much weight in the hot dog as there is in the ball . . . do they have the same amount of weight?" (Record answer.)
"Why is that?" (Record reasons.)

III. Conservation of Volume (use two balls of the blue clay).
"Do both balls take up the same amount of space . . . do they both take up as much room?"
If child doesn't think they do, ask him to
"Make them the same." (Drop each ball into water jar and check water level.)

Prediction question:
"Suppose I were to roll one of the balls into a hot dog, would they both take the same amount of space . . . would the hot dog take as much space as the ball?" (Record answer.)

Judgment question (actually roll one ball into a hot dog, but keep it out of the jar):
"Now, will the hot dog take the same amount of space as the
ball in the jar does . . . will they take the same amount of room?" (Record answer.)

"Why is that?" (Record reasons in full.)

IV. Combinations.

"In the next game we will use different colors. We'll start with Red and Blue. We can make one pair out of them. Now we'll use another color, Yellow. Make a pair you don't have yet. Make it here (under Red and Blue). Make it with Yellow and one of the other colors. Now find another pair of colors that we don't have yet. Sometimes it's easier to keep track by putting the pairs under one another like this (putting Red pairs under Red (Red and Blue, Red and Yellow))."

When it is clear the child understands for three colors, say,

"Help me put these back in the right piles, and we'll try it with four colors."

Let child proceed. If he does not seem to get the hang of it, or stops with perhaps four pairs or so, ask,

"Do you have Red with Blue, Red with Yellow, Red with White? Now see if you have all the colors with Blue."

If the child puts down a pair he already has, ask,

"See if you have that pair already."

When the child has all six pairs, say,

"Now let's put them back in the piles again, and we'll try it with six colors. See if you can find a trick or a system that makes it easy to do."
After this, give no help. If the child gets hopelessly muddled, record what he does, then say,

"Let's put them back and start again, and see if you can find a system that makes it easy to keep track this time."

Give him help just this one time, if he is mixed up. The second try, record how he goes about it, and after about 10 pairs, if he's stuck, say,

"Now you have them all."
APPENDIX D

Tester's Record Form for Houston Study of Piagetian Tasks

Name ___________________     School ___________________
Tester ___________________   Date _______  Age _______

Record Sheet—Conservation

I. Mass
Did child want to change clay? Yes____ No____
If he did, did he change shape________________________
or take clay from one ball to the other?_________
Prediction question: Yes____ No____
Judgment question: Yes____ No____
Reasons____________________________

II. Weight
Did child want to change clay? Yes____ No____
If he did, did he change shape________________________
or take clay from one ball to the other?_________
Prediction question: Yes____ No____
Judgment question: Yes____ No____
Reasons____________________________

III. Volume
Did child want to change clay? Yes____ No____
If he did, did he change shape_______________________
or take clay from one ball to the other? ____________

Prediction question: Yes___ No___
Judgment question: Yes___ No___
Reasons__________________________________________

IV. Combinations

Did child understand and use a system with three colors right away? Yes___ No___ How many times?___

Did child seem to use a system with four colors the first try? Yes___ No___
on second try? Yes___ No___

Record with six colors:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>1</td>
<td>1-2</td>
<td>2-3</td>
<td>3-4</td>
<td>4-5</td>
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<td>1-3</td>
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<td>1-6</td>
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Total number of pairs ______
APPENDIX E

Analysis of Variance of Summed Scores (Mass-Weight-Volume)

<table>
<thead>
<tr>
<th>Source</th>
<th>M.S.</th>
<th>D.F.</th>
<th>F Ratio</th>
<th>P</th>
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<tbody>
<tr>
<td>Between</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultures (A)</td>
<td>17.117</td>
<td>2</td>
<td>2.2754</td>
<td>0.1038</td>
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<tr>
<td>Sexes (B)</td>
<td>1.038</td>
<td>1</td>
<td>0.1380</td>
<td>0.7121</td>
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<tr>
<td>Economic Levels (C)</td>
<td>1.995</td>
<td>1</td>
<td>0.2652</td>
<td>0.6136</td>
</tr>
<tr>
<td>A × B</td>
<td>0.601</td>
<td>2</td>
<td>0.0798</td>
<td>0.9228</td>
</tr>
<tr>
<td>A × C</td>
<td>3.427</td>
<td>2</td>
<td>0.4555</td>
<td>0.6408</td>
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<tr>
<td>B × C</td>
<td>3.457</td>
<td>1</td>
<td>0.4596</td>
<td>0.5059</td>
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<tr>
<td>A × B × C</td>
<td>5.531</td>
<td>2</td>
<td>0.7352</td>
<td>0.5147</td>
</tr>
<tr>
<td>Within</td>
<td>7.522</td>
<td>168</td>
<td></td>
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<tr>
<td>Total</td>
<td>7.394</td>
<td>179</td>
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APPENDIX F

Analysis of Variance of Mass, Weight, and Volume Tests

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<td>19.171</td>
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<td>16.8991</td>
<td>0.0000</td>
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<tr>
<td>Sexes (B)</td>
<td>0.024</td>
<td>1</td>
<td>0.0215</td>
<td>0.8783</td>
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<tr>
<td>Economic Levels (C)</td>
<td>1.156</td>
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<td>1.0193</td>
<td>0.3151</td>
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<tr>
<td>A × B</td>
<td>0.562</td>
<td>2</td>
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<tr>
<td>A × C</td>
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<td>B × C</td>
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<td>1</td>
<td>1.8714</td>
<td>0.1696</td>
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<td>2.570</td>
<td>2</td>
<td>2.2657</td>
<td>0.1048</td>
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<tr>
<td>Within</td>
<td>1.134</td>
<td>168</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1.345</td>
<td>179</td>
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### Weight

<table>
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<tr>
<td><strong>Between</strong></td>
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<td></td>
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<tr>
<td>Cultures (A)</td>
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<td>Sexes (B)</td>
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<td>0.4469</td>
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<td>Economic Levels (C)</td>
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<td>1</td>
<td>0.3887</td>
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<td>A × B</td>
<td>0.117</td>
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<td>0.0664</td>
<td>0.9354</td>
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<td>A × C</td>
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<td>B × C</td>
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<td>A × B × C</td>
<td>1.788</td>
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<td>1.0125</td>
<td>0.3669</td>
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<tr>
<td><strong>Within</strong></td>
<td>1.766</td>
<td>168</td>
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<td><strong>Total</strong></td>
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### Volume

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<tr>
<td><strong>Between</strong></td>
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<td>Economic Levels (C)</td>
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<tr>
<td>A × C</td>
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<td>B × C</td>
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<tr>
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# APPENDIX G

## One Way Analysis of Variance of Manipulation Scores in Conservation Patterns

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<td>151.39</td>
<td>179</td>
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BIBLIOGRAPHY


______. "La nozione di conservazione del volume e le operazioni di combinazione come indici di sviluppo del pensiero operatorio in soggetti appartenenti ad ambienti fisici e socioculturali diversi," Rivista di Psicologia sociale, 13 (1962): 147-162.


