

A COGNITIVE DEVELOPMENTAL STUDY  
OF CHILDREN'S SEX-ROLE DEVELOPMENT

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of the requirements of the  
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## PREFACE

This study is a stage and sequence investigation of the hierarchy of operational structures involved in the child's acquisition of gender identity. It is a study in the Piaget tradition, taking its point of departure from Lawrence Kohlberg's theorizing. In the recent Handbook of Socialization Theory and Research (Goslin (ed.), 1969) the following comment appears:

"Since the cognitive developmental theory sex-typing was proposed recently, there have not yet been any direct tests of specific hypothesis derived from theory and adequate evaluation is not possible. Nevertheless, Kohlberg's presentation is intriguing, thoughtful, stimulating and plausible. It cites relevant supportive evidence and emphasizes a number of problems neglected by other theories of sex-typing." (Mussen, 1969, p. 726.)

This study investigates qualitative changes in the child's perception of his social world involving his sense of self and his sex-role using measures that were devised by the author.

The study demonstrates that the child's sexual and social attitudes are neither a direct reflection of cultural patterns nor a direct reflection of innate structures, but are patterned by the child's cognitive organization of his social world along sex-role dimensions.

## APPRECIATION

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K.D.V.

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### Summary

The present study of the acquisition and development of the child's sex-typed behaviours and attitudes is pursued in the Piagetian cognitive developmental tradition. Qualitative changes in the child's perceptions of himself and his physical and social world are described as changes in *mental structure*. The cognitive structures are made up of categories of experience or *schemas*. The schemas are organizations of actions upon objects which possess the quality of mobility. Development of the cognitive structure is facilitated by old structures being continually fitted to new functions, and new structures evolving to fill old functions under changed circumstances. Through age and experience, schemas form hierarchical integrations of increasing differentiation moving from predominant use of lower to higher level operations.

This study accounts for the qualitative changes in the child's gender self-concept with age development by investigating the changes in the structure of the child's cognitive schema. The cognitive developmental approach evidenced in the work of Piaget and Inhelder deals comprehensively with the acquisition and general stabilization of constancies in the physical world; the concepts of number, weight, mass, time, etc., only recently has it been proposed to account for the development of gender concepts (Kohlberg, 1966).

One of the central postulates of this research is that the stabilization of gender concepts in the area of socialization is only one aspect of the general stabilization of constancies, and

that a firm gender identity develops and becomes secure in a fashion parallel to the development of physical concepts.

The research strategy attends to the problem of how the cognitive representation of the sex-role identity of the young child not only differs from the mature adult, but how it moves from predominantly lower to higher levels of operation. The research strategy therefore employs a stage and sequence method of analysis demonstrating:

- (a) that stages imply qualitative changes in children's modes of solving the same problem at different ages.
- (b) that these different modes of thought form an invariant sequence or succession in individual development; while cultural factors may slow down, stop or speed up development, they do not change its sequence.
- (c) Each of these different sequential modes of thought represent a structured whole.

A given stage response on a task does not just represent a specific response determined by knowledge and familiarity with a particular task or tasks similar to it. Rather it represents an underlying thought organization. Hence the method of enquiry adopted is described as the 'revised clinical method'. It is a method which is capable of studying the *content* or structure of the child's thought. The content of the child's thought is particularly difficult to investigate as young children do not find it easy to communicate their thoughts. In this study, whenever possible, the examiner's questioning refers to concrete objects set before the child. In some instances the child is required to make judgements about the materials before him, at other times he is required to

manipulates them in this way revealing:

- (a) whether he understands the problem as set down by the examiner, as well as
- (b) providing him with a means to express himself.

The data is recorded on two levels; at a quantitative level permitting a statistical analysis of the responses between age groups and within age groups (this data is presented in the tables and graphs), at the qualitative level the actual structure of the child's thought is analysed as evidence of a particular stage of operations.

The sample population was made up of 125 middle class white boys and girls between the ages of 4 and 8 years of age, with 25 children in each age group. The study comprises of 5 sections with 5 measures designed by the author which were administered to these subjects. (See Table 1)

The first chapter introduces the concept of 'gender identity' as generated by the cognitive developmental approach, i.e. that the child's basic sex-role identity is largely the result of a self-categorization as male or female made relatively early in development (2-3 years). Subsequently the intuitive self categorization broadens and becomes operationally stabilized as the cognitive structure develops.

A Gender Identity Measure was developed by the author to investigate the stages of development and the degree of constancy which children between 4-8 years of age attribute to gender assignment. This measure is intended to be related to the more detailed investigations of the cognitive processes at each stage

of development described in the subsequent chapters.

The theme that emerges is that Gender Identity as a cognitive construct passes through a vertical hierarchy of operations which means that at each age, not only does the child's age-role definition alter, but also the way he perceives his social environment and interprets his social relationships differ quantitatively from one stage to the next.

The performance of 125 children on the Gender Identity Measure is statistically treated and graphically represented (Table 2, Figure 1), revealing age related stages of development analogous to Piaget's classic experiments of conservation in the physical world.

In the chapter, Gender Ascription, the change from the physical to the psychological-normative modes of cognition is investigated, demonstrating the influence of body size on early intuitive gender ascription. The child at the preconceptual level begins to reconstruct all that has developed at the sensori-motor level, but this time at the level of representational thought, facilitated by the use of language. But as yet there are no operations, i.e. no conservation. The child at the preconceptual stage uses ready made schemas arrived from his sensori-motor experience to interpret these social realities.

The data (see Tables 3, 4, 5) reveals that children are still confused about genital differences at an age (4 - 5 years) when they clearly stereotype gender in terms of size, strength and aggression, which suggests that genital considerations do not form the direct basis of sex-role definition. Rather, it appears that it is only at the stage of about 7 years when the child realises that genitals are the basis for gender ascription that they acquire new significance and centrality.

The chapter on Gender Classification investigates how the child's thought gradually becomes freed from defining social and behavioural characteristics in terms of physical attributes and becomes capable of establishing properties as invariant in the face of irrelevant changes. The child begins to categorize part from part. From an egocentric self-label of 'boy' or 'girl' it is now possible for him to conceive of a class of beings with common defining properties.

The data from three classification tasks from 75 children between the ages of four and six years is presented in Table 6 and 7. The findings indicate:

- (a) The reality judgements leading to appropriate self-categorization and categorization of others are judgements which follow a regular course of age development and
- (b) The difficulties that the child experiences in establishing gender definitions closely parallel his difficulties in establishing stable definitions of physical objects in general, and the former are resolved as the latter are.

In the chapter Gender Class Inclusion, the investigation attends to how the child becomes capable of comparing part to the whole destroying the part as previously. This means that he begins to perceive boys and men as subgroups of the class of males and girls and women as part of the class of females.

The measures devised by the author were based on Piaget's classic experiments of class inclusion. In Table 8 and 9 the data from gender class inclusion tasks and physical class inclusion tasks from the sample of 100 children between 5 and 8 years of age

is presented. The operations involved in the gender tasks and physical tasks were compared and found to be the same.

The implications of the age at which these operations take place is discussed in terms of the cognitive developmental interpretation of identification, i.e. that identification proper depends on the ability to conceive of one's own sex parent and oneself in the same class of beings, that identification is the *consequence* rather than the cause of gender identity as in traditional theories.

The final chapter, Gender-Age-Time, investigates the stages and sequence of operations in the development of the child's concept of gender, age and time. The research strategy is both theoretically and practically related to Piaget's investigations through discovering how the child succeeds in organizing the time of external events, at first intuitively and then by a set of qualitative operations.

The findings are categorized into stages, the data appears in Table 10 showing the relationship between the sequence of the stage and the age of subjects. Qualitative trends revealing the logical difficulties encountered at each stage are drawn from the children's protocols.

#### Brief References

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- 1969 The cognitive developmental approach to socialization. In D.A. Goslin (ed.): Handbook of Socialization Theory and Research. Chicago: Rand McNally.

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- 1966 A Cognitive developmental analysis of children's sex-role concepts and attitudes. In E. MacCoby (ed.): The Development of Sex Differences. Stanford, California, Stanford University Press.

A COGNITIVE DEVELOPMENTAL STUDY OF CHILDREN'S SEX-ROLE DEVELOPMENT

The present study is an attempt to investigate the child's acquisition of sex-typed behaviours and attitudes guided by an approach labelled 'cognitive developmental' incorporating a set of assumptions and research strategies common to a variety of specific theories of social and cognitive development such as J.M. Baldwin (1906), J. Dewey (1930), J.H. Mead (1934), Loevinger (1960), and more specifically Piaget (1948, 1952) and Lawrence Kohlberg (1966, 1969).

The assumption that we begin with is that the child's sexual and social attitudes are neither a direct reflection of cultural patterns nor a direct reflection of innate structures, but are patterned by the child's cognitive organization of his social world along sex-role dimensions.

The development of sex-typing is conceived as an aspect of cognitive growth which involves basic qualitative changes with age in the child's mode of thinking and concomitantly in his perceptions of the physical and social world, including his sense of self and sex-role. Learning, particularly observational learning, plays some role in sex-role acquisition, but the most significant factor is the child's *cognitive activity* -- his active selection and organization of his perceptions, knowledge and understanding.

Before considering the application of the cognitive developmental approach to sex-role development, we shall outline the basic characteristics of these theories in general and Piaget and Kohlberg's contribution in particular.

### Cognitive Structural Stages

The cognitive developmental approach to children's sex-role development used in this study, departs significantly from the mentalistic-associationist theories of cognition, as psychoanalysis, as well as behaviouristic theories such as S - R mediation theories.

The most striking departure from the more popular approaches above, is the way in which the qualitative changes in the child's perceptions of himself, his physical and his social world are accounted for. Following the Piagetian tradition, such changes are described as changes in *mental structure* which are distinguished from behaviour changes or learning, due to the rate or intensity of the response or the pairing of a response with a particular stimulus as defined by the parameters of associationistic learning. Rather, the concept of mental structure refers to the general characteristics of shape, pattern or organization of the response and the rules for processing information or for connecting experienced events.

The Piaget concept of mental structure is derived from the biological explanation of the adaptive ability and development of biological structures which are stimulated to evolve to suit the life of an area with its particular geographic and climatic conditions. It is Piaget's view that the behaviour of the human strongly resembles the biological picture of a complex, mutually regulatory system in equilibrium involving the continuous suiting of old structures to new functions, and the development of new structures to suit old functions in changed circumstances.

### The Schema

For Piaget, the behavioural equivalent of the biological structure is the 'schema'. The schema differs in a number of ways from a response to a stimulus: It is true that in its simplest form the schema can be nothing more than a predictable response to a stimulus at the reflex level, but this where the similarity ends. Even the earliest schema described Piaget -- the sensorimotor sucking reflex in response to stimulation on the inside of the mouth -- in practice differs from a response to a stimulus in that it has the quality of mobility, and this mobility increases with age. For example, within a few weeks after birth the sucking schema has already expanded to include a variety of acts under many different circumstances. For instance, searching for the breast when the child is placed against the mother's body and performing sucking movements while watching the mother prepare food for him. Later sucking is applied to a variety of nonnutritive objects such as blocks, spoons and the thumb. Because of its mobility, the schema can be applied to objects never before encountered. The mobility increases if the schema is employed for obtaining some goal in addition to providing satisfaction as an end in itself.

The example we have given is of an overt (sensorimotor) schema, however Piaget uses the term at another level to describe internalized thought processes (cognitive schemas). What is the justification for including both sensorimotor and cognitive schemas under the same conceptual label? There are a number of reasons: For Piaget, cognitive structures are always structures of action upon objects as

much as the overt schemas are structures of action. He maintains that every schema has certain unitary properties which justify the assertion that all actions involved in it are parts of a single schema. Conceptual thinking to him involves mental acts such as putting things together or relating events, and drawing implications. Further, the cognitive schemas derive from the sensorimotor schemas by a process of internalisation. Piaget shows developmentally how the primitive schemas of the neonate gradually broaden, merge with one another, differentiate, and become more mobile and eventually acquire the organisation that marks operational systems. An operational system is the integration of a number of schemas into a coherent logical system. The child who is capable of combining objects to form classes, and combining classes to form larger classes, or conversely is able to divide members of a large class into subclasses is said to be at the stage of concrete or formal operations (7-8 years).

According to Piaget:

"A cognitive operation consists of joining objects to a class to construct a classification, or putting things in a series; or an operation would consist of counting or measuring. An operation or a 'process' which is the essence of knowledge, is a set of actions modifying the object and enabling the knower to get at the structure of the transformation ... The operational structures are what seem to me to constitute the basis of knowledge, the natural psychological reality, in terms of which we must understand the development is to knowledge. The central problem of development is to understand the formulation, elaboration organisation

and functioning of their structures." (Piaget, 1964, p8,9.)

So far, we see that the cognitive developmental approach differs from the associationistic theories of learning:

1. By explaining basic development in terms of transformations of *cognitive structure* involving a description of parameters of organisational wholes or systems of internal relations.
2. The cognitive structures are made up of categories of experience (schemas), the organisation of which is always an organisation of *actions* upon objects, rather than a passive connecting of experienced events through external associations and repetitions. The connecting of experienced events or processing of information is carried out by selective and active processes of attention, information gathering strategies, motivated thinking, etc.
3. The schemas possess the quality of *mobility* which increases with age. Development of the cognitive structure is thus facilitated: old structures are continually being fitted to new functions, and new structures evolve to fill old functions under changed circumstances. Through age and experience, schemas form hierarchical integrations of increasing differentiation moving from predominant use of lower to higher level operations. The qualitative changes in a child's mode of cognition with age development are accounted for by the changes in the structure of the child's cognitive schema.

4. A further important assumption made by the cognitive developmental approach regarding the development of the cognitive structure is that it is the result of a process of *interaction* between the structure of the organism and between the structure of the environment rather than the direct result of learning (in the sense of a direct shaping of the organism's responses to accord with environmental structures.

In accounting for developmental changes, the cognitive developmental assumption of 'interaction' deals with issues relating to the location of the principles producing basic mental structure within or without the organism in contrast to organismic maturational theories like those of Lorenz (1965), and Gesell (1954) in which the patterning of age-specific behavioural forms is primarily due to the unfolding of genetic structures, and in contrast to environmentalists beginning with John Locke, J.B. Watson and Skinner (1965), who may allow for genetic factors in personality, but assume that the basic structure of complex responses results from the structure of the child's environment. Both specific structures and general cognitive structures, like categories of space, time and causality, are believed to be reflections of structures existing outside the child -- structurings given by the physical and social world. (Kessen, 1965.)

In other words, the cognitive developmental assumption of basic mental structure as being the result of an interaction between certain organismic structuring tendencies and the structure of the outside world rather than reflecting either one directly, contrasts with the

maturationalist assumption that basic mental structure results from innate patterning, and the learning theory assumption that basic mental structure is the result of the patterning or association of events in the outside world.

The above assumptions hold for cognitive development in general, in describing ways of thinking about both physical and social objects. However, the present study dealing with social social-emotional development, i.e. sex-role development, requires the addition of four further assumptions adapted from Kohlberg (1969).

1. 'Affective' and 'cognitive' development and functioning are not distinct realms, but parallel. They represent different perspectives and contexts in defining structural change.
2. There is a fundamental unity of personality organisation and development termed the 'ego' or the self. Psychosexual, moral and general social development are united by their common reference to a single concept of self in a single social world with social standards. Social development is, in essence, the restructuring of the concept of self in its relationship to concepts of other people, conceived as a being in a common social world with social standards.
3. All the basic processes involved in 'physical' cognitions, and in stimulating developmental changes in these cognitions, are also basic to social development. In addition, however, social cognition always involves '*role taking*', i.e. awareness that the other is in some way like the self, and that the other knows or is responsive to the self in a system of complementary expectations. Accordingly, developmental changes in the social self reflect parallel changes in

conceptions of the social world.

4. The direction of social or ego development is towards an equilibrium or *reciprocity* between the self's actions and those of others toward the self. The social analogy to logical and physical conservations is the maintainance of an *ego-identity* throughout the transformations of various role relationships. (We find evidence of this analogy in our investigation of the child's belief of his own unchangeable gender identity, which developes at the same age as physical conservations. See chapters on Gender Identity and Gender Classification.)

The Acquisition of Gender Identity: The Social<sup>Learning</sup> and Psychoanalytic Approaches

In order to understand how the cognitive developmental approach differs from the psychoanalytic and social learning approaches with regard to the acquisition of gender identity, we shall describe the latter orientations briefly.

For the psychoanalytic theory, the child's gender definition is derived from a process of "identification". This term refers to the process whereby, "An individual may be observed to respond to the behaviour of other people or objects by initiating in fantasy or reality the same behaviour himself ... the individual strives to behave in a way that is exactly like that of the object." (Sanford, 1955, p.202.)

For identification to take place, the motivation postulated is anxiety over anticipated aggression from a threatening and powerful father. (A. Freud, 1946; Sarnoff, 1951.) Around the age of 5-6

the boy's incestuous wishes toward the mother are very strong, but are counter balanced by the child's fear of his father's strength and the possibility of punishment, particularly castration. Since the boy cannot hope to vanquish his father and win his mother, he copes with this by "becoming one with him", by introjecting him and thus avoiding threat as well as, presumably, enjoining the mother vicariously. This process is called "identification with the aggressor". (Anna Freud, 1937) or "defensive identification". (Mowrer, 1950). Sanford (1955) referred to this as "identification proper".

The cognitive developmental view of identification differs from the psychoanalytic in the following regards:

- (a) Identification is viewed as a cognitive structural stage of more general imitative or social-sharing processes.
- (b) Accordingly it is not uniquely dependant upon particular motives and ties only present in the early parent-child relationship.
- (c) Identifications are not totally fixed, irreversible, or "internalized". Rather identifications are "solutions" to developmental tasks which may change in object or nature with new developmental tasks.

#### The Social Learning View

The social-learning view also describes the child's gender identity in terms of 'identification' with the same-sex parent. This theory takes little account of the oedipus conflict, although recognizing it does occur in some cultures. It argues that the son

identifies with the father *because* he has been rewarded by him and therefore wishes to be like him. (Mischell, 1966.) The social-learning theory maintains that it is possible for boy's to make an adequate male identification and at the same time continue loving the mother. The identification is better consolidated if the boy has a strong and loving father than if he has not. The affection that he has for his father, under fortunate circumstances, grows stronger with age. As a result of it, and of general influence, the boy begins to immitate his father, hence acquire a masculine identity with appropriate sex-typed behaviour. There is no mechanism postulated why the boy should want to shift his affection from the mother to the father as in Freudian theory. In fact, withdrawal of the mother's affection should result in increased identification with her in terms of Sears (1957, p. 154) "dependency drive sequence".

In terms of strict learning principals the close attachment the boy has with his mother during the first five years should result in a feminine identification which is obviously not the case.

The alternative to the psychoanalytic and social-learning postulations of the acquisition of gender-identity is the cognitive developmental approach, recently formulated by Kohlberg (1966). In the following section we describe the principles of this orientation.

KOHLBERG'S COGNITIVE DEVELOPMENTAL THEORY OF SEX-TYPING

Since the present investigation takes its departure from Lawrence Kohlberg's formulation (Kohlberg, 1966), it is necessary to summarize the cognitive mechanisms whereby children acquire sex-role concepts and how they are translated into masculine-feminine values according to this theorist. The child's initial conception of sex-role stems from:

"important 'natural components of patterning i.e. aspects of sex-role attitudes which are universal across cultures and family structures and which appear relatively early in the child's development. This patterning of sex-role is essentially 'cognitive' in that it is rooted in the child's conceptions of physical things, the bodies of himself and of others, as he relates body concepts to his conceptions of a social order which makes functional use of sex categories in quite universal ways. Rather than biological instinct, it is the child's cognitive organization of social role concepts around universal physical dimensions that account for the existence of universals in sex-role attitudes." (Kohlberg, 1966, p. 82.)

According to Kohlberg, sex-typing is initiated by the very early self definition or labelling, beginning with the hearing and learning of the words 'boy' and 'girl'. By the age of two or three, children know their own self labels, and within the next few years they label others according to conventional cues. The child regards his sex definition as an 'abstract self-concept' which, when stabilized, is practically irreversible, "maintained by a motivated adaptation to physical social reality and by the need to preserve a

stable and positive self image". (Kohlberg, 1966, p. 88.)

The child's basic self categorization as 'boy' or 'girl' become a major organizer and determinant of many of his activities, values and attitudes. The boy in effect says, "I am a boy, therefore I want to do boy things, therefore the opportunity to do boy things (and gain approval for doing them) is rewarding". (Kohlberg, 1966, p. 89.)

At the same time that the child begins to understand the principle of conservation at about five or six years of age -- i.e. the fact that physical properties such as mass, number and weight are stable and invarient -- his own sex self concept or gender identity becomes stabilized. With further cognitive development he acquires a number of cross cultural stereotypes of masculine and feminine behaviour -- of male as active, dominant and powerful and aggressive, and females as more nurturant. These are not derived from parental behaviour or direct tuition, but rather stem from universal perceived sex differences in bodily structure and capacities.

Once established, basic sex-role concepts generate new sex-typed values and attitudes Kohlberg postulates a number of mechanisms by which sex-role concepts become directly translated into masculine-feminine values:

(a) Beginning with the assumption that the child is a valueing and value-seeking organism in that the infant has a tendency to explore, learn, act upon and master external objects and stimuli, rather than treating each tendency as a distinct primary need or drive, Kohlberg

is adapting Piaget's notion of assimilation i.e., "the child's tendency to respond to new interests that are consistent with old ones". (Kohlberg, 1966, p. 112.)

By the age of two or three there are clear-cut differences in interests, activities and personality characteristics. New objects or activities consistent with well established interests and preferences are assimilated, while discrepant ones are not.

(b) Children make value judgements consistent with their self-concepts of sex-role. The three year old has a "naive and egocentric tendency to value anything associated with or like himself" as best (Kohlberg, 1966, p. 113) and hence values and seeks objects and activities that are representative of his own sex.

(c) The motivational forces are general "drive neutral" motives for effectance and competence, which orient the child both towards cognitive adaptation to a structured reality and towards the maintenance of self-esteem. Young children tend to associate positive, self-enhancing values with sex-role stereotypes and these values are motivating. According to Kohlberg:

"The stereotyping revealed in the same-sex preferences of both boys and girls are too generalised to be simply extensions of innate or early acquired sex-differences in specific interest and temperament." (1966, p. 120)

Nor can they be explained by same-sex parent identification, as boys are still mother oriented (at age four) when preferences for objects, activities and playmates are already clearly established.

Masculinity is associated with values of strength, competence and power, and for the boy, acquiring this stereotype produces motivation

to enact the masculine role. With regard to femininity, even though adult females are perceived as less competent and less powerful than males, it is still superior to that of a child of either sex. There are distinctly feminine values associated with 'niceness'.

(d) The child has a tendency to perceive his gender role as normative and hence generates judgements that conformity is morally right and deviations as morally wrong. Kohlberg believes this tendency is largely the result of the child's conception of a socio-moral order in which each person has his place and in which deviation should be punished. Piaget (1947) also describes the child tendency to view any deviation from the social order as bad or wrong even if such deviation would not be considered bad by adults. Kohlberg goes on to postulate that the physical constancies underlying the child concepts of gender identity tend to be identified with divine or moral law, and the need to adapt to the physical realities of one own gender identity are viewed as moral obligations.

(e) Kohlberg's fifth mechanism is modelling or identification. His analysis of the process is strikingly different from the psychoanalytic or learning interpretations. Sex-typing is not conceived as the *product* of identification, quite the contrary, identification is a consequence of sex-typing. Boys model themselves after males because they already have masculine interests and values; "for the boy with masculine interests and values, the activities of a male model are more interesting and hence more modelled" (Kohlberg, 1966, p. 134.)

Kohlberg's interpretation of imitation and identification is

derived from Piaget's documentation of the "tertiary circular response" (Piaget 1952, p. 267) which is a kind of repetitive behaviour that engages and fascinates the child, where he repeats an action over and over again, not in any stereotyped form, but more like variations on a theme that is deliberately varied. New actions spring from this theme, which is one of the familiar schemas already well established in the child's repertoire. Extending this concept to gender development and imitation and identification in particular, Kohlberg sees this process as evolving from the circular reaction.

With regard to the central issue of biological versus cultural patterning, Kohlberg's approach to psychosexuality is 'interactional' in a special sense. The assumption is made that the basic mental structure is the product of the interaction between the organism and the environment rather than directly reflecting either innate patterns in the organism or patterns of events in the environment. He avoids any discussion on the quantitative contributions of biological and cultural factors to individual variations in sexual attitudes, maintaining that when the problem is posed in such a fashion, one can easily be led to nothing than piously eclectic 'interactionalism' which asserts that all behaviour is affected by both hereditary and environmental factors which have little conceptual significance.

"The critical theoretical issue here is the conception of the basic source of patterning in sexual attitudes, not the quantitative contribution of the factors that may influence or deflect this pattern in individual cases." (Kohlberg, 1966, p. 84.)

The necessity to clarify the above issue is important as many American psychologists have been peculiarly concerned with individual differences rather than developmental universals, and because they failed to understand the distinction between behaviour differences in general and behaviour *structure*, they have frequently misinterpreted European theories of development. Some American writers have, for example, misinterpreted Piaget's stages as "maturational" in the Gesellian sense, and have thought he claimed intelligence is unaffected by environment. Others (like J. Mc V. Hunt, 1961, 1963) have correctly interpreted Piaget's stages as being based on the assumption of organism-environment interactions but take the assumption as indicating that individual differences in intellectual performance was less hereditary than was long believed.

Kohlberg too, is unfortunately misunderstood by some American writers, for example Mussen comments:

"The theory is a descriptive-developmental one and is not primarily concerned antecedent-consequent relationships in sex-typing. As a result, it gives less adequate attention to individual differences in degree of sex-typing i.e. within sex differences in strength of sex-typing responses. Kohlberg views these fundamentally as the outcome of differences in level or rate of cognitive development. This hardly seems a satisfactory explanation however, for in any group of boys of the same age and equal intelligence there are wide variations in degrees of masculinity of interests, attitudes and behaviour." (Mussen 1969, p. 726.)

A recent comment by Danziger can appropriately be used as a reply to Mussen objection:

"Structural theories are not designed to predict individual differences in biological or psychological function. The most careful microscopic or macroscopic description of the anatomical structures involved in the function of digestion, for example, will not enable us to make any predictions relating *individual differences* in anatomy to individual differences in digestive function. Similarly, Freud's account which purports to describe certain universal functioning in personality in general does not logically lead to predictions about individual differences, and it does not seem that Freud could ever do so ... Faced with such considerations some investigators have turned to study socialization as a *process* rather than as an effect. Their interests have shifted from the products of socialization to its mechanisms." (Danziger, 1969, p.28.)

Another misunderstanding of the cognitive structural nature of Kohlberg's theory is expressed by Biller and Borstelman (1967) who, in an integrative review attempt to isolate factors which are presumed to effect masculine development. They see his emphasis on 'cognitive influences' to be a "rather one-sided view of sex-role development". They say, "He seems to assume that knowledge of sex-role is isomorphic with sex-role development ... but it does not encompass it all." (Biller and Borstelman, 1967, p.279.)

These critics appear to be using the concept "cognitive influence" in a way that associationists talk about only one process -- association. Cognitive theorists do not talk of the 'cognitive influence' upon the child on the one hand, and then go on to talk of the 'sociocultural influences' upon the child on the other hand, and then weigh out their relative contribution to the child's development -- an approach Biller and Borstelman adopt.

THE RESEARCH STRATEGY: Studying the development of children's sex role identity in terms of cognitive structural stages.

The research strategy involves foremost, an analysis of the development of children's sex-role attitudes and concepts in terms of cognitive structural stages. In terms of our assumptions above that the social-emotional development and functioning are not distinct realms, but parallel -- merely representing different perspectives, it becomes logically possible to relate the present analysis to the stages and structures elaborated by Piaget.

Piaget charted the growth of the child's thoughts through four distinct but chronologically successive modes of intelligence:

- (i) the sensorimotor (birth to 2 years)
- (ii) preoperational (2-7 years)
- (iii) concrete operational (7-11 years)
- (iv) formal operational (11 onwards).

In Diagram A, which is a summary of our research formulation, the respective cognitive structures relating to gender are depicted in the form of 'layers' or stages on the vertical axis, while the horizontal axis of the diagram gives an indication of the sequence of stages and their correspondence to the periods of operation formulated by Piaget.

Cognitive stages are hierarchical integrations forming an order of increasing differentiation. As the child grows, his cognitive organization of the environment changes qualitatively. Our strategy attends to the problem of how the cognitive representation of the

DIAGRAM A

THE RESEARCH FORMULATION:

Sex-Role Identity as a Product  
of Cognitive Growth.

IDENTIFICATION: Cognitive growth now permits the boy, for example, to recognize and define the masculine role of his father in more individualistic terms related to the father's particular role definitions. Further identification does not make the boy more masculine, but serves to make the boy more conforming to parental expectations.

GENDER-AGE-TIME: Gender categorization becomes independent of age and time changes. The child understands that a sex-role definition involves an age-role definition.

GENDER CLASS INCLUSION: As the child becomes capable as regarding as permanent the relation of the part to the whole, he sees boys and men as subgroups of the class of 'males', and girls and women as the part of the group 'females'.

FIRST CATEGORIZATIONS: The child moves from arbitrary labels to the ability to define gender into classes of boy, girl, man and women. The child is able to establish certain properties as invariant in the face of irrelevant changes.

FIRST STEREOTYPES: Gender size operations: The concrete nature of the child's thought leads him to define social and behavioural characteristics in terms of physical attributes. Size, for example, defines the basic values and stereotypes on power dimension..

INTUITIVE CONCEPTS: appear resulting from successive 'centering'. The child begins to generalise the 'boy'-'girl' percept on the basis of a loose cluster of physical characteristics

PRE-CONCEPTUAL LABELLING of self and others as 'boy' or 'girl' on the basis on conventional cues, primarily clothing and hairstyle. Because of the child's egocentric tendency to make positive value judgements of anything associated with or like himself -- those cues that are perceived as 'like self' associated with the label 'boy' or 'girl' are viewed positively and predict the social reinforcements they seek.

EARLY SENSORY MOTOR SEX-TYPING through physical experience with toys and artefacts which are differentially prescribed for boys and girls at an age when they are yet too young to be aware of the sex-typed nature of of such preferences.

3

4 5-6 7-8 11 → period of formal operations

4-7 period of intuitive operations

2-7 preoperational period 7-11 period of concrete operations

sex-role identity of the young child not only differs from the mature adult, but how it moves from predominantly lower to higher levels of operation.

A stage and sequence analysis will demonstrate:

- (a) That stages imply qualitative changes in children's modes of solving the same problem at different ages.
- (b) That these different modes of thought form an invariant sequence or succession in individual development; while cultural factors may slow down, stop or speed up development, they do not change its sequence.
- (c) Each of these different and sequential modes of thought represent a structured whole.

A given stage-response on a task does not just represent a specific response determined by knowledge and familiarity with a particular task or tasks similar to it. Rather it represents an underlying thought organization. For example, the interpretation of the child's responses to our 'gender class inclusion' procedures at a particular stage such as the period of concrete operations, will reveal that his understanding that the class of boys and the class of men are sub-classes of the category of 'males' is determined by the same cognitive structure that permits him to grasp intellectually that one class can be included in the other, i.e. that two classes have the same defining properties, but that the sub-class has additional defining characteristics which the class does not have.

The cognitive developmental approach to sex-role acquisition thus presupposes a conceptual analysis of structural stages of the

following nature:

(a) An analysis of universal features of experienced events.

Stages of physical or social concepts depend on universal structures of experience for their shape in addition to invariants of the nervous system. An interactional conception of stages differs from a maturational one in that it assumes that experience is necessary for the stages to take the shape they do in addition to assuming that a richer stimulation will lead to faster advances through the stages involved.

(b) The understanding of cognitive stages depends on the logical analysis of orderings inherent in given concepts. Since the invariants of the sequence in the development of the concept does not depend on a prepatterned unfolding of neural patterns, it must depend on a logical analysis of the concept itself.

(c) Thirdly, an understanding of sequential stages depends on an analysis of the relation of the structure of the specific experience of the child to the behaviour structure. Such analysis focus on discrepancies between the child's action system or expectancies and the experienced event, and hypothesise some moderate or optional degree of discrepancy as constituting the most effective experience for structural change in the organism. (employing the concepts 'assimilation' and 'accommodation').

In the case of the present study, the rigorous application of the above strategy is, in a sense, modified as it is an extension of the analysis of stages already documented by Piaget. From a practical point of view therefore, the research strategy manifests itself in

the subsequent chapters to the extent of:

(a) demonstrating the presence of a particular operation and how it manifests itself at a particular stage of gender identity development,

(b) showing the parallel relationship between operations of a social nature and operations of a physical or numerical nature as documented by Piaget,

(c) demonstrating the process through which schemas at one stage are assimilated to a previous stage of operation. For example, in terms of the principle of the hierarchical integration of stages we find, how, at the level of concrete operations, the child replaces a physical-normative mode of cognition in which he used body-size as a basic indicator of all important age statuses with psychological-normative modes: as the schemas become more differentiated competence is associated with 'being clever' rather than 'being strong'.

In our experimental investigation we trace a change from the physical to the psychological-normative modes of cognition, demonstrating the influence of body-size on early intuitive gender ascription. (See chapter Gender-Size) Then we go on to investigate how the child's thought gradually becomes freed from defining social and behavioural characteristics in terms of physical attributes, and becomes capable of establishing properties as invariant in the face of irrelevant changes. The child begins to categorise part from part. From an egocentric self-babel of 'boy' or 'girl' it is now possible for him to conceive of a class of beings with common defining properties. (See chapter Gender-Classification.)

In the chapter Gender Class Inclusion, we discover how the child

becomes capable of comparing part to the whole without destroying the part as previously. This means that since he sees boys and men as subgroups of the class of males and girls and women as part of the class of females, he is now in the position to recognise and define the masculine role of his own father in more individualistic terms related to the father's particular role definitions.

Perhaps one of the most interesting discoveries is how gender becomes divorced from age and time. (See chapter on Gender-Age-Time) The operations of succession and duration which were previously unconnected become co-ordinated, permitting the child to understand that sex-role definition involves an age-role definition. These operations become stabilised at the 7-8 year level.

While each of the research chapters focusses on a particular operation within the hierarchy and the structures related to it, the Gender Identity chapter describes the gradual stabilisation of the child's gender self concept between the ages of four to eight years through the application of the Gender Identity measure. Here we discover how the child is able to consistently maintain a masculine definition of a male figure in the face of changes in its conceptual configuration.

## DEVISING MEASURES

This study investigating the hierarchy of operations that describe sex-role identity as the product of cognitive growth is presented in five sections:

- (a) Gender Identity
- (b) Gender Classification
- (c) Gender-Size
- (d) The Development of Gender Class Inclusion
- (e) Gender-Age-Time

Each section focusses on relevant aspects of the development and functioning of the child's cognitive structure at a particular stage. In order to define and analyse the nature and significance of the child's underlying thought organisation, a series of measures were designed by the author for the purpose. According to Mussen in the Handbook of Socialization Theory and Research: (Goslin, Ed., 1969, p. 726.)

"Since the cognitive developmental theory of sex-typing was proposed very recently, there have not yet been any direct tests of specific hypotheses derived from theory and adequate evaluation is not possible ..."

A problem that was confronted in planning the execution of the research strategy was the absence of any standard measures which could be employed. Mussen attributes this to the recency of the theory. Consequently the author set about devising instruments that could suitably be employed to study the content or structure of the child's thought with regard to sex-role.

The respective measures are described in the appropriate sections in conjunction with a description of the processes under consideration, the rationale and the postulates. Each section also contains a description of the problems encountered in devising and applying the measures, as well as the treatment of the responses.

Before each measure was finally administered, it was checked in a pilot study for significance and reliability. The nursery school and primary school teachers who observed the pilot testing made a number of valuable practical suggestions. In most cases alterations or modifications were called for before the final administration.

#### Postulations of Invariance

The nature of the cognitive developmental approach, being a study of process rather than cause and effect, demands postulates of invariance rather than directional hypotheses. Invariance is one of the important concepts in natural science which unfortunately has yet to become part of common usage in psychology. It can be said that a scientific theory is always, in a sense, a statement of invariance. This term is frequently encountered in the writings of Piaget. It is of interest to us for two reasons:

(a) A theory of cognitive development must describe and explain the processes whereby children come to understand the invariance of properties in their environment, as Piaget demonstrated how weight, for example, does not change if an object is reshaped as long as nothing is added or taken away. Similarly we are interested in demonstrating how all the basic processes involved in 'physical' cognitions are also

basic to social development.

Social development involves the restructuring of the concept of the self in relationship to concepts of other people, conceived as being in a common social world with common standards.

(b) We are equally interested in discovering invariances in the child's thought processes themselves. Here, the problem is, how does the child's functioning develop permitting him to transfer knowledge from one situation to another while maintaining a cognitive stability that allows him to meet the pressure of the changing situation.

The respective postulates of invariance appear in the appropriate chapters relating to the specific cognitive operations under consideration.

### METHOD OF ENQUIRY

The first problem in devising a suitable research strategy was to select a method of enquiry which was capable of studying the *content* or structure of the child's thought. The content of the child's thought is particularly difficult to investigate as young children do not find it easy to communicate their thoughts. The investigator who wishes to study this field should be aware that the young child does not yet use language as a dominant mode of communication, therefore, the techniques of eliciting data should be particularly sensitive. What is equally important is that the examiner himself should be a trained and sensitive observer of children. If adequate rapport is not established, or if the child's attention span is surpassed, the data will be unreliable.

### Considerations in choosing an appropriate method

Careful attention had to be devoted to the choice of an appropriate method by weighing the advantages and the disadvantages of the various alternatives open to us in relation to the research requirements. Consideration of the various methods used by Piaget as well as the methods used by subsequent investigators in replicating his research was found to be useful.

In Piaget's early study of infants he employed partly a naturalistic and partly an informal experimental approach. He patiently observed and documented the behaviour of his own three children as it occurred naturally while the child was in the crib or while it was at play.

It was a method he had taken over from his previous experience in biological science. There was no observer to check the reliability of his observations, nor specific instruments or experimental apparatus. If however, in the course of his observations, it appeared that the child could not deal with a certain kind of problem, Piaget would often intervene and impose these obstacles on the child and observe the results. This procedure is obviously very different from the usual experimental approach in which the child's behaviour or psychological reactions are observed, often with special instruments under carefully controlled conditions in the laboratory. Yet the procedure suited Piaget's requirements admirably. His aim at the outset was to explore and to describe. He felt that at the initial stage of research, a rigid testing technique and the use of statistics was premature.

It is indeed true that unlike a controlled experiment which tends to focus the attention of the investigator on a limited class of behaviour, often making it impossible for other kinds of behaviour to be noticed; Piaget's keen observation and intimate contact with his subjects lead him to discover phenomena that not only were original but almost too surprising to be believed. Yet the drawbacks which prevent it from being used by us as an instrument of research are numerous:

1. It is very time consuming as an examiner may observe a child for a very long time before anything of interest may be noted.
2. As he is called to make constant evaluations, the

- examiner must be a highly skilled and attentive observer.
3. Standard statistical tests are not used although today they are seen as indispensable tools of research.
  4. It is more suited for initial exploratory work with a small number of children, requiring maximum flexibility, than for a later phase of research when flexibility can be sacrificed for standardization.

The above method of enquiry is unsuitable for our requirements for both practical and theoretical reasons: Theoretically, the cognitive developmental approach is sufficiently well established with regard to the documentation of the successive stages of cognitive and the mechanisms operative at these stages, to permit us to both narrow the focus and adopt a more rigorous methodology. Practically, the naturalistic-observational method is more applicable to the sensory-motor stage while the youngest of our subjects are four years old -- in the preoperational stage. At best, naturalistic observation can serve only a subsidiary role in that it can suggest questions for intensive clinical examination, or it can serve as a check on the results of clinical testing.

#### The Clinical Method versus the Testing Method

An evaluation was made regarding the suitability of the testing method versus the clinical method insofar as they would suit our

purposes.

The testing method is a widely used psychological research technique featuring a series of questions which are posed in the same way to all who take the test. It is important that the questions be read in precisely the same way to all the children. No flexibility at all is permitted, other than repeating the question if the child does not understand. The important feature of the method is the standardized administration in order to guarantee that all subjects are faced with the same problems. If four year olds give one answer and 8 year olds another, then the examiner may reasonably conclude that there is a real difference between age groups.

Replication studies of Piaget's exploratory work by researchers such as Elkind (1961) demonstrate the value of a strict testing method. The lack of flexibility in procedure, the narrow focus upon a single facet of cognitive growth are then no longer disadvantages, but are exploited to gain normative data.

When it comes to the *discovery* of content or 'structural operations', then the testing method is not suitable for the task -- mainly because of the inflexibility of the method. If the child gives an interesting response the examiner cannot pursue it, or if the child's answer suggests an additional topic for investigation then the examiner must leave the matter unexplored. For example, in our investigation of children's gender-size concepts some children revealed that they had classified one of the two pictures of dogs presented to them as female on the basis of length of hair. This was an interesting response and was worth pursuing.

Another disadvantage of the testing method is that the answer the child gives may not reveal the spontaneous contents of his thought, but may merely be a hastily considered response to a question encountered for the first time. In research of our nature when one is investigating the invariance of certain concepts, it is particularly important that the examiner is assured of the stability of the child's response. If the child is unsure, further questioning may induce him to change his mind, whereas if the concept is secure the child will consistently reveal it. The testing method merely requires an answer without indicating whether it is secure or tentative.

Piaget tended to avoid a set standardized form of testing, preferring a general framework with wide flexibility for questioning the child. We can call this the 'Clinical Method'. The basic aim of this method is to follow the child's thought without deforming it by suggestions, or by imposing the adult's views upon the child. Piaget admirably demonstrated how the examiner adopts the language of the child and keeps the level of the questions accessible to the child. Terms which are beyond his reach are avoided or replaced as much as possible by those which the child has spontaneously emitted. If the child does not understand then the examiner is free to rephrase the question. The answers of the child are formed into an hypothesis concerning the nature of the child's belief; subsequent questions are then used to test this hypothesis.

The delicate nature of the clinical method and the fact that it is prone to several kinds of errors hardly makes it a viable alternative to the testing method. It is easy to see that no two examiners

will pursue the same line of questioning. Since clinical interviews are very unstandardized it is difficult for an independent investigator to test the findings.

For our purposes the clinical method is deficient. Piaget came under heavy fire in that he committed a large number of methodological sins; his books only give portions of selected clinical interviews. He fails to report the number of subjects, their exact age, social background and there is no statistical summary. However, Piaget's goal was to open up new areas for investigation using methods which were as flexible as possible.

For our purposes, the ideal method of investigation would be one which would be somewhat midway between the Testing Method and the Clinical Method, yet minimising the disadvantages of each. This involves finding a balance between the attributes of the two methods -- weighing out concepts which are often mutually exclusive such as rigidity permitting standardization versus flexibility and depth. This method, which we shall call the 'Revised Clinical Method' is the one that we have adopted.

#### The Revised Clinical Method

This method involves several features which admirably suit our research requirements.

First, where possible it avoids a dependence upon verbalization unlike the traditional clinical method where the examiner poses the question in words and the child is required to give the answers in the same way. The reason for this is that the child might not understand

everything said to him, particularly if the words do not always refer to concrete objects. From the child's point of view, even if he *can* understand the examiner, it is very likely that he can not adequately express in words the full extent of his knowledge. So, whenever possible, the questioning refers to concrete objects set before the child. In some instances the child is required to make judgements about the materials before him, at other times he is required to manipulate them in this way revealing

- (a) whether he understands the problem as set down by the examiner, as well as
- (b) providing him with a means to express himself.

While completely non-verbal tests are desirable, it is often hard to invent them. This is particularly true for a study of our nature involving abstract concepts or the concept of thought as these concepts are not easily manifested in the simple manipulations of concrete objects. The revised clinical method, therefore must depend for its data on the child's verbal response. But even when this is necessary, the child's answers refer to a problem stated in terms of concrete materials which are present. For example, the child demonstrates his understanding of gender classes by sorting cards depicting boys, girls, men and women into their respective classes, i.e. the concept that boys and men are in the same class (males), the child again reveals this understanding by working with a concrete representation placed before him.

The problem of standardized questions versus a flexible enquiry is dealt with by compromising to some extent. All the

measures have a degree of standardization of administration in that the sequence of questions is basically the same for all subjects, yet when and if it is required, it is permissible to follow through a spontaneous comment by the child which appears fruitful. This is documented alongside the standardized enquiry adding qualitative information.

What we have attempted, is a balance between the quantitative and qualitative, and flexibility and standardization. The sample of children from whom we have acquired data is large, permitting us to make a statistical summary of their responses. At the same time many of the spontaneous comments and questions from the children will be included when describing results.

In summary the revised clinical method adopted involves:

1. a minimum of verbalization per se;
2. question and answers refer to concrete objects set before the child;
3. there is a degree of standardization for the purpose of statistical documentation of results;
4. a certain flexibility is permitted in following through the child's spontaneous remarks.

## SUBJECTS

A total of 125 children made up the sample for the major study. The youngest were four years old, and the oldest, eight years old at the time of testing. They were divided into five groups according to age.

The younger subjects of 4 and 5 years of age were all enrolled at two of the three demonstration schools attached to the Barclay House Training College for Nursery School Teachers. The 6, 7 and 8 year old subjects were all enrolled at the Golden Grove Primary School nearby.

The twelve subjects used in the pilot study were taken from the Herschell Road Nursery School, while the older ones were arranged privately. Their ages ranged from 4 to 10 years.

### Parents Permission

Parents who enter their children at the demonstration nursery schools give permission that their children may be used for observational studies by studentteachers as the completing of an observational study is required from each student. However, it was thought advisable by the headmistress that a special letter be drafted and distributed to the parents of the prospective subjects to explain the purpose of the present study, and requiring them to give signed permission that their children may be used as subjects. This was decided upon as past experience had shown that many parents had interpreted a request for their children to be tested as an indication that there was something wrong with their child. The

letter assured parents that this was purely a normative study.

The headmaster of the primary school, after acquainting himself with the nature of the tests, and noting that no real demands were being made on the children beyond that which they were accustomed to in the normal school routine, decided that no purpose would be served in "making too much fuss" by informing the parents etc., so that the testing commenced relatively unnoticed.

#### Socio-Economic Class

Admission to the nursery schools is highly desired by parents, and made strictly according to waiting lists. The high attendance fees, as well as the residential addresses of the parents indicated that the subjects came from an upper socio-economic bracket. Information from the school administration revealed that necessity was not a reason given for desiring admission -- almost all parents had their own domestic servants, and those mothers that worked did so out of preference. Only two reasons were given by parents for desiring admission for their child -- companionship and training.

The 6, 7 and 8 year old subjects were enrolled at the Primary School all lived in the upper middle class neighbourhood (Rondebosch) in which the school was situated. Most of the nursery school children move on to this school or others in the same neighbourhood. There was thus a certain continuity in residential and socio-economic class between the younger and older subjects.

### Qualifications for Subjects

Lists of children to be tested were drawn up in co-operation with the teachers who knew the children well, and were able to screen them in terms of the qualifications laid down. The only requirements were that the child had no incapacitating emotional, intellectual or physical handicap. It was stressed that the child should be able to represent his age group -- "a typical five or six year old" -- in order that generalizations could be made. These requirements were adhered to strictly by the nursery school teachers. However, there were two six year olds and two seven year olds in the primary school sample who manifested definite signs of personality disturbances. This was discussed with the teachers concerned who had drawn up the lists, who admitted that they had included these children in the hope that they could be given some advice on handling them, or in arranging treatment for them. These children were removed from the sample.

### The Composition of Age Groups

Each group contained 25 subjects of a particular age. 13 girls and 13 boys were initially listed. Absenteeism, refusal, or some other reason for the child not being tested generally brought the sample down to 25. If the sample was less than 25, then a replacement was found. If however, the quota was reached, then the final child on the list would be deleted. The ratio of girls to boys was as close as possible -- 13 to 12. Table 1 shows the number in each age group as well as the tests that they were

subjected to.

AGE

MEASURES

Gender Identity Measure  
 Gender Size Measure  
 Gender Classification Tasks  
 Additive Composition Tasks  
 Gender - Age (Time)

4		5		6		7		8	
M	F	M	F	M	F	M	F	M	F
12	13	12	13	12	13	13	12	13	12
13	12	12	13	12	13	13	12		
12	13	12	13	13	12				
		13	12	13	12	12	13	12	13
		12	13	13	12	12	13	12	13

TABLE 1 The number of boys and girls in each age group and the tests they were administered.

Testing Routine

A schedule of testing was drawn up to suit the routine of the particular school. At the nursery schools, testing began at 9 a.m. ending at 12 a.m. Allowance had to be made for the children's tea break, lunch, toilet routine, and the rest period. Each child was tested individually by one examiner. The average time taken to complete the test battery varied between 40 minutes and one hour. On occasions it was necessary to break the testing into two sessions.

At the primary school, the 6 year olds were tested between 9 a.m. and 12.50 a.m. when their school day ended, while the 7 and 8 year olds were tested in the afternoons between 12.50 and 2.15 p.m.

GENDER IDENTITY

The concept of 'gender identity' as generated by the cognitive developmental theories (Baldwin 1896, 1905, Piaget 1947, Kohlberg, 1966, 1969) is one that is very different from theories which suggest that basic sex-role attitudes are patterned by social reinforcements, sexual fantasies and fears, or identification with models. The alternative conceptualization is that the child's basic sex-role identity is largely the result of a self-categorization as male or female made relatively early in development by means of a process of intellectual or cognitive development, which depends partly on maturation, partly through contact with reality, and partly through explicit socialization pressures.

Gender identity seen from this perspective, is actually a cognitive structure that functions to extract and process information from the environment (i.e. stimuli), and integrate it into a representation of the environment in which the individual is himself a part. Such a structure then serves, in fact, to determine the effectiveness of various stimuli.

Research on children of kindergarten age (Delucia, 1961; Epstein and Leverant, 1963; Stevenson, 1965) demonstrate no general effect from reinforcement -- either negative or positive. Moreover, masculine and feminine values are not only maintained, but *determine* the value of some situational rewards. For example, high masculine scoring boys learned more effectively with reinforcements from a male E. than

a female E., while low masculine scoring boys showed no such differences.

Kohlberg (1966) refers to gender identity as a "basic cognitive categorization of the self". Other authors have recently proposed similar concepts such as Aronfreed's (1969) "cognitive template", or Bandura's (1969) "an image guiding imitation". Freud clearly recognised the importance of gender identity: The psychoanalytic interpretation emphasises the child's early anatomical uncertainty, with emphasis assigned to the discovery of differences in the external genitalia of males and females, resulting in the Oedipal Complex with castration anxiety in boys, and penis envy in girls. In other words genital differences, for Freud, was the basis on which children derived their gender identity.

The cognitive developmental theory however, while recognising the child's early anatomical uncertainty, does not assume the existence of the oedipal situation; the concern about the integrity and constancy of his own body is merely part of the child's general cognitive uncertainty at this time. Gender identity is not the result of a sudden and total resolution based on genital considerations at the age of 6 or 7 years; in fact children remain unclear about the genital basis of gender identity well after they have clearly accepted their own gender identity. (Katcher, 1955)

According to Kohlberg,

"Gender identity, i.e. the cognitive self-categorization as 'boy' or 'girl' is the critical organizer of sex-role attitudes. The 'gender-identity' results from a

basic, simple cognitive judgement made early in development. Once made, this categorization is relatively irreversible and is maintained in spite of the vicissitudes of social reinforcement, parent identification, etc." (1966, p.88)

In line with our perspective that gender identity is a cognitive mediator, it is worth clarifying Kohlberg's statement that gender identity results from a "basic, simple, cognitive judgement made early in development ..." This statement may appear somewhat final and could be misunderstood to be analagous to analytical resolution of the oedipal complex. For the cognitive developmental theory however, the early judgement or self-labelling as 'boy' or 'girl' at about 3 years of age (Gesell, 1940; Rabban, 1950) is no more than the earliest beginning of a cognitive structure.

As we intend to demonstrate in subsequent chapters; this 'judgement' is of an intuitive and egocentric nature which has yet to develop. The frame of reference has to broaden, and the concepts which are assimilated to the structure have to become stabilized.

Our thesis is that gender identity, as a cognitive structure, develops in the same sequential stages, involving similar operations at each stage, as the operations the child uses to understand his 'physical' world. We are interested in investigating these stages and the level of operations used in the cognitive development of gender identity.

The cognitive developmental approach postulates a vertical hierarchy of operations in the development of a structure, which means that at each age, not only the child's age-role definitions alter,

but the way he perceives his social environment and interprets social relationships will differ qualitatively from one stage to the next. For example the loose cluster of physical characteristics that the child relies upon to make early sex-typed distinctions, signify the level of operations at that stage, which are very different from the later more sophisticated operations that are evidenced at say six - seven years.

The problem of identifying and describing the development of different processes that go to make up gender identity is dealt with by applying specific measures which are discussed in subsequent chapters. These measures are intended to reveal in greater depth the operations of the cognitive components of gender identity. In this chapter, however, we describe the 'Gender Identity Measure' which demonstrates the degree of stability with which children at various ages have acquired with regard to their gender self-concept, so as to provide normative data, to which the findings of subsequent measures provide further understanding of the relative operations involved.

#### The Rationale for a Cognitive Gender-Identity

The rationale that leads us to want to investigate the relative 'stability' of the postulated structure -- Gender Identity, is based on Piaget's view that there is a parallelism or a correspondence between the cognitive verbal and affective aspects of the development of a reality orientation. According to Piaget (1947), the infant is from the start motivationally oriented toward contacting, maintaining and mastering objects, rather than toward pure tension discharge.

The child's gradual increase in reality orientation, his increased awareness of the constancy of the existence and identity of objects, is a result of basic qualitative changes in motivational processes. Research in this direction, (Piaget, 1947; Wallach, 1963; Inhelder and Piaget, 1958, 1964) has demonstrated that children below the age of 6 - 7 years do not view physical objects as retaining an invariable mass, number, weight, length, etc. when the perceptual configuration in which the object appears varies. Our contention is that gender identity is a cognitive structure, and is arrived at much in the same way, and in the same period, as the child arrives at other physical constancies. This involves the postulate that there are qualitative changes with age in the child's perception of his social world in which he is represented, as there are qualitative changes in his perceptions of his 'physical' world.

In effect what we are saying is:

- (a) Gender identity is the *product* of cognitive growth, not the result of differential reinforcements or parent identifications.
- (b) Gender identity is the *organizer* of sex-role attitudes and values.
- (c) It is the intervening mechanism between the stimulus and the response -- a cognitive mechanism -- which serves to extract the information from stimuli and integrate it into a cognitive representation of the environment.
- (d) A stable gender identity represents the equilibrium of a number of cognitive processes. Once established this categorization is relatively irreversible and is maintained by basic physical reality

the judgements regardless of/viscissitudes of social reinforcements, parent identifications, etc.

(e) Since gender identity is a cognitive mechanism, it develops in parallel stages as the stabilization of other physical reality concepts of the sort demonstrated by Piaget.

#### Development of the Gender Identity Measure

A number of requirements had to be met in developing a measure that would successfully assess the extent to which a subject was capable of categorizing gender as being irreversible and maintained by a cognitive conceptualization despite changes in appearance or behaviour.

Keeping in mind Piaget's classic experiments in which he required children to make judgements about the physical properties of various objects such as clay, liquids, etc., in which the perceptual configurations in which they appeared varied; we similarly required some means whereby we could get children to make a judgement about gender permanence, and then increasingly vary the perceptual configuration in such a way that the child's correct responses eventually could only be determined by his cognitive conceptualization of the irreversibility of gender assignment.

What was required was an instrument which would permit the measurement of a movement from the perceptual to the conceptual.

A survey of the literature revealed that there was no measure of this nature available. This is not surprising as the present approach is a radical departure from the conventional approaches which either stress the degree of similarity with same-sex adult

model as a function of gender identity, alternatively the measuring instruments take the form of various psychological Masculine-Feminine scales which depend on a description of interests and activities that western culture considers male-female or neutral; the degree of conformity to the norm is taken to be an index of 'gender identity'.

Before a measure such as the one intended, could be adopted, a number of questions had to be dealt with; the most pressing one being, 'what in fact are the cues by which children assign the correct sex-label to themselves and others?' Freudian theory suggests the young child's difficulty in learning the generalized differences between the sexes is due to his difficulty in accepting that there are genital differences between himself and those to whom he is attached such as his mother. Freud observed that it was only in the early school years (7 - 8 years) that the child could resolve these differences and was capable of identifying with the parent with the same anatomical attributes. This is supported by an early study (Conn and Kanner, 1947), using a doll play interview technique. Only fifty per cent of children aged four to six were aware of genital differences, while 72 per cent of children aged seven to eight were, and 86 per cent of children aged eleven to twelve were.

However, the cognitive developmental theory has it that genital uncertainty is only part of the broader anatomical uncertainty for the young child. There are two early studies on the discrimination

of sex differences by young children which provide useful information for the development of our gender identity measure -- Brieland and Nelson (1951), and Katcher (1955).

Brieland and Nelson (1951) wanted to determine how accurately children could identify the sex of children who were approximately their own age, and what factors predominated in such identification. They presented photographs of preschool children to 90 subjects between the ages of  $2\frac{1}{2}$  and 7 years. Ten photographs in each of five categories were presented -- both clothed and nude with sex appropriate and inappropriate somatype and hairstyle. They found that the hairstyle appeared to be the dominant cue in every age group, while genitals became increasingly important for older age groups, (6 - 7 years).

Katcher's (1955) study was similarly interested in discovering whether children were any more aware of genital differences than they are of other sex differentiating cues such as hair, breasts, clothing, manners, urinary posture, and how accurately young children could identify these differences. A series of coloured pictures depicting nude and clothed children and adults in similar poses were presented in segmented form. The subjects assembled the segments of the pictures and determined the sex of the figures by hair, clothes, breasts, and external genitalia.

The findings were that few errors were made by children over three years in assembling and identifying the clothed figures. In contrast children aged 3 to 6 years made many more errors in identifying the gender of the genital sections and matching it with the hair and trunk sections of the unclothed figures. Some errors

in genital assignment were made by 88 per cent of the three year olds, 69 per cent of the four year olds and 31 per cent of the 6 year olds.

When the findings of these two studies, Brieland and Nelson, and Katcher, are considered together, it appears that children rely predominantly on clothing and hairstyle as sex differentiating cues. It is not until the age 6 - 7 that they become aware that genital differences determine genders. Subsequently, our own measure was devised such that a fully clothed boy with short hair would be used to elicit responses about the male gender, and a girl with long hair and a dress to elicit responses about the female gender. Further, in order to determine the degree of constancy to which children of various ages attribute to gender assignment, the measure was developed so that the masculine defining cues could be successively altered by introducing feminine perceptual cues, until finally the male figure appears to be a female. This idea was derived from Kohlberg (1966) who asked children whether a girl could be a boy if she wanted to, if she wore boys' clothing and hairstyle. The feature of this then, that the subject is required to make a number of judgements about the constancy of gender assignment in the face of an increasingly changing perceptual configuration. Correct responses to the final question about the figure when for all intents and purposes it *looks* like a girl, can only be maintained by a cognitive construct, which we interpret as evidence of the invariance of gender identity.

#### Description of the Measure

The measure consists of a coloured cut-out drawing of a clothed

boy 6 cm high, a cut-out dress which can be superimposed over the boy's clothes, and cut-out girl's shoulder length hair which can be fitted over the boy's hair. There is also a larger card with a drawing of a number of girls playing; a blank space in the centre of the picture is provided where the fully dressed 'girl-figure' is placed.

#### Administration

S. is presented with a picture of a clothed boy and asked the following:

- (1) Give the child a name.
- (2) Is it a boy or a girl?
- (3) Could he be a real girl if he wanted to be?
- (4) Could he be a real girl if we put girls clothes on him, or would he just be dressing up as a girl?  
(E placed cut-out dress over boys clothes.)
- (5) Could he be a real girl if we let him have a girl's hairstyle? (Leaving dress on, E. places cut-out girls hairstyle over boys hair.)
- (6) Could he be a real girl if he played girls' games with the girls? (E. placed the figure with long hair and dress, onto a background picture of girls playing.)

#### Scoring

After introducing the cut-out figure to the child and orienting the child to the measure by asking him to give the male figure a name, the responses are scored from item 2 to item 6 on an all or none basis. Each item correctly answered is scored one point.

#### Range

The range of scores on the G.I.M. is from zero, when the child

fails even to identify the figure, to a score of 5, when the child reveals a consistent categorization of gender despite perceptual alterations in the test figure. The test items are graded in such a way that it should not be possible to score a zero on any item and gain a score on a subsequent item.

#### The Preliminary Study

An initial draft of the G.I.M. was administered to 12 children between the ages of 4 and 10 years. The purpose was to ascertain whether the wording, and the sequence of questions were appropriate as well as whether any alterations or modifications in the presentation of the figure was called for.

A valuable suggestion was made by the teachers at the nursery school where the pilot study was carried out, after sitting in on some of the sessions. After listening to a number of four and five year olds responses to the question, "Could he be a girl if he wanted to?" and "Could he be a girl if we put girls' clothes on him?" which the child in each case said was possible (referring to the cut-out figure). They felt that the child's response to the question relating to the figure were governed by the child's tendency to fantasise. This objection assumed that the child would give a different answer for a 'play-play cut-out figure' than if he was asked about a *real* person. To remove this objection the question was put as follows: "Could he be a *real* girl if he wanted to?" adding, "and not just a play-play girl, which is just dressing up."

A further check was made by asking the subject the same question both directly and projectively, i.e. "Could *you* become a real girl if you wore girls' clothes and grew your hair long and had a girl's hairstyle?" In each case the same response was obtained.

Table 2: The Gender Identity Measure

<u>N</u>	<u>Age Group</u>	<u>Mean</u>	<u>S.D.</u>
25	4 years	1.96	1.30639
25	5 years	2.52	1.32665
25	6 years	3.36	1.65529
25	7 years	4.16	1.02794
25	8 years	4.92	.399998

Anova Summary:

Source	S.S.	D.F.	M.S.	F Ratio
Age Group	143.408	4	35.8521	24.1482
Error	178.16	120	1.48467	

F = 24.1482, df = 4, 120, p < .01

In order to make a comparison between the projective measure and a direct approach in testing young children, all the four and five year olds in the major study were also asked the question directly.

#### Treatment of Responses

The results of the children's performance on the Gender Identity Measure appear in Table 2. The one way analysis of variance (1 way anova) was the statistical procedure employed in order to investigate the significance of the developmental trends between the ages of four and eight years in relation to the invariance of the gender self concept in spite of perceptual changes in the test figure.

#### Discussion of Results

The null hypothesis tested by the simple analysis of variance is that there is not significant difference between the mean square of scores between age groups and the mean square of scores within each age group.

$$F = 24.1482 \quad df = 3, \quad 90 \quad p < 0.01$$

The null hypothesis is rejected. There is a significant difference in the means of the five sample age groups. (See Table 2)

A further treatment was added to the research design, the multiple comparison of means. The mean of the four year old sample was compared to the five year olds, the five year olds with the six year olds, the six year olds with the seven year olds and the seven year olds with the eight year olds.

The purpose of comparing the means between age groups was to discover whether there were any significantly large departures from the orderly progression in the cognitive development of the gender

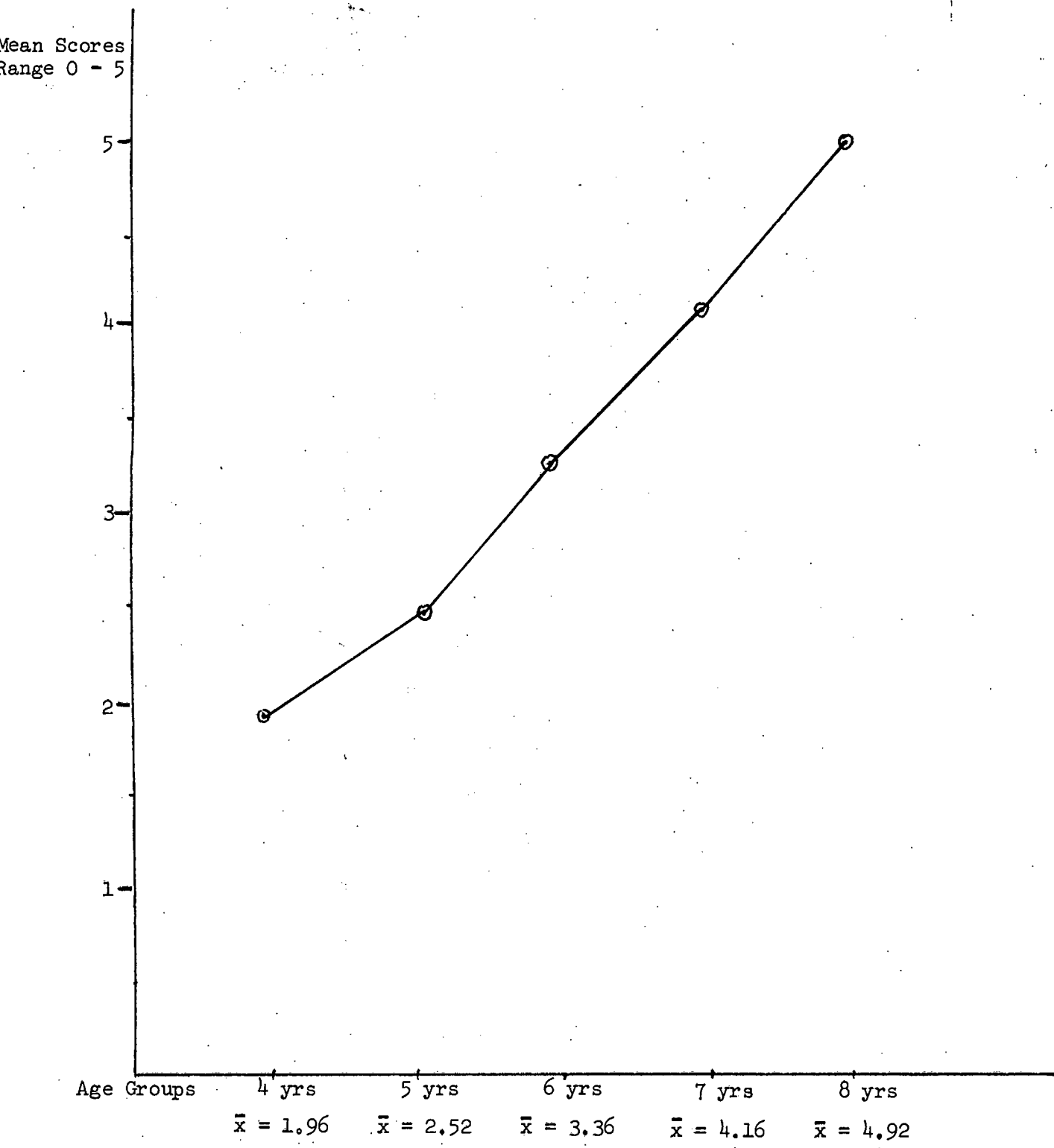


Figure 1: GENDER IDENTITY DEVELOPMENT. The means of the five sample age groups on the Gender Identity Measure.

into a girl, yet they feel that it is unlikely that he would *want* to change.

Anna Marie (4:11) says, "Yes, but I don't want to... I wouldn't like to play boy's games. The shorts I wear aren't boy's shorts, you know. They have buttons on. There's no belt like on boy's shorts."

Caroline (4:2) "He could... but it's not nice to be a boy because boys don't have pretty curly hair. I like my curly hair. I also wear pretty dresses. It would be so much trouble for Mummy to buy me all new boys' clothes anyway!" she said defiantly.

Joanne (4:9) says, "Yes... but I don't want to be a boy. I want to stay a real girl because girls have nicer clothes and dresses. Girls have nicer games than boys..."

The mean of the five year old sample is 2.52. It appears that the five year old conserves the identity of the figure up to a point where the dress is placed over the boy's clothes. Further perceptual changes result in the child falling into error.

Children of 4 and 5 who rely on their perceptual intuitions adjust their reasoning to suit their intuitions. Children who describe gender as changing as clothing is changed, also believe that it can just as easily be changed back again.

Jennifer (5:5) believes this is possible, "Yes, if I cut my hair and put on boy's clothes I would be a boy."

E.: "An if you took it all off again (demonstrating on the figure.)

Jennifer: Then I would be a girl with short hair (laughs) just like Nicolette!"

Neill (4:2) with a score of 1, names the figure 'Peter'.

E: Could he be a girl if he wanted to be?

Neill: Yes, only if we change his name to Jane.

E: Why?

Neill: That's my sister's name.

E: Could he be a girl if we put girl's clothes on him? (placing cut-out dress on figure)

Neill: Yes. Yes. Now he is a girl for sure.

E. Can she change back to a boy again? (removing clothes)

Neill: Yes. Now he is a boy again.

The mean of the 6 year olds is 3.36. 44 per cent of the six year olds obtain a full score compared to 16 per cent of the five year olds, and 52 per cent of the seven year olds. It appears that at six years of age the child begins to move away from egocentric intuitions to logical structures in maintaining the permanence of gender.

Increasingly children become aware of ascription as permanent from birth. They simply say, "I was born a boy."

Howard (6:4): "At the Kingsbury (Nursing Home) they make you a boy, where mommies go to have their babies. Your mommy doesn't know what is coming -- then suddenly it comes out as a boy or girl."

E. to Daniel (6:0) "Could he grow up to be a girl?"

Daniel: He would look like a man and they would laugh if he had a dress. It's funny then."

It is interesting to relate our findings that it is at the seven-eight year level ( $\bar{x}$  = 4.16 and 4.92 respectively) when the child acquires cognitive independence from the changing perceptual configuration of

the gender figure with the following considerations:

- (a) According to Piaget, this is the period the child moves from the stage of articulated intuitions to fully reversible operations.
- (b) According to Freud, it is the period the child resolves his wishes and fears (primary processes) and identifies with the same-sex parent.
- (c) According to Kohlberg (1966), at this age the child is capable of relating his particular role definition in individualistic terms to his father's role definition.

At the 7-8 year level many of the children in our sample explained that dressing up as a girl is just a disguise.

Phillip: (7:3): "it's just a boy with a disguise on. If you took that off he would still be a boy.

E: "What makes you a boy?"

Phillip: The way you are born.

Also Steven (6:7): "No. You are still a boy. He's just tricking (referring to the figure). If he dresses up he can play with girls to trick them."

E: "If you grew your hair long and wear a dress could you become a girl?"

Steven: No.

Between the ages of four and eight years, the responses to the Gender Identity Measure reveals that there are structural changes in the mode of the child's thought in his understanding of the invariance of gender identity.

The responses of children between four and eight years of age

on the Gender Identity Measure, demonstrate the degree of invariance that children at these ages have acquired the regard to their gender self concept.

The responses of the four year olds support the cognitive developmental theory that gender identity begins with an egocentric intuitive judgement or labelling of 'boy' or 'girl'. This judgement is no more than the earliest beginning of a cognitive structure.

We find that the five year olds still rely on this intuitive judgement. As the perceptual cues are altered in the male test figure of the G.I.M. giving the male the appearance of a female, these children believe that it is *possible* for a boy to become a girl but that the boy would not want to change.

It is only at the 6-7 year level that we observe children beginning to rely on logical operations in maintaining the invariance of the gender figure. The perceptual changes of the figure no longer dominate their thinking. Analogous to Piaget's classic conservation of clay experiment in which the mass is understood to be constant in spite of changes in its perceptual configuration, these children describe gender as unchangeable in spite of changes in its clothing. "He is just dressing up as a girl. He can't change into a girl," they insist. Here we have evidence of invariance in the child's thinking supported by 'reversible operations' in thinking.

By the age of 8 years 96 per cent of the sample tested obtain a full score on the measure revealing that reversible operations are well established by this age.

## Summary

This chapter introduces the concept of 'gender identity' as generated by the cognitive developmental approach, i.e. that the child's basic sex-role identity is largely the result of a self-categorization as male or female made relatively early in development (2 - 3 years). Subsequently the intuitive self categorization broadens and becomes operationally stabilised as the cognitive structure develops.

A Gender Identity Measure is developed by the author to investigate the stages of development and the degree of constancy which children between 4 - 8 years of age attribute to gender assignment. This measure is intended to be related to the more detailed investigation of the underlying cognitive processes at each stage of development presented in the subsequent chapters.

The theme that emerges is that gender identity as a cognitive construct passes through a vertical hierarchy of operations which means that at each age, not only does the child's age-role definitions alter, but also the way he perceives his social environment and interprets his social relationships differ qualitatively from one stage to the next.

The performance of 125 children on the Gender Identity Measure is statistically treated and graphically represented, revealing age related stages of development in the child's social world analogous to Piaget's classic experiments of conservation in the physical world.

GENDER ASCRIPTION

In this section our interest is focussed on the origins of some of the earliest social distinctions made by children with particular attention to the formation of gender distinctions.

This chapter is intended primarily to demonstrate the presence of such distinctions, their early structure, and their function, while later chapters will trace the developmental stages through which these early intuitions become freed from their physicalistic origins.

The cognitive developmental theory postulates that the earliest social distinctions of the young child are derived from judgements of size. For example, three and four year-olds readily distinguish between "bigger than" and "smaller than", particularly in referring to concrete objects.

In our discussion with children we observed that they would often make statements about relative size such as, "My daddy's got big, big shoes. I've got a small shoes", or "I've got a big doll. My sister has only got a small one." Later they are able to say "My bike is *bigger than* Paul's bike".

Some indication of the way social distinctions become assimilated to physical distinctions is revealed in the following statement by a four year old, "I've got a small bed because I am small. My brother's got a big bed like daddy because he is grown up". E. "What about your little sister?" "Oh, she's only a baby, she doesn't sleep in a bed yet."

According to Kohlberg, the earliest social distinctions made by young children is that of age-size-babies, children and grown-ups. In our observations we also noticed how readily children of four and five

used size-based concepts to describe incidents, in preference to alternative descriptive concepts, for example:

E: "Which boy pushed you over?"

S: "The big one".

E: "Is that why she is crying?"

S: "Yes, she's a baby."

The cognitive developmental approach interprets the young child's dependence upon physical attributes at this stage as due to the concrete nature of his thought. Social and behavioural attributes are defined in body terms. These distinctions are merely intuitive as the child at the preconceptual level is not yet capable of 'grouping' i.e. performing certain sets of intellectual actions with a set of elements which have relations with one another.

Postulates:

Until the young child is capable of 'grouping', social and behavioural attributes are intuitively defined in body terms. By means of 'primary circular reactions' the child at the preconceptual stage uses ready made schemas derived from his sensori-motor experience to interpret new social realities, consequently:

- (P1) *The child's physical -normative modes of cognition leads him to use body-size as a basic indicator of all the important age-stage differences, e.g. differences in strength, in knowledge, in social power and self control.*
- (P2) *Body-size is the intuitive basis of gender ascription; males are perceived as bigger and stronger than females, just as adults are perceived as bigger and stronger children.*

(P3) *Since sex-role differentiation usually follows age-role differentiation and is also size linked, it tends to take on connotations of age differentiation.*

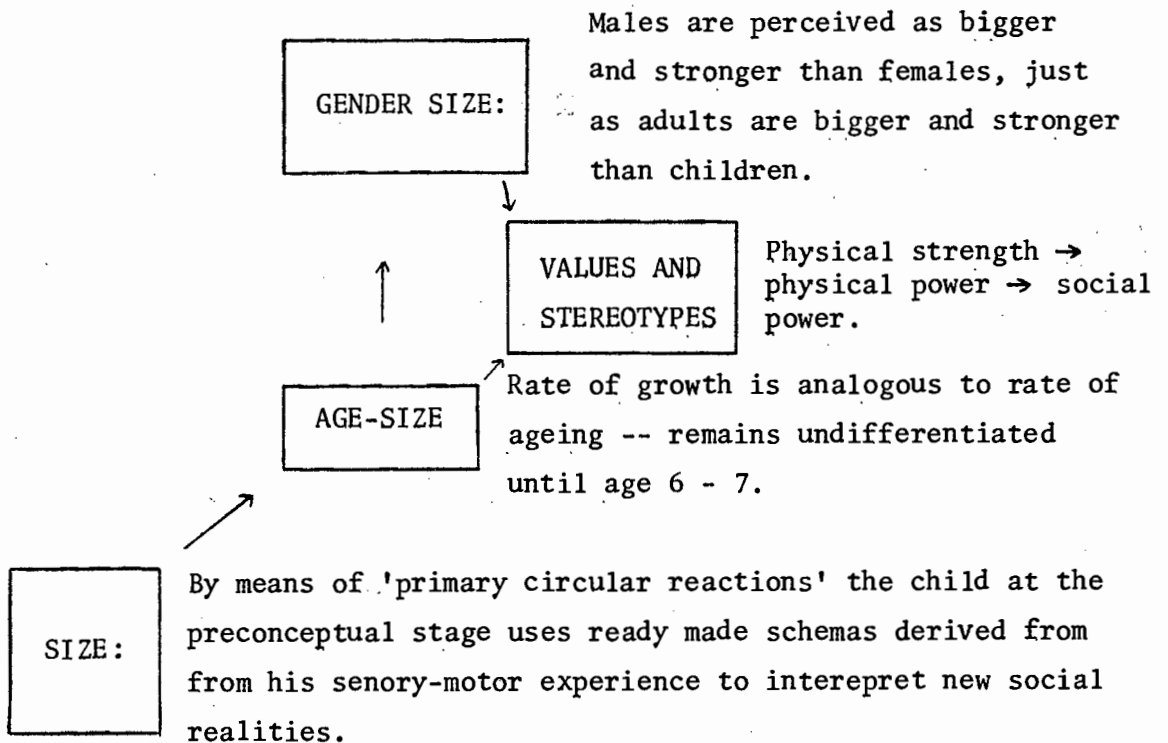


FIGURE 3. The postulated sequence in which size concepts become differentiated as they are applied to the psychological-normative aspects of social behaviour.

#### The Change from Physicalistic to Psychological-Normative Modes

The cognitive developmental point of view holds three important notions:

- (a) the vertical hierarchy of operations;
- (b) the continuous interaction with the environment;
- (c) the competence strivings of the child

through which the change from physicalistic to psychological-normative modes are effected.

The child at the preconceptual level begins to reconstruct all that has developed at the sensory-motor level, but this time at the level of representational thought, facilitated by the use of language. But as yet there are no operations, i.e. -- no conservation. The continuous interaction with the environment introduces the child to situations of a social nature in which the child is required to make distinctions, as for example, between old and young and also to apply differential values, and to recognise differences in capacity -- strong, weak, etc.

The child at the preconceptual stage uses ready made schemas derived from his sensori-motor experience to interpret these social realities. By means of 'primary circular reactions' he co-ordinates motor habits and perceptions. This kind of assimilation extends the breadth and mobility of the schema. The existing physical content of the schema is gradually extended and applied to the psychological normative aspects of social behaviour. Once a circular reaction is established it may be used in a modified form when the child encounters situations of a nature that is sufficiently close to elicit the schema.

Generalizing assimilation however, involves more than making use of an old response to a situation that resembled the one to which the response was originally learned; the schema changes slightly to the new demands (accomodation).

Finally, the schema exists in a number of forms each adapted to a particular circumstances. The child's use of size concepts at the preconceptual level involves the use of new schema which resemble one another closely as they are all derived from the same original schema.

They are applied to bring about the same result to a variety of concepts. As different demands are placed on them they become increasingly differentiated.

It is necessary for us to consider the motivation that generates change from the physical to the psychological-normative modes of thinking about social concepts. For Piaget, the child's motivation takes the form of cognitive structuring of the self and the world around him: the assimilation of the interesting, mastering and extending control over events, and striving to be competent. In other words, motivation is the child's striving towards independence.

Kohlberg maintains that with regard to the cognitive basis of sex-role attitudes, "the motivational aspects of sex-role development are best understood in terms of a theory of the self and identification that rests on general competence, effectance (White, 1959) and self regard motives rather than infantile sexual drives or attachment and dependency motivation, unique to the early parent child relationship ..." (1966, p.88.) The movement from the physical to the psychological-normative modes is determined by this competence -- effectance motivation.

The child below the age of five years uses the same schema for age and size (Piaget 1969, p.201). For him, the age status of an individual is defined in terms of his own physical size and strength. From his own experience physically 'growing up' i.e. 'growing bigger' means becoming stronger, more powerful and more competent. Being small means being a baby -- the most helpless and least competent of all categories.

By about 6 - 7 years the child begins to distinguish between the physical and psychological attributes of competence as the schemas become more differentiated: competence becomes associated with 'being clever' rather than 'being strong', 'knowing how to do things right' and 'understanding things' rather than being physically powerful. In this way a psychological normative standard of role behaviour becomes established to define the appropriateness of various behaviours.

The child of four or five years equates the relative differences in competence between males and females with differences in age-size. Males are bigger and stronger than children. (In this respect some interesting observations are reported in the chapter on gender-age.)

#### The Purpose of the Present Section

In this section we intend to:

- (a) Investigate experimentally the process through which young children intuitively rely on size concepts to make gender distinctions.
- (b) Provide a basis for subsequent chapters on gender-age and sex-role stereotypes in which the sequence of stages in the change from physicalistic to psychological-normative modes are traced.
- (c) Provide experimental support for the cognitive developmental postulates that:

(P1) *For young children, size becomes a basic indicator of all the important age-status differences, e.g. differences in strength, in knowledge, in social power and self control; and*

(P2) *Body size is the intuitive basis of gender ascription: males are perceived as bigger and stronger than females, just as adults are perceived as bigger and stronger than children.*

### The Measure

In order to investigate gender-size concepts it was necessary to develop a relatively simple measure that would avoid attributes such as clothing or hairstyle which have already been found to facilitate gender distinctions at a young age, (Katcher, 1955) and also to avoid stereotyped responses from subjects. For this reason, it was decided that a test of a projective nature using animals would be most suitable, the assumption being that if children do rely on size concepts in distinguishing between the different attributes of males as the cognitive developmental theory would lead us to believe, then an analysis of children's responses to questions referring to drawings of two dogs would provide such information.

### Administration

Two cards 8 cm by 11 cm with stylised ink drawings of a large dog (7 cm) on one card and a small dog (2 cm) on the other card, are presented to the subject with the following instructions:

E: Here are drawings of the two dogs I saw sitting in the street.

Are they the same kind? How are they different? (S specifies).

Right, they are two completely different types of dogs. One is big, has pointed ears and short hair, and the other is small with long hair and long ears. They are not alike at all. Now I would like you to tell me, simply looking at these drawings, which dog is the girl dog, and which is the boy dog?

All of the S's responses are recorded. For example, S: "Did you draw them? You drew them different. The one is a big one. It's the strong one. My daddy plays rugby -- he's the strongest."

E: (Referring to the pictures again.) Which one is the girl-dog and which one is the boy-dog?

S: That one is the boy-dog -- he looks bigger (pointing).

E: And the girl-dog?

S: That one: (pointing to the smaller dog).

E: Can you be sure you are right?

S: Yes! the big one is stronger.

E: How can you tell if it is a boy or a girl?

S: I just know!

### Subjects

The Gender-Size Measure was administered to the four year old sample. (N = 25.)

### Suitability of Measure

The test was administered to 12 subjects between the ages of 4 and 8 years to determine the suitability of the measure; to see what extent the dog drawings readily elicited size based responses, and to establish a standard sequence of questions. It was found that in addition to the questions -- about the two dogs of different size -- a further enquiry in the form of an open ended question was found useful:

"If you saw a dog in the street, how would you tell if it was a boy or a girl dog?"

### Treatment of Responses to Gender Size Measure

In order to demonstrate the postulate that the very early differentiations made by children are related to intuitive judgements based on physical size, the responses of the four year old children from our sample who maintain that the large dog is a male or female respect respectively in the absence of further differentiating cues was statistically analysed by the chi-square for its significance. (See

Table 3: The number of 4 year olds who maintain that the larger dog is a male or female respectively

		4 Year Olds	
		Large dog: observed	Large dog: expected
Male		23.0	12.5
Female		0.2	12.5

$$\chi^2 = 17.64, \text{ df} = 1, p < .005$$

AGE:		4	5	6	7
		%	%	%	%
TYPE:	i)	43	50	47	27
	ii)	8	3	15	8
	iii)	24	28	15	15
	iv)	22	12	18	17
	v)	3	7	5	33

Table 4: Scalogram: The relative per cent of responses in each category for each age group.

$$x^2 = 17.64, \quad df = 1, \quad p < .005$$

The null hypothesis is rejected. The sample deviates highly significantly from the hypothesised uniform distribution. The data appears to support the postulate regarding young children's early gender differentiation being an intuitive judgement based on physical size. According to Table 3, 92 per cent of the four year old sample maintained that the larger dog was a male and the smaller dog was a female.

#### Responses to the Open Ended Question

In order to investigate the qualitative nature of young children's intuitive judgements in making gender distinctions, a further enquiry was made in the form of an open ended question:

"If you saw a dog in the street, how would you tell if it was a boy or a girl dog?"

All children between 4 and 7 year making up our sample (N=100) were asked this question. A wide variety of responses were obtained.

These were grouped into the following five types:

- (1) *Size*: "The bigger dog is always the boy dog."
- (2) *Projected traits derived from size intuitions*: "The one that fights a lot is the boy dog", and conversely, "The 'nicer' or 'happier' dog is the girl dog."
- (3) *Appearance other than size*: "The fluffy dog..." or "The dog with the lighter colour is the female."
- (4) *Recognising ascription without necessarily understanding the basis of such*: "from the name..." "My mother would tell me."
- (5) *Genitals*: "You can tell if you look underneath."

Examples of the statement of each type are presented below providing interesting and sometimes surprising information about children's reasoning.

#### Type 1. Sized-Based Responses

Most of the type 1 answers were similar to Carol (7:4), "Boy

dogs look bigger and stronger: Girl dogs are weaker and smaller."

Charles (4:8), "Girl dogs aren't as big and strong as boy dogs. My daddy plays rugby, and he is the strongest." Stuart (4:9), "If it is big, I would say it is a boy. Our dog is a big one but its a girl."

It is interesting to see how children use other loosely held intuitions in addition to size, yet size appears to be the defining feature. Steven (6:4), "If it's got long hair, its a girl. If it is bigger it's a boy." Jason (6:1) referring to the drawings, "I am sure that one's a boy. It looks stronger. It looks fat and big." In the open ended question he was emphatic that, "If it is a girl, it *looks* like a girl, and if it is a boy it *looks* like a boy."

Type 2. Projected Traits -- derived from size-based intuitions.

Lindsay (4:3), "You can tell a dog if it is a boy dog -- they are the ones that bark a lot, are big and fight a lot." Karen (7:8), "If I saw dogs in the street -- if one was fierce it would be a boy dog. The other one (the female) would be 'nice'. Boy dogs are fierce." Richard (7:8), "I can tell; if they had a fight the strongest would be a boy." Tania (6:4), "You can see by their face ... the girl has a nicer face."

Type 3. Appearance other than Size.

Hair appears to be a prominent determinant for differentiation. Rob (7:5), "See if it's hair is all messed up and rough ... then it's a boy." Jennifer (5:8), "I would look at the hair. If it had long hair, it's a girl. A big dog could be a boy or a girl -- but a boy dog would have short hair." Adrian (5:9), "If it had short hair it would be a boy." Paula (4:11), "The one with lots of fluff would be the girl." Adele (7:1), "You can look at their faces. One has whiskers (the boy), the other one hasn't."

Children also use colour: Gary (6:1), "You can tell by the colour. The boy is darker." Stuart (5:10), "My mummy told me -- I would have known anyway -- mother dogs are mostly white." Nicola (4:3), "The black one is a boy and the blacky-white one is a girl. The girl is small."

Type 4. Recognition of Ascription without necessarily understanding the basis of such.

Jacques (6;5) asked what their names were. When E told him he said he did not know their names, he refused to commit himself as, "It is difficult to tell if you don't know their names." Martin (6:2), "I would ask what its name was. If no one was there, I don't know. I really don't know -- maybe the name will be on the collar." Lucinda (5:4) also recognises ascription by name as a way of defining sex, but is not sure how she would discover the dog's name. "I don't know what I would do. We have a tortoise we found. We didn't know if it was a boy or a girl. We called it 'Petite'. Is that a girl's name?" Ben (4:4) said he would simply ask a policeman whose dog it is, in order to find out. Kevin (7:4), "I would ask somebody what its name was." Russel (7:4) in spite of judging the large dog as a boy, is beginning to believe that there must be some other form of ascription, yet he is still not sure. "I would start tracing out families. I would ask lots of people." E: "Could you tell by looking at the dog?" "I don't know, my friends always pick up a dog and say, this is a girl or a boy. You can't always tell though."

It is interesting how in spite of enlightenment about reproductive functions, some children still do not rely on genitals. Phillip

(7:1), "I would tell by looks -- I would wait a year or so, and see which one gets puppies. The one that gets puppies is the girl."

E: "Isn't there a quicker way?" "Oh yes, the collar has a name on it. I would tell by the collar."

#### Type 5. Recognising Genitals as a Means of Ascriptions

Heather (7:1), "You can tell by its tail. Boys have got like a baloon under it. Girls haven't." Rob (7:5), "The boy dog cocks its legs, the girl doesn't." Roger (7:7), "Watch what it does -- how does it wee. A boy dog would wee differently." Dain (7:11), "See the way it cocks its legs when it wees." Kevin (7:5), "I would try to discover its name!" (recognising ascriptions), eventually he states, "I would see the way it wees."

Simon (7:2), "You look underneath at the 'wee'. If it is low it is a boy dog, if it is high it is a girl dog." Dianne (7:7) would commit herself no further than, "I would look close at it. I would look at its tail." Corrie (7:7), "I would look underneath." Vibike (5:6), "I would look underneath -- if he has got a pis then he is a boy."

#### Categorization into Stages

The relative percentage of all responses to the open ended question which fell into the five types were summarized in a scalogram. Each response was treated as a percentage of the total responses in each age group.

Through examination of the percentage data in the scalogram it appears that the answer to the open ended question could be categorized into three developmental states. It interested us to note that the size based type 1 responses predominated for 4, 5 and 6 years of age

Table 5: The development of the conception of gender ascription:  
 The number of children's responses within each age group falling into three developmental stages.

N	AGE	STAGE 1		STAGE 2		STAGE 3	
		observed	expected	observed	expected	observed	expected
25	4	14	12.75	10	6.5	1	5.75
25	5	16	12.75	6	6.5	3	5.75
25	6	16	12.75	5	6.5	4	5.75
25	7	5	12.75	5	6.5	15	5.75

Table of Chi-Squares

.122549	1.88462	3.92391
.828431	.0384615	1.31522
.828431	.346154	.532609
4.71078	.346154	14.8804

Overall  $\chi^2 = 29.7578$ ,  $df = 6$ ,  $p < .005$

(43, 50 and 47 per cent respectively), while at 7 years there is a sudden drop in size based responses (27 per cent), and an increase in responses recognizing ascription based on genital differences.

In terms of our rationale the following three developmental stages were postulated:

Stage 1: revealing size-based intuition.

Stage 2: which implies a recognition of ascription without understanding the reason for such. There is usually an appeal for adult information. "I would ask my mother -- she would know its name", or "I would ask a policeman". Children at stage two are aware that gender differences are ascribed from birth, yet because of their own uncertainty they are reluctant to make the distinction themselves.

Stage 3: children at this stage are confident about how to go about making gender distinctions themselves. They realize that not only is ascription something that exists from birth, but that the ascription is determined by observable genital differences between males and females.

#### Statistical Treatment of Categorized Responses

The number of responses from each age group falling into each of the three stages are presented in Table 5. In order to investigate the significance of the pattern of frequencies of stage related responses across age groups the data was subjected to a chi-square analysis. The null hypothesis tested is that the pattern of observed frequencies across age groups does not depart significantly from the expected.

The overall chi-square = 29.7578,  $df = 6$ ,  $p < .005$

The null hypothesis is rejected. There is a significant difference in the pattern of stage related responses across age groups.

From the table of individual chi-squares we observe that there

are certain chi-square values which are greater than others. Although nothing can be stated on the basis of the chi-square analysis regarding the relative significance of these values, it will be useful to comment on these individual chi-square values for the light they cast on developmental trends.

#### Developmental Trends in Stages

Looking at the table of chi-squares from Table 5, we observe that the value of 14.8804 is notably higher than any of the other values in the table. The next highest value is 4.71078. Both these values occur within the seven year old sample. The former corresponds to the frequency of 15 in stage 3; the latter to the frequency of 5 in stage 1. Taken together, we may ask what is the meaning of these two values at this age level? The interpretation suggested is that it is indicative of a developmental change in the level of the child's cognitive operations occurring at seven years of age. It means that the seven year old child is ascribing gender on the basis of genitals and secondary sexual characteristics (stage 3) whereas previously (stage 1 and 2), ascription was derived from size-based intuitions (see Table 3).

This finding casts a different reflection on the traditionally held Freudian view relating to the child's acquisition of gender identity (Freud, 1908), which stresses the interaction between the child's wishes and the adult's provision or withholding the anatomical information. Our data reveals that children are still confused about genital differences at an age (4-5 years) when they clearly stereotype gender in terms of size, strength and aggression, which suggests that genital considerations do not form the direct basis of sex-role definition. Rather it appears that it is only at the age of about

seven years when the child realises that genitals are the basis for gender ascription that they acquire new significance and centrality.

These results are consistent with a number of previous studies; Conn (1940) and Conn and Kanner (1947) were able to elicit knowledge of genital differences in a doll play interview from only 50 per cent of children between four and six years, from 72 per cent of children aged seven - eight, and from 86 per cent of children aged eleven - twelve. Katcher (1955) reports that in a task in which children were required to assemble and identify the gender of several cut out figures, with unclothed figures, some error in genital assignment was made by 88 per cent of the three year olds, 69 per cent of the four year olds, and 31 per cent of the six year olds.

In the table of chi-squares referred to above the other values worth noting are 3.92391 and 1.31522 derived from the observed frequencies of 1 and 3 in stage 3, occurring within the four year and five year old samples respectively. Here, particularly in the case of the four year olds, the chi-square value indicates a departure of the observed frequency from the hypothesised in the opposite direction to that described for the seven year olds, i.e. that there are notably *few* stage 3 responses occurring within these samples.

These observations are congruent with our description of the nature of the younger child's thought described in the earlier sections of this chapter.

Looking at the observed frequencies of the six year old sample, they do not depart to any great extent from the hypothesised frequencies and it is reasonable to assume that as regards ascription, the child of this age is moving away from the intuitive judgements characterised by the younger child.

### Summary

This chapter investigates the development of the cognitive operations employed by the child in making gender ascriptions.

It begins by describing why the earliest social distinctions made by the young child are dependent upon physical attributes. Social and behavioural attributes are defined in body terms, particularly size. The child at the preconceptual level begins to reconstruct all that has developed at the sensori-motor level, but this time at the level of representational thought, facilitated by the use of language. But as yet there are no operations, i.e. no conservation. The child uses ready-made schemas derived from his sensori-motor experience to interpret these social realities.

The responses of the four year old sample to the Gender Size Measure were statistically analysed. This was a simple projective measure devised by the author which required the subjects to ascribe gender to drawings of two dogs of different sizes. 92 per cent of the four year olds, relying on size based intuitions, maintained that the larger dog was a male and the smaller dog was a female (see Table 3).

Chi-square = 17.64, df = 1,  $p < .005$

A further enquiry in the form of an open ended question, "if you saw a dog in the street, how would you tell if it was a boy or a girl dog?", evoked a wide range of responses from 100 subjects between four and seven years of age. The responses were categorized into 3 stages each representing a certain level of operations. The frequency of responses from each age group falling into each of the

three stages appear in Table 5. Chi-square = 29.7578, df = 6,  $p < .005$ . Developmental trends were interpreted from the data, revealing that children are still confused about genital differences at an age (4-5) when they clearly stereotype gender in terms of size, strength and aggression, which suggests that genital considerations do not form the direct basis of sex role definition for young children. Rather it appears that it is only at the age of about seven years when the child realises that genitals are the basis for gender ascription that they acquire new significance and centrality.

### GENDER CLASSIFICATION

Let us consider what the word 'boy' or 'girl' means to the young child of about three years. To the adult, it is an arbitrary word signifying a wide range of attributes distinguishing between the sexes. It is a verbal representation of a class of beings recognised by the use of the label; in fact the definition of the word is a definition of class.

Although words play a tremendously important role in facilitating the development of concepts, conceptual thinking does not automatically occur when the child begins to talk. When he first uses words, the child is not using them as signs or representation for objects and events, but merely as utterances that function as 'speaking schemas' which assimilate various environmental events. For example, saying 'mama' when mother appears need not be psychologically different from hugging her when she holds the child in her lap.

How is it then that the word 'boy' or 'girl' moves from an unstable, loosely connected sound associated with the self to a verbal representation of a whole class of beings? According to Kohlberg (1966), children learn gender self-labelling early (age two-three), and in the next two years learn to label others correctly according to conventional cues. Kohlberg refers to this as a 'cognitive reality judgement'. Yet such judgements are only intuitive -- the child is still far from being able to make the categorization of what makes up the class of boys or girls, men or women. He has yet to learn how to invest the label 'boy' or 'girl' with properties which will enable it to

claim membership of a class of beings sharing common properties.

The child of two to four years has many difficulties, even when he can use language fairly well in everyday situations. Piaget illustrates from his record of his daughter, Jacqueline, how words used as names are not concepts in the way they are for adults.

"At about 2:6, she used to term 'the slug', for the slugs we went to see every morning along a certain road. At 2:7 she cried, "There it is", on seeing one and when we saw another ten yards further on she said, "There is the slug again". I answered, "But isn't it another one?" J. went back to see the first one.

"Is it the same one?"

"Yes", she answered.

"Another slug?"

"Yes", she answered again. The question obviously had no meaning. (Piaget 1951, p.225.)

### Purpose

The purpose of the present section is to examine the development of the operations that the child uses in acquiring the ability to form an abstract conception of class involving gender. According to the cognitive developmental theory, the reality judgements leading to appropriate self-categorization and categorization of others, are judgements which follow a regular course of age-development in the child's ability to make simple gender classifications. In subsequent chapters we will consider how the early classification schemas broaden and ramify. (See Additive Composition of Gender Class, and Gender-Age Time.)

### Postulations

The cognitive developmental theory leads us to postulate:

(p.1.) *By 5 - 6 years; the child moves from the limitations of making reality judgements on the basis of a cluster of loosely held intuitions, to operations which permit the classification of boy, girl, man and woman into correct groupings on the basis of a number of common properties.*

We also wish to investigate the relationship between the ability to form classes of a physical or numerical nature, compared to gender class. A feature which should emerge clearly, is the parallel development between the child's social categorizations and general physical categorizations, as the operations involved are the same. This should provide support for the cognitive developmental view of sex-role acquisition that the stabilization of the operations involved in acquiring gender identity is only one aspect of the general stabilization of constancies of physical reality objects that take place between the years three and seven. Hence the following postulation:

(p.2.) *The difficulties that the child experiences in establishing gender definitions closely parallel his difficulties in establishing stable definitions of physical concepts in general, and the former are resolved as the latter are.*

Rationale: The Classification of Concepts

Before going on to describe our techniques for obtaining information about gender-class concepts, let us consider the meaning of 'class' which is employed in the experimental investigations:

In order to classify objects into groups, there must be a mental representation of a set of categories throughout the sorting process; each category has a defining characteristic that determines whether an

object is put into that category, and each set of objects must be considered as a number of distinct individual objects with a common feature that defines the class. In this respect there are four significant points:

- (a) No object is a member of both classes simultaneously, e.g. the red triangle is in the class of triangles and not also in the class of circles. The classes are mutually exclusive or *disjoint*.
- (b) All members of a class share one similarity. For example, a large blue circle and a small red circle share the property of circularity which is the defining property of the class. Thus the circularity is the *intension* of the class, i.e. the defining property or intension of the class is the circularity. Colour and not shape could also alternate the intension of the class; a large blue circle and a small blue triangle both share the property of 'blueness'.
- (c) Instead of describing a class by its intension or defining property, the class may also be described in terms of a list of its members or *extension* (small yellow triangle, large blue triangle, etc.)
- (d) The defining property of a class determines what objects are placed in it, i.e., the intension defines the extension. This means that if we know that a particular class is formed on the basis of circularity and another on the basis of triangularity, then the content of the list in each case can be predicted.

The problems which confronted Piaget were -- do children classify

objects in accordance with these properties? When is the child able to form mutually exclusive classes? And, do his classes have defining properties which determine the list of objects in each case? Inhelder and Piaget (1959, 1964) investigated these problems by means of a number of experiments which are related to our own techniques of investigation.

### The Measure

Our measure consists of a total of 48 square cards with stylized monochrome ink drawings approximately the size of playing cards. The measure was sub-divided into three sections consisting of 16 cards each, which were administered separately.

(a) *A heterogeneous assortment* contains:

4 geometrical shapes -- a triangle, square, circle and star.

4 animals -- a hippopotomous, monkey, elephant and giraffe.

4 different types of flowers.

4 people -- boy, girl, man and woman.

(b) *Animal Species* -- four different breeds of dogs, cats, rabbits and birds.

(c) *Gender* -- four men, four women, four boys and four girls.

### Development of Measure

Before finally arriving at the present form of the measure, various alternative forms were considered and tested in the pilot study. In developing the measure, a number of important features were included:

First, it was important that the classification tasks be subdivided into at least two comparative sections in order that the child's performance on the gender classification task could be compared with his

performance on another relatively neutral classification task. The heterogeneous assortment and the species assortment were considered separately as to their suitability as controls to the gender task. The heterogeneous task appeared to us to be intuitively closer to Piaget's original classification tasks, while the species identity task was considered likely to elicit very similar cues to the gender tasks. After comparing all three tasks in the pilot study, it was decided that the final measure would include two controls to which the gender performance could be compared.

Practical factors considered in developing the measure:

- (a) As all the tasks required sorting, *the size and thickness of the cards has to afford easy handling by young children*, hence the playing card size was found to be most convenient.
- (b) The number of cards to be classified in each section had to be great enough to provide evidence that the child was able to make a consistent assortment *without the task becoming too laborious or time consuming*. From an initial 20 cards, with 5 in each class, it was found both equally effective and more convenient to reduce each test to 16 cards with 4 in each class.
- (c) *The drawings had to be clear and unambiguous*. The use of colours or shading was avoided as it was likely that the subjects would rely on colour intensity cues in classifying. The final drawings consisted of stylised monochrome ink drawings.
- (d) *No drawing was identical*. The artist initially designed that were both identical and coloured the same. This was found to be unsuitable as children's success on such a task might not necessarily

be due to true classification. Inhelder and Piaget (1964) for example, gave young children no more than two years old, a number of coloured shaped mosaics and let them play with them. They described how the subjects might group together red ones or the squares -- often they formed some sort of geometrical pattern composed of pieces of a single shape. This behaviour made it appear that the children were classifying the objects to the shape, and picking out all the members of a class to form a geometrical shape, but Piaget denies this interpretation. He describes it as the successive assimilation of square objects by sensory-motor schema, and perhaps also the recognition of the homogeneity of the line of objects if they are all the same shape. But they are not grouped into a class on the basis of squareness. It could be that the first shape is matched by the second in shape, but the third is matched to the second in colour -- a sort of chain reaction, which is not a classification at all but merely a momentary clustering of two objects because of their similarity. In our tests we took precautions to avoid this by using linear drawings with each item in the class being different.

#### Age of Subjects

The classification tasks were administered to a total of 75 subjects between four and six years, with 25 subjects in each group.

#### Procedure

Each child is individually presented with a shuffled pile of the heterogeneous assortment of pictures. E. gives the following

instructions, "Here are some pictures of different things that belong together. Sort them out and put them into groups where they belong. Tell me when you are finished."

The time for the task to be completed is noted. Relevant comments by the subject as well as pertinent observations about the way in which the subject tackles the task are recorded.

The next task is then presented, which is the assortment of different species of animals. E. gives the same instructions as above beginning with, "Now we have got some pictures of different animals all mixed up together ..."

Finally the Gender Task is administered with the instructions, "Here are some pictures of people all mixed up. Now I want you to put the people into groups where they belong. Put the people together who belong together. Each group must be different. Tell me when you are finished."

The order of the presentation of (a) and (b) is alternated with each administration; (c) is always presented third.

#### Treatment of Responses

The children's responses to each of the three classification tasks were categorized into two stages:

Stage 1. These are responses which indicated that the child does not operate under an overall guiding plan. He classifies in a primitive way: his groupings are dominated by momentary impressions and accidents.

Stage 2. The sorting of children at stage 2 becomes more systematic in the sense that a single criterion is exhaustively applied to the

domain. The *intension* (similarity among objects) determines the *extension* (i.e. which objects are to be grouped together). If the child defines a collection on the basis of the defining property of circularity for example, all the circles would go in one pile and none placed in another pile.

The method of enquiry provided data on two levels: (a) quantitative data which is presented in two tables and (b) qualitative data describing the structure of the child's thought. Table 6 shows the number of responses at each stage of gender classification development per sample group. The data in this table related to the postulate (p.1) that the reality judgements leading to appropriate categorizations are judgements which follow a regular course of age-development dependent upon cognitive organisation. Table 7 shows the relationship between the number of children at various ages achieving success on the gender classification task and two control tasks, (a) the heterogeneous task and (b) the species categorization task. The data in this table relates to the 'parallellism' postulate (p.2), that the difficulties the child experiences in establishing gender definitions closely parallell his difficulties in establishing stable definitions of physical concepts in general, and the former are resolved as the latter are.

#### Statistical Treatment and Discussion of Results

In order to demonstrate the postulate that by 5-6 years the child moves from the limitations of making reality judgements on the basis of a cluster of loosely held intuitions, to operations which permit the classification of boy, girl, man and woman into correct groupings on the basis of a number of common properties, the responses of the 4, 5 and 6 year old samples to the Gender

Classification Measure were statistically analysed by the chi-square for its significance. (See Table 6.)

$$\chi^2 = 12.013, \text{ df} = 2, \text{ p} < .01$$

The null hypothesis is rejected. The distribution of observed frequencies representing stage 1 and stage 2 responses between the three age groups was found to depart significantly from the expected frequencies.

In order to observe developmental trends, from the table of individual chi-square values we note that the value of 4.45454 and 3.500 are somewhat higher than the other values in the table. Although nothing can be stated on the basis of the chi-square analysis regarding the significance of these values, it is worth noting that both these values occur within the four year old sample. The former value corresponds to the observed frequency of 18 in stage 1, the latter to the frequency of 7 in stage 2. The above suggests that the responses of the four year old sample are predominantly at stage 1. 72 per cent of the four year olds are still unable to operate under an overall guiding plan. They classify in a primitive way; their groupings are dominated by momentary impressions and accidents. However, we find the converse is true for the six year old sample. Their sorting becomes more systematic in that a single criterion is exhaustively applied to the domain.

Hence it is reasonable to conclude that the data from the Gender Classification Task appearing in Table 6 suggests a qualitative change in the structure of the child's thought at

Table 7: The number of children achieving success on the gender classification task (Task C) and two control tasks, the heterogeneous task (Task A) and the species task (Task B).

N	AGE	TASK A		TASK B		TASK C	
		Observed	Expected	Observed	Expected	Observed	Expected
25	4	7	7.30	8	7.30	6	6.39
25	5	21	20.52	21	20.52	17	17.96
25	6	20	20.17	19	20.17	19	17.65

$$\chi^2 = .348857, \text{ df} = 4, \text{ p} > .975$$

the 5-6 year level enabling him to conceive of boy, girl, man and woman as discrete categories.

Table 7 presents the number of children achieving success on the gender classification task and two control tasks. The data in this table relates to the 'parallellism' postulate.

Through considering the pattern of results across tasks for each age group, the intention is to show that the pattern for each age group is essentially similar. The chi-square test was selected to demonstrate this similarity. This test is normally used to show that patterns are dissimilar when the chi-square is significant. The purpose here however, is to obtain a significantly *insignificant* chi-square.

$$x^2 = .348857, \text{ df} = 4, \text{ p} > .975$$

The null hypothesis is supported. This means that we find a high correlation between the child's success on the gender task and the two control tasks.

By referring to the previous chapter on Gender Ascription, it is interesting to note how the large majority of the same sample of four year olds (92 per cent), who are unable to make consistent categorizations of gender as a class of beings, yet demonstrate their successful reliance upon intuitions derived from early physicalistic modes such as size. They intuitively recognise ascription with having the facility of being able to logically understand such ascription, since the ability to group or order into classes still eludes them. The Gender Classification

Measure reveals their ability to categorize begins to occur around 5-6 years.

These findings are in accordance with studies of children reported by Piaget and Inhelder (1958, 1964). They describe evidence of two phenomena in the attempts of children between two and four years to classify.

(a) *Syncretism*, which is the tendency to group together a number of disparate events into an ill-defined illogical whole and,

(b) *Juxtaposition*, which is the inability to see that several objects are indeed members of the same class.

Inhelder and Piaget (1958, 1964) describe how in their experiments with children of three and four years, when given a heterogeneous assortment of objects, cut out pictures of geometric forms, plants, animals and people, the subject may start by putting some squares together, then go on to add a few circles and never finish the squares; or he may go on to put a few plants together adding a few people but never adding all the people. The characteristic feature of children at this age is lack of co-ordination of the properties or qualities that are being grouped. Resemblance may influence the child's decision one moment, spatial proximity at another, or even some play theme like 'making a farm' at the next.

#### Qualitative Trends

Below are presented some protocols of children whose responses to the classification tasks were categorized into Stage 1. The

errors made by our subjects revealed:

(a) that the young children perceives *similarities* among the objects, yet these do not fully determine what goes into a collection. This is also what Piaget and Inhelder (1964, p.21) reported from testing a number of children between two and five years of age. Piaget describes how one child put two dolls in a cradle, then two wheelbarrows together, then a house was added. When the child was asked for all the objects like a horse, she gave him all the animals then a baby and two trees. The intention or similarity that the subject originally perceives does not determine the extension.

(b) Another error observed in grouping objects at this stage is what Piaget calls 'small partial alignments' when the child uses some of the objects in the original array and puts them together in several ways apparently without any overall guiding plan. Small partial alignments are not true classes for the reason that the intension does not define extension.

(c) Children at this stage were also observed to arrange the material to be sorted in order to construct an interesting form or story picture. Piaget calls these 'complex objects'. For example, children were observed to group the gender pictures together to 'make a family' or the geometric shapes together to 'build a wall'. The characteristic feature of children at this stage is lack of coordination of the properties or qualities that are being grouped.

#### Stage 1. (A) The Heterogeneous Tasks

Carolyn (4:3) tackles the heterogeneous task enthusiastically yet somewhat impulsively. She begins to build a 'complex' by

arbitrarily grouping a few cards "that look nice together". On being given the instructions again to make quite sure that she understands the requirements, she begins to put a few 'shapes' together but soon becomes distracted by other items and does not go on to complete the task.

Nicola (4:3) arbitrarily makes groups of cards -- taking one card at a time from the pile in her hand and placing it on the table saying, "That one goes there, that one can go there ... etc." without any intension. When asked, "Why did you put that one there?" She replies, "Because I *want* it there."

Kate (4:7) becomes disconcerted as she searched for identical cards and does not find them. "None of them are the same", she complains. E. "Put together the ones that belong together." "But they are all different." She gives up.

Julian (6:4) begins by systematically putting different cards at different corners of the table, but he soon forgets the criterion for the category and confuses shapes with people. He puts four flowers together then adds a monkey. When asked the reason for this, he replies, "Because it climbs trees."

#### (B) The Species Task

In the species task Carolyn (4:3) enjoys shuffling through the cards as they are spread across the table before her. She maintains, "I like to collect pictures." She manages to sort the four dogs and four cats into groups, but then goes on to contaminate the sequences by adding the rabbits and the birds arbitrarily.

Lindsay (4:11) laboriously sorts all the cards across the table.

"This is like laying the table", she comments. E. discovered that at this particular nursery school each child has their own distinctive animal place mat at their lunch table, which explained why Lindsay was putting individual cards in different positions around the table. E. explained that she must not play at laying the table, but that she should put the pictures together that are the same, or belong together. Lindsay however found it difficult to change her mental set.

Anton (4:9) shuffles all the cards around the table with both hands. On being reminded to put the ones together that go together, he succeeds in making two pairs of dogs and two pairs of rabbits. E. asks him if *all* the rabbits are not the same. He agrees, and decides to put them together. He does the same with the dogs. But the birds and the cats remain scattered before him. He appears confused as what to do with them. After examining them for a few moments, he tells E. that the game is finished. It appears that Anton only managed to group the rabbits and the dogs through the assistance of E's question, and the fact that he had formed two pairs. His initial success was not due to true classification as his later performance indicated.

Some children such as Andrew (4:4) sorted the species into "the ones I like" and "the ones I don't like". Similarly Caroline (5:3) puts animals together "that belong in the Jungle book". Chrystal (6:4) compares all sorts of features such as tails, or whether the animals are standing or sitting. She does not appear satisfied with her efforts, "I am just stupid", she says.

#### (c) The Gender Task

The same type of errors in the control tasks appeared in gender

classification, Kirsty (4:4) does not follow through the defining properties of classes. As in her other performances, a few items in a class are arranged in a small partial alignment, but she forgets what she was about to achieve. After a pause she breaks up the correct sequence, only to put together again a few items which are 'standing the same way'.

Anton (4:9) names the cards, "boy", "girl", "lady", etc., as he places them on the table from the pile in his hand. He asks, "Did you draw them?" Then begins to place them all one next to the other in a long row, after which he announces that he has finished. E. asks him if he has put all the people into the correct groups where they belong. He replies that he has.

Kate (4:7) sorts out all the females from the males while commenting about their dresses, "This one's got a nice dress. This one's got a funny dress. Who is this?" Leaving the males unsorted, she places all the dresses in a row. By relying on articulated intuition she has in fact succeeded in discriminating class one the basis of the presence or absence of a dress. But she is not aware that she is categorizing males and females. The males are left unsorted.

Deborah (4:3) shuffles the cards into different positions on the table. Previously she had just succeeded in classifying the species task correctly. "I can't do these, these aren't the same." E. "Aren't any the same?" "No, they are all different." E. "Don't any belong together?" D. "No, they belong where they are." Andrew (4:4) is also emphatic that they are not the same. He only manages

to place a few boys and men together after a little encouragement. The girls and ladies are ignored.

Stuart (4:9) makes three arbitrary groups from any cards which just happen to be nearby. He then plays with the figures, and uses them as illustrations for the story he tells E.

### Stage 2

Compared to the children at stage 1 who appear confused, or get distracted by irrelevant details, the child at stage 2 begins to work methodically through all the items. They often anticipate the formation of a group when they reach a new card in the pile that they are sorting, the card is put at one of the corners of the table in abeyance if it does not match the items that are lying displayed. Many children proceed to categorize in this manner. Alternatively, they spread the whole pile of cards out on the table and systematically select members of a class, one at a time, from them. After most of the groups have been arranged before them they apply themselves to sort any loose cards which they were previously unsure of.

It became evident that a number of children soon recognise that each category only contain four items, and use this as an aid in forming groups. This applies particularly to the gender task, when the child initially sorts the cards into two large groups and then goes on to break them down into four smaller groups.

### Summary

Consideration is paid to how the word 'boy' or 'girl' moves from an intuitive, loosely connected sound associated with the self to a verbal representation of a whole class of beings. Children learn gender self-labelling early (age two-three) and in the next two years learn to label others correctly according to conventional cues.

Two postulates derived from the cognitive developmental theory are investigated experimentally through analysis of the responses of 75 children between the ages of four and six years on three classification tasks: (a) a heterogeneous task, (b) a species task, and (c) a gender classification task. The findings are presented quantitatively in table form showing the comparative scores for each age group on each task thus revealing (a) the relationship between age and stage of classification (b) the parallel development between gender classification and two control tasks. Further, a qualitative observation of the structure of the child's thought at each stage is presented with illustrations from children's protocols.

The findings indicate:

(a) The reality judgements leading to appropriate self-categorization and categorizations of others are judgements which follow a regular course of age-development of the child's ability to make simple classifications, and:

(b) The difficulties that the child experiences in establishing gender definition closely parallel his difficulties in establishing stable definitions of physical objects in general, and the former are resolved as the latter are.

THE DEVELOPMENT OF  
GENDER CLASS INCLUSION

Class inclusion

Up to now we have attempted to demonstrate how the child's gender concepts of boy, girl, man, woman moves from a 'preconcept' (at approximately 4 years) to an ability to understand that boys, girls, men and women actually form a class of beings. He develops an ability to perceive similarities and differences in attributes between these beings and, moreover to realise that he himself is part of such a class.

In spite of the fact that the child of 5 - 6 appears to grasp the principles of classification, Piaget found that the child is still not capable of regarding as permanent the relations of the part to the whole in the realm of classes. He is still not able to understand the relations among different levels of an hierarchy, which is the problem of class inclusion.

Inhelder and Piaget (1964) devised the following type of experiment to test the child's understanding of such hierarchical classification, i.e. to find the earliest age level at which he understands the principle that subgroups may be members of a higher ranking order. The child is shown a number of counters some blue and some red, some circular and some square. In this particular experiment all the blue counters were circular. The child is then asked whether this is true. "Are all the squares red?" "Are all the circles blue?" A typical error of the child at four or five years is to answer the question: "Are all

the circles blue" in the negative and to justify his answer by saying "because there is a blue square". This type of response at this age makes it appear that the child does not distinguish between the question "Are all the circles blue?" and "Are all the blue ones circles?" This type of error is seen by Inhelder and Piaget as resulting from his inability to form a logical class.

Inhelder and Piaget believe that the question "Are all the squares blue?" is the same as "Are all the circles equivalent to some of the blues?" and that one source of error is that the child at this age does not understand what the terms 'all' or 'some' mean. Evidence from their other experiments indicate that children tend to think of 'all' as being rather a large number as though it meant 'many' while 'some' means the same as 'few'. A child of five when presented with two blue squares, three red squares, and two blue circles and asked if all the circles were blue said, "No, there are only two" as if the word 'all' should not be applied to such a small number of objects.

#### Gender Class Hierarchy

As discussed in the previous chapter, a class is a set of objects or events that have certain characteristics in common. The common characteristics define the class, and the label 'boy', 'girl', 'man' or 'woman' designates this class. Moving on from here the child gradually begins to understand the variety of relationships that classes have with one another. One class can be included in the other, which means that the two classes have the same defining properties, but the sub-class has additional defining characteristics which the class does not have. The class of boys, for example, is included in the class of males;

all the defining properties of males apply to boys, but in addition to being a male, a boy must have some additional specific characteristics that distinguish him from other males. In the chapters dealing with gender-size and gender-age we consider more fully the attributes that a child uses to distinguish between the gender subclasses. In this chapter however, we focus on the sequence of stages of the operations permitting an understanding of the hierarchy of classes relevant to gender classification.

#### The Purpose of the Present Section

The purpose is threefold:

(a) To investigate the operations by which children develop the important gender concept of 'we males' or 'we females' and the mechanics of classification necessary to acquire such a concept. In this regard the following postulates are presented:

(p.1) *In spite of the fact the child of 5 - 6 years is able to grasp the operation of comparing part with part in the classification of boy, girl, man or woman into correct grouping on the basis of a number of common properties; he is still not able to understand the relations among different levels of an hierarchy, which is the problem of comparing part with the whole.*

(p.2) *Until the child is capable of establishing a permanent relation of part with the whole (class inclusion) at seven years of age, he will not be able to grasp that boys and men are part of the class of males and girls and women are a part of the class of females.*

(b) The data in this section is intended to provide experimental support for the cognitive developmental theory with regard to

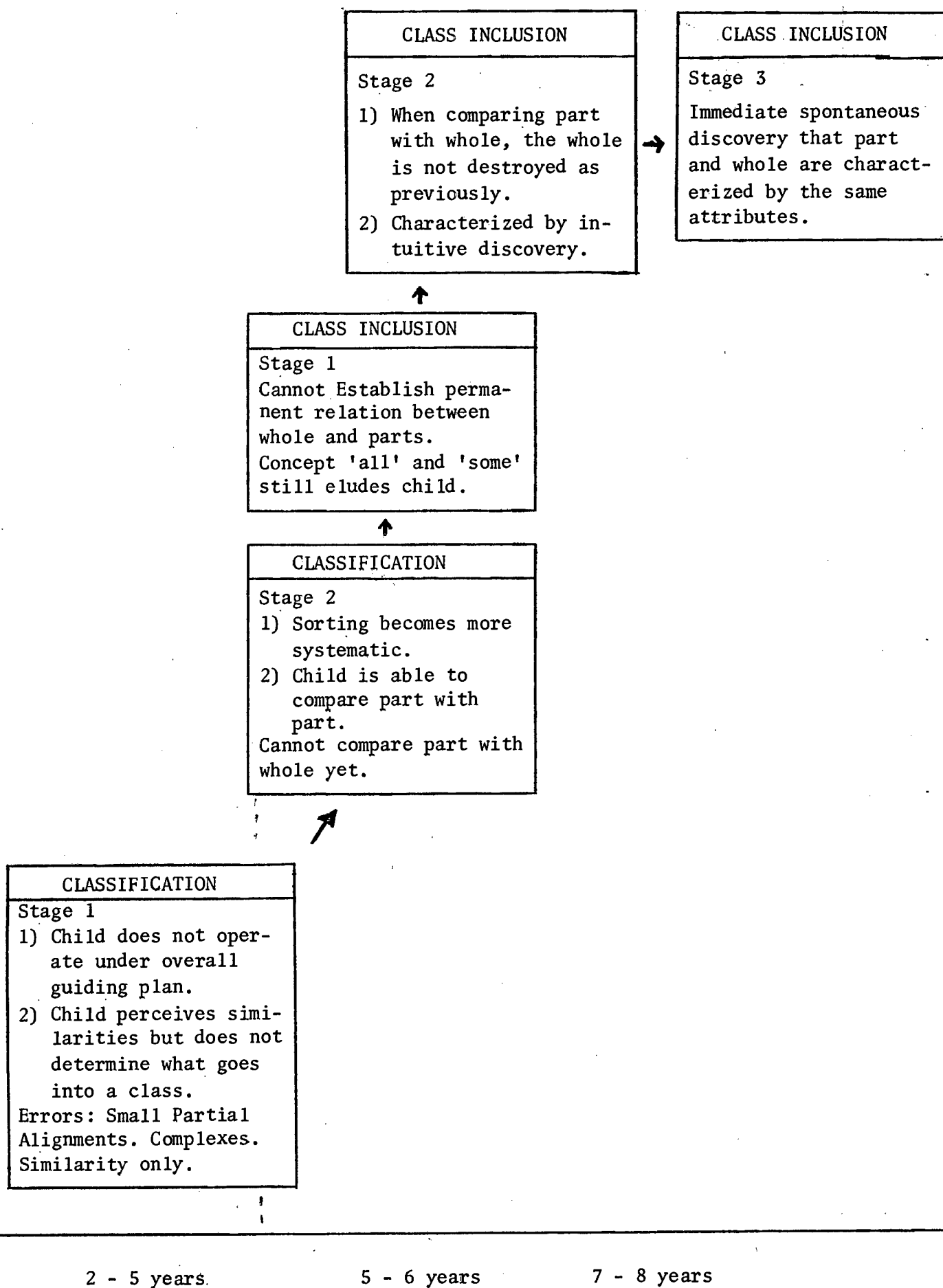


Figure 2: Predicted sequence of stages in moving from simple classification to class inclusion.

identification, i.e. that identification is not the *cause* of the child's desire to ascribe to generalised sex-role stereotypes, as according to traditional theories but that it is *consequence* of normal cognitive development. It is our argument that it is not until the child is capable of perceiving the same-sex adult model as a member of the same class that he will be able to consistently model or identify with members of that class. This means that the boy of six or seven years, for example, only begins to realise the 'like self' nature of the father's gender when he is able to see him as a man in the class of males, and himself as a boy in the same category. Such an understanding implies a grasp of operations to additively compose classes or class inclusion.

(c) Further, this section is intended to demonstrate that the acquisition of the process of gender class inclusion is parallel to the process of object class inclusion as demonstrated by Inhelder and Piaget (1964).

#### Development of the Measure

The present method and procedure was developed from Piaget's experiments of the relationship of the inclusion of one class in another. His classification experiments have been described a number of times and replicated by Elkind (1961) and Lovell (1961). These are the classic experiments with wooden beads:

The child is shown a box containing only wooden beads, most of them brown but two of them white. The child is asked whether the box contained more wooden beads or more brown beads. This question involved the most elementary form of additive composition of classes.

$$A + A' = B \text{ therefore } A' = B - A \text{ and } A < B$$

This problem appeared too difficult for children aged four to six years, so Piaget rephrased it in more intuitive terms. The child is presented with a set of wooden beads comprising of about 20 brown and 2 of white colour. The child is asked if all the brown beads are strung into a necklace would there be any left?

The child replies that the white ones would remain. E then goes on to ask, "And if I strung all the wooden ones into a necklace would there be any left? "No" replies the child. Then E asks, "Which would be longer, a necklace with all the wooden beads, or a necklace with all the brown beads?"

The child of 5 - 6 then generally replies that the one made with all the brown beads would be longer because there are only a few white ones, or because there are more brown beads than white ones.

Having built up clear evidence of the systematic difficulty experienced by children under 7 - 8 years including one class in another, and understanding that a total class is wider than one included in it, Piaget pursued the theme by conducting a number of analogous experiments with classes, each of which had a proper name. An example of such an experiment was one using 'poppies' and 'bluebells', both belonging to the class of flowers. This was to obviate the criticism that 'wooden beads' was artificial in that it had no specific name.

Another objection he anticipated was that the subordinate classes he had used were more prominent perceptually than the superordinate as the former had been defined in terms of colours. Therefore, in further control experiments, superordinate class was colour (blue beads) while

the superordinate ones were shape. (Square versus round beads.) Piaget also added an example of a social category, with 12 girls and 2 boys forming the subordinate, and 'children' forming the superordinate. He found the same kind of answer was given as in the case of beads. The subjects in fact found the questions referring to girls and children easier than the questions about beads which Piaget felt was due to the fact that the use of classes which have specific names are an aid in differentiating between them and forming the hierarchy.

Once the decision had been made to demonstrate the acquisition of gender class in the same way that Piaget demonstrated the acquisition of object-class, consideration was paid to developing a standardized measure that would be both efficient and reliable. The measure would contain two gender tasks and two control tasks which were replications of Piaget's tasks.

#### Description of the Measure

The tasks that were adopted consisted of:

- (a) A task analagous to Piaget's 'flower' task.
- (b) The 'all or some' task referring to children.
- (c) A gender task with boys and males, and
- (d) A second gender task referring to girls and females.

The material that is presented to the child consists of four large cards with the following drawings: (see the drawings in the appendix 4.)

- (a) *Flowers*: Twenty small red flowers clustered to the left of the card and two large yellow flowers on the right.

- (b) *Children*: Twelve girls standing in a group with two boys in the background.
- (c) *Males*: Three men in the upper left corner and a group of ten boys on the right of the picture.
- (d) *Females*: Two women standing together on the right of the picture with ten girls spread out to the left.

#### Developing the Measure

A trial study was undertaken to weigh the effectiveness of various alternative forms of presentation.

- (a) The number of elements in the subclasses were varied to best emphasise the 'all or some' nature of the tasks. Twenty poppies and two roses as in Piaget's Flower task were found satisfactory, while ten girls and two women, and three men and ten boys were found well suited to the purpose.
- (b) In order to minimize reliance upon language, all the questions referred to the respective drawings set before the child. The task involving children (Task B) unlike Piaget's (and Elkind, 1961) study also referred to a drawing rather than the actual school class the child was in.
- (c) Various forms of presenting the gender task were considered, such as, "If all the boys went into a house, would there be any males left?" Rather than a house, a bus appeared more appropriate, particularly as the final question was, "Would the bus be fuller if it had all the males or if it had all the boys inside?"

(d) It was discovered that the terms 'males' and 'females' were not yet part of many children's vocabulary, particularly the younger children. Therefore, in the introductory questions with each child, E. satisfied himself that the child became acquainted with these terms, for example, E: "All these people are males" ... and "show me the males (s. indicates "That's right all these people are males", etc.

A major problem that became evident at this stage lead to the dropping of the entire Afrikaans speaking sample that was to be included. This had to do with the translation of the words 'male' and 'female'. The Afrikaans words 'manlik' and 'vroulik' are literally equivalent to the English 'man-like' and 'women-like' and could not be used in the same context as the English. Also in the Afrikaans language, the distinction between males 'manlike persone' and men, 'mense' was so slight that the Afrikaans children found the questions confusing. It was decided that as it was not possible to translate this section of the text satisfactorily into Afrikaans, the Afrikaans speaking sample had to be forfeited. We were obviously confronted by semantic problems which, although interesting, were beyond the scope of the present investigation.

#### Administration

Each child was seen individually. The two control tasks were administered first, alternating the order of presentation between subjects. After which boys were given the 'gender-males' task, followed by 'gender-females' while girls were given the 'gender-females' task then the 'gender-males' task.

The standard question sequence as set out below were generally

adhered to, with all the responses of the children recorded in the space provided. Where responses or questions were considered to be worth further investigation, they were followed through, and recorded.

(a) *Flowers*

E: Look are there a lot of flowers in this field?

S: A lot.

E: What colour are they?

S: Red and Yellow.

E: The red ones are poppies and the yellow ones are daisies. I want to make a very big bunch. Must I pick the flowers or the poppies?

S: The poppies.

E: Show me the poppies. (S. indicates.)

E: Show me the flowers. (S. indicates the whole drawing.)

E: Then will the bunch be bigger if I pick the flowers or the poppies?

S: If you pick the poppies.

E: If I pick the poppies, what will be left?

S: The daisies.

E: And if I pick the daisies as well, what will be left?

S: Nothing at all.

E: When what will be bigger, the bunch of flowers or the bunch of poppies?

S: The bunch of poppies.

E: And what about the bunch of flowers -- will it be bigger or smaller?

S: Smaller.

E: Why?

S: Because you've made a bunch of poppies, or because you have got more poppies.

(b) *Children*

S is presented with a drawing of twelve girls and two boys.

E: Are there more girls or more children in this class?

S: More girls.

E: But aren't girls children?

S: Yes.

E: Then are there more children or more girls?

S: More girls.

(c) *Gender-Males*

S is presented with a group of males consisting of ten boys and three men.

E: Look at this picture. What does it show?

S: Some men and lots of boys.

E: All these people are males waiting to catch the bus. Show me the males. (S. indicates.) The younger ones are the boys and the older, bigger ones are the men. Show me the boys (S. indicates.) Show me the men. (S. indicates.)

E: If all the *boys* got into the bus would there be any left?

S: Yes, the men.

E: And if all the *males* got into the bus, would there be any left?

S: No.

E: Then would the bus be fuller if it had all the males, or if it had all the boys inside?

S: All the boys.

E: But aren't boys males?

S: Yes.

E: Then would there be more males or more boys in a full bus?

S: More boys.

(d) *Gender-Females*

S is presented with a group of females consisting of ten girls and two women. The instructions are similar to the ones above.

Number and Age of Subjects

One hundred children between 5 and 8 years of age made up the sample, with 25 children in each age group. 12 children between 4 and 10 years were tested in the trial study.

Categorization of Responses

Stage 1 (5 - 6 years)

Children at this stage cannot establish a permanent inclusion between the whole and the parts as soon as the whole is divided, even in thought, the parts cease to be included in it and are merely

juxtaposed without synthesis. In Piaget's wooden beads experiments, children at stage 1 grasped without difficulty that if all the wooden beads were taken out of an empty box there would be none left, whereas if only the brown ones were taken out, only the white ones would remain. These children were unable to break down this impression and compare part against whole, i.e. the brown with the wooden. Piaget remarked that the child apparently forgets the parts when he thinks of the whole, or rather, when he thinks of the whole he can envisage the parts which have not yet been dissociated but when he tries to dissociate one of the parts he forgets the whole, or he disregards it, and merely compares the part in question with the remaining part.

#### Stage 2 (5 - 6 years)

Children's responses at the second stage are characterized by the intuitive discovery of the correct answer by a form of trial and error, and not by immediate composition. When comparing part with the whole, the whole is not destroyed as previously.

#### Stage 3 (7 - 8 years)

Stage 3 is characterized by an immediate and spontaneous discovery that there are more flowers than poppies, or, the bus would be fuller if it had all the males in it rather than all the boys. Children at this stage see that the part and the whole are not defined by the same attributes, but that the whole comprises the remaining part.

#### Treatment of Responses and Discussion of Results

The children's responses to the Class Inclusion Tasks were categorized into three stages in terms of Piaget's criteria (see above). Each child was given a score of 1, 2 or 3 relating to

Table 8: The scores of children between 5 and 8 years on the Gender Class Inclusion Measure in relation to their age.

AGES	5	6	7	8
Scores of 1	17	14	8	3
2	4	8	7	6
3	4	3	10	16

Age Groups	N	$\bar{X}$	S.D.
5 yrs	25	1.48	.770281
6 yrs	25	1.56	.711805
7 yrs	25	2.08	.862168
8 yrs	25	2.52	.714143

Anova Summary:

Source	S.S.	DF	M.S.	F Ratio
Age Groups	17.17	3	5.90334	10.034
Error	56.48	96	.588333	

F = 10.034, df = 3, 96 p < .01

the stage in which the response was categorized.

The one way analysis of variance (1 way anova) was the statistical procedure employed to investigate the significance of the developmental trends between the ages of five and eight years.

The null hypothesis tested by the one way analysis of variance is that there is not significant different between the mean square of the scores between age groups and the mean square of the scores within each age group.

$H_1$  is that the mean square between the significantly larger than the mean square within groups.

The results appear in Table 8.

$F = 10.034$ ,  $df = 3, 96$   $p < .01$

The null hypothesis is rejected. There is an overall significant difference in the means of the four sample age groups.

We observe that there is an orderly progression in the means of each successive age group. The mean of the five year old sample is 1.48 (SD = .77), the six year olds 1.56 (SD = .71), the seven year olds 2.08 (SD = .86) and the eight year olds 2.52 (SD = .71).

In order to determine whether there were any significantly large increases in the mean of any one age group compared to the previous age group, a further treatment was performed; the multiple comparison of means using the Scheffé procedure. This treatment revealed that none of the compared means differed at

any acceptable level of significance. This is attributed to the fact that the analysis of variance provides a more powerful test of the hypothesis of equal means. Considering that the sample were of equal size it is reasonable to conclude that the larger mean is significantly larger than the smaller mean even though the Scheffé test was unable to detect this difference and isolate particular means which departed from the gradual progression.

Interpreting the data for the light it casts on the structural level of the child's thought at the various ages, we observe that the means of the five and six year old samples represent operations which are predominantly stage 1. ( $\bar{x} = 1.48$ ,  $\bar{x} = 1.56$ .) From the table of scores we find that 68 and 56 per cent of the five and six year old's responses respectively were categorized into stage 1.

The child at this stage cannot establish a permanent inclusion between the whole and the parts as soon as the whole is divided. This is in spite of the fact that the child of 5-6 years is able to grasp the operation of comparing part with part in the classification of boy, girl, man and woman into correct groupings on the basis of common properties (as described in the previous chapter on Gender Classification). The data appears to support the postulate (p.1) that the ability to understand relations among different levels of an hierarchy, which is the problem of class inclusion still eludes the child of this age.

By eight years of age, the mean of this sample ( $\bar{x} = 2.52$ )

represents operations which are predominantly stage 3. The table of scores shows that only 12 per cent of this sample are still unable to comprehend that the whole need not be destroyed when comparing part with whole, while 88 per cent, either through trial and error or spontaneous understanding are able to perform class inclusion operations.

At the seven year level it appears that the observed change between stage 1 and stage 3 is taking place.

The data in table 9 appears to provide support for the postulate (p.2) that until the child is capable of establishing a permanent relation of part with whole, he will not be able to grasp that boys and men are part of the class of males and girls and women are part of the class of females. The age at which this takes place has important implications for the cognitive developmental interpretation of identification.

#### Implications for Identification

In terms of the cognitive developmental interpretation of identification, i.e. that identification is the *consequence* rather than the *cause* of gender identity as in traditional theories, our evidence of gender class inclusion occurring at 7 years of age has interesting implications:

In previous sections we have described how the child's egocentric thinking, and later the general principle of homophily tends to lead to valuing of that which is 'like self' and to affiliation. The tendency to imitate, as Piaget (1952) has documented, is a product of the child's

desire to master or demonstrate a causal control of interesting environmental events. Through 'circular reaction' (Piaget, 1947), the child only imitates those activities of people that are already in his repertoire, then gradually through extension of his schema begins to imitate new acts of the model.

When we come to consider a totalistic form of identification in which the general traits, attitudes and values of the same-sex model representing the child's conception of a particular person, we discover that for the model to be perceived as conceptually similar to the self, it requires a certain level of cognitive structural development to take place before such a conception is possible. The cognitive structure required is the ability to additively compose classes, i.e. class inclusion, which according to our findings only takes place around the age of 7 years. At 5 - 6 years we observe how the child is able to classify on the basis of similar attributes. He understands that he is a boy amongst the class of boys, at this age the child can perform the operation of logically comparing part with part. The boy's classification of adult males is a more cognitively advanced achievement and for this reason it follows from his ability to classify other boys in the same category. It is now, not only, "I am a boy in the class of boys", but "I am a boy in the class of males", and he is now able to expand his category of "males" to include the same-sex figures of diverse ages particularly the same-sex adults (see chapter, Gender-Age-Time). The 'like self' nature of the category facilitates stable empathy and affiliative relationships. It is at this point that modelling tends to become part of a

Table 9: The number of responses falling into each of the three stages on the Gender Class Inclusion Task and the two Control tasks, (a) flowers, (b) children.

	N	Stage 1		Stage 2		Stage 3	
		Obs.	Exp.	Obs.	Exp.	Obs.	Exp.
Gender	100	43	45	25	23.7	32	31.3
Control A	100	41	45	29	23.7	30	31.3
Control B	100	51	45	17	23.7	32	31.3

Table of Chi-Squares

.0889	.0751	.0148
.3556	1.2019	.0567
.8	1.8779	.0142

Overall Chi-Square

$$x^2 = 4.48448, \quad df = 4, \quad p > .250$$

unique relationship of identification or as Ausubel (1957) refers to it, "Satellization", in which the desire of proximity, compliance dependence and approval become integrated.

### The Parallel Development of Gender Class Inclusion and Physical Class Inclusion

In order to further demonstrate the cognitive developmental theme that the child's organization of his social and sexual cognition undergoes the same radical transformations with age development as his basic cognitive organization of his physical world, the performance on the gender task was compared with the children's performance on the two control tasks (a) flowers (b) children presented in Table 9.

### Treatment of Responses and Discussion of Results

The responses of all subjects between 5 and 8 years of age who were administered the class inclusion tasks (N = 100) were sorted in terms of whether their responses were categorized as stage 1, stage 2 or stage 3. Table 9 shows the number of responses falling into each of the three stages for the gender task in comparison to the two control tasks, (a) class inclusion with flowers and (b) class inclusion with children.

In order to demonstrate the parallel development of gender class inclusion with physical class inclusion, the pattern of results across stages for each task was considered. The chi-square test was selected to demonstrate the similarity. Although the test is normally used to show that patterns are dissimilar when the chi-square is significant, the purpose here is to obtain a significantly insignificant chi-square in order to demonstrate the null hypothesis.

$$\chi^2 = 4.48448, \quad df = 4, \quad p > .250$$

The null hypothesis is accepted.

The cognitive developmental theme that sex-typing is an aspect of cognitive growth involving basic qualitative changes with age in the

child's mode of thinking and concomitantly in his perceptions of both his physical and social work appears to be supported by the above data.

#### Structural Errors in Composing Classes

These are two forms of difficulty which the child experiences in attempting to additively compose classes: (Piaget, 1929) (a) At early stages the child's thought still reflects *realism* -- his thinking in concrete and physicalistic in nature, which prevents him from conceiving of two sets of elements in the same class at once which is the error of *extension*. The concept 'boys' or 'girls' are to the child a real spatial entity and are, in a sense, 'used up' so that by putting them in one class he is not able to put them in another class.

(b) The error of *intension* is that the child is unable to conceive of a single element as possessing two properties at once. For these children a boy cannot be both a 'boy' and a male at the same time.

By 7 years, once the child has developed the necessary mental structures, he appears to overcome his difficulties due to his earlier realism. He is now able to return to the starting point of his mental construction and recognize the same objects as being in a second class, possessing a second property.

Finally, through investigation of gender class inclusion and discovering the relationship between the operations of a physical-object nature and social-sexual nature it is appropriate to quote Piaget:

"To sum up we can now see why the additive hierarchy of classes, seriation of relationships, and operational generalization of number ... appear at approximately

Summary

This chapter describes the stages and sequence of operations in the development of what is called 'gender class inclusion', which is the ability to understand that boys, girls, men and women are subordinate categories of a class of beings; males and females. The argument is put forward that it is not until the child is capable of perceiving the same-sex adult model as a member of the same class that he will be able to consistently model or identify with adult members of that class. This means that the boy of six or seven years, for example, only begins to realise the 'like self' nature of the father's gender when he is able to see him as a man in the class of males, and himself as a boy in the same category. Such an understanding implies a grasp of operations to additively compose classes or class inclusion.

Experimental support is provided for the two postulates:

(p.1) In spite of the fact that the child of 5-6 years is able to grasp the operation of comparing part with part in the classification of boy, girl, man or woman into correct groupings on the basis of a number of common properties; he is still not able to understand the relations among different levels of an hierarchy, which is the problem of comparing part with the whole.

(p.2) Until the child is capable of establishing a permanent relation of part with the whole (class inclusion) at seven years of age, he will not be able to grasp that boys and men are part of the class of males and girls and women are part of the class of females.

The measures used to assess gender class inclusion operations was devised by the author on the basis of Piaget's classic experiments.

Experimental support is also found for the 'parallelism' hypothesis i.e. that the child's organization of his social and sexual cognition undergoes the same radical transformations with age development as his basic cognitive organization of his physical world. The children's performance on the gender inclusion task was compared with their performance on two control tasks taken from Inhelder and Piaget (1964).

The implications of the age at which these operations take place is discussed in terms of the cognitive developmental interpretation of identification, i.e. that identification proper depends on the ability to conceive of one's own sex parent and oneself in the same class of beings, that identification is the *consequence* rather than the *cause* of gender identity as in traditional theories.

GENDER-AGE-TIME

Up to now, we have been considering the development of the operations children use to group or categorize concepts permitting them to create order, and to understand their own position in the social structure with regard to their gender role.

A particularly important aspect in the gradual stabilization of gender identity between the years three to seven relates to the child's understanding of 'lived time' or ageing. This is important not only from the point of view that a secure gender identity involves the child's ability to recognise the permanence of gender ascription in spite of changes in size or age, but further, it permits him to understand that a sex-role definition also involves an age-role definition. For example, the sex-role at five is specific to the attributes of a five-year old, and different from a sex-role at twenty-five. Which means that at each age a sex-role is specified for that level.

There are only two papers that we are aware of which touch on the problem of gender age role definition -- Kohlberg (1966) and Hartley (1964b). Kohlberg postulates,

"The first basic social differentiation made by children is that of age - size (babies, boys and girls, and grown-ups), a differentiation that precedes gender differentiation. Concepts of age (time) are more difficult than size concepts, and are assimilated to the later." (p.101)

He provides an anecdotal observation of comments made by four

year old Jimmy to his 4½ year old friend Johnny:

Johnny: I am going to be an airplane builder when I grow up.

Jimmy: When I grow up I'll be a Mommy.

Johhny: No, you can't be a Mommy, you have to be a Daddy.

Jimmy: No, I'm going to be a Mommy.

Johhny: No, you're not a girl, you can't be a Mommy.

Jimmy: Yes, I can.

Another example he gives is:

"Philip (aged 3 years, 10 months) told his mother,

"When you grow up to be a Daddy, you can  
have a bicycle too, (like his father)."

(p.95)

Hartley was concerned in discovering what form of learning processes there are which function to specify the appropriate behaviour out of a matrix of all those possible behaviours at each age. She felt that it was possible that role cognitions and expectations may develop in anticipation of future statuses by perception of role-implementation by older persons, much like the development of the 'cognitive-maps' of Tolman.

"Although sex-role *implementation* can be assessed only at the current age status of the subject, sex-role *definition* proceeds on a multiple track, depending on the perceptibility of differences among sex-age-role status and the verity of exposure of the subjects. (1964b, p.5.)

However, her paper is only speculative as,

"A search of the literature and a widespread

enquiry be correspondence has been singularly unavailable with regard to systematically collected data which could blue-print such processes ..." (1964b, p.4)

### Operations of Time

These have been a number of studies made on the growth of the child's understanding of time: Stuart, 1952; Ames, 1964; Bradley, 1948; Springer, 1952; and Lovell and Slater, 1962; however they are of little value to us all these studies except Lovell and Slater's, emphasise such aspects as knowledge of time words, telling the time, and the ability to appreciate universal time.

We have been very fortunate however, in having available an early study of Piaget's (1946), which has only recently been translated into English -- "The Child's Conception of Time" (1969). Piaget's analysis of stages in the development of the child's conception of age provided the necessary foundation for our investigation of the processes relative to gender-age acquisition.

Piaget himself, mentions how the development of the child's conception of time remained elusive to him as the time relationships constructed by young people depended so much on what they hear from adults and not from their own experiences; it was only after he had successfully applied the concept of 'grouping' to the child's conception of number and quantity that it was a relatively easy step for him to applied the same approach to the concept of motion, velocity, then time.

Piaget began his investigation by trying to discover how the child succeeds in organizing the time of external events, at first

intuitively, and then by a set of qualitative operations. He found that at the intuitive level, the child, in accordance with the general laws characteristic at that level, judges physical time as if it were 'inner time', i.e. as if it contracted and expanded with the contents that have to be timed. As a result, he fails to grasp the idea of homogeneous time, common to all phenomena (Piaget, 1969, p.197). For example, if two actions take place in equal intervals of time, but one takes place more rapidly than the other, then the child will say that the former takes longer, while the older child can correct his judgement by distinguishing between subjective and objective time.

Some of Piaget's experiments were extremely ingenious in investigating and identifying the elementary operations involved in the construction of psychological time. The simple experimental situations which were performed before the child dealt with (a) simultaneity, (b) the sequence of events, and (c) duration. Piaget maintained that if time is really the co-ordination of motions in space, then we must be able to discover the existence of *operational time* involving relations of succession and duration based on analagous operations in logic. He makes a clear distinction between operational time and *intuitive* time which is limited to successions and durations given by direct perception. Had Piaget not departed from the old introspective school of psychology based on the adult view that there is a distinction between 'outer' time and 'inner' time -- that inner time can be grasped by introspection, while external time must be constructed -- he would never have been able to document the child's

successive operations in acquiring the concept of time. In his own words,

"Introspection, which is a form of derived conduct gives us nothing but incomplete and deceptive information: being utilitarian it can tell us about the products of our mental operations, but nothing about their mechanisms." (1969, p.197.)

A cognitive developmental approach to time, which Piaget adopts, however, assumes that time may be constructed by true operations permitting qualitative comparisons, seriations, and colligations depending on whether the operations involved are analagous to those involved in classes and logical relations, or whether numerical units come into play.

#### Age

We are particularly interested in tracing the development of the concept of age which involved ideas of biological growth and also total duration. Piaget takes his cue from an early study by Decroly (1932), who observed the spontaneous reactions of his own daughter between the ages of 4 and 6 years. Decroly's conclusion was that young children tend to confuse age with height -- as if ageing were tantamount to growing. Further, from the responses elicited by Decroly when he asked several groups of children how old they were last year, how old they would be next year, and how old they were at birth; 75 per cent of his subjects failed to give the correct answers to the first two questions, while question 3 eluded even older children. Piaget's subsequent experiments of a similar nature lead him to the conclusion that for the young child age meant growth,

and was not dependent upon order of birth. Adults remained at the same age because they had 'ceased to grow'. But as the child developed, he gradually came to realise that age was dependent upon the date of birth, although he believed that differences in age could still be modified with time, so that a younger smaller child could reach the same age as an older one when the former grew to the same size as the other. Only at about the age 7 - 8 years, did Piaget find that children understood that birth order was the decisive factor determining age.

#### The Link Between Gender, Size and Age

In order for us to investigate the type of statement as made by four year old Johnny to his friend, "When I grow up I'll be a Mommy", and Philip to his mother, "When you grow up to be a Daddy you can have a bicycle too", we need to establish a theoretical framework incorporating gender, size and age concepts.

In the previous section on 'gender-size' we demonstrated how, due to the young child's intuitive and physicalistic thinking, size is a very convenient yardstick by which he distinguishes between the sexes -- boys are bigger and stronger than girls; male dogs are bigger and stronger than female dogs. At the same time Piaget (1969) has documented how this physicalistic intuitive thought leads young children to believe that as they grow older and bigger they catch up with their elders.

"One thing in particular strikes one directly namely the static and almost discontinuous character of the child's idea of age. To him ageing is not a perpetual and continuous

process, but rather a process of change tending toward certain states; time ceases to flow once these states are attained. That is precisely why young children equate ageing with growing up: when growing stops, time apparently ceases to operate." (p.202, 1969.)

As a strategy of enquiry we have attempted to theoretically link the child's concept of gender, size and age by the following logic: If the preconceptual child intuitively makes distinction about gender on the basis of size as we have indicated, and if (as Piaget documents) children's early intuitions about ageing (or lived time) are connected with becoming bigger or growing up, then it should not be difficult to reveal the connection between ageing and gender definition, which puts us in the position where we can interpret a young child's statement like, "When I grow into a Mommy ..." and understand the logic behind, "If I grew bigger than my sister, then I could be a boy if I wanted to." and "If I grew older than Peter (age and size being synonymous) then I could be a boy."

After directly questioning "forty or so" 4 to 10 year old subjects about their conception of their age, Piaget (1969) noted that there was a remarkable agreement between the child's conception of age and the child's conception of physical time as revealed in his earlier tests. The mechanisms that operate are the same in both cases. For example, the construction of physical time requires the co-ordination of motions and velocities which is demonstrated by Piaget's experiments with two dolls that 'race' across the table.

Growth is comparable to the path traversed by the runner while ageing (the rate of growth) to the differences in the velocities of the two runners.

There are two fundamental errors that children under seven or eight tend to make:

- (a) Duration -- both with the young child's age and his time concepts, duration is confused with the path traversed, and
- (b) Succession -- there is a lack of differentiation between both spatial and temporal succession.

With the emergence of 'articulated intuitions' (stage 2) there is a partial connection of primitive intuitions, revealing itself either in succession (the part in time becomes divorced from the part in space) or duration (more quickly = less time) which however, remain unco-ordinated until the appearance of operational co-ordination at 7 - 8 years (stage 3).

Piaget postulates the following:

"If the views we have presented are correct the child begins by evaluating growth by its material results alone (height), and so comes to believe that greater stature necessarily corresponds to greater age, irrespective of the rate of growth. On the other hand, as soon as different growth rates are introduced, age is no longer treated as being proportional to height alone, but to height relative to the rate of growth. In other words, just as physical time is equal to distance/velocity, so age

is equal to height/growth rate. (1969, p.218)

For the young child in the preconceptual stage, size or stature is a major determinant of many of the intuitive judgements he makes about gender differences (documental in our previous chapters) which is due to the concrete physicalistic thinking of the child at this age. Many of the sex-typed qualities and attributes that the child discerns, such as strength, physical power, social power, competence, etc., originate from such size concepts to which they are assimilated. At the same time Piaget's investigation into the child's concept of age indicates that "the child begins by evaluating growth by material results alone (height), and so comes to believe that greater stature necessarily corresponds to greater age irrespective of rate of growth" (see above). This means that the child before the age 7 - 8 uses stature to determine both age, as well as many of the qualities that refer to gender. Hence, the logical error by a four year old girl, "When I grow up to be a Daddy ..." which is a result of the following sequence: Size and age are equivalent. Males are bigger than females. Therefore a girl, by growing bigger relative to her brother may grow into a man.

#### Purpose

The purpose of the present section is:

- (a) To examine the processes whereby children move from an articulated intuition of gender-age which is linked to physicalistic size, to a stage where, by means of operational realization

they free themselves of concrete thinking and conceive of gender as a permanent category irrespective of changes in size, age or time.

- (b) To demonstrate the sequence of stages of the gender-age concept, and their relationship to the stages that Piaget conceptualized in his analysis of children's ideas of age.

#### Postulate

Hence the following postulation is presented:

*The stabilization of gender-age categories follow after gender-size concepts as they are assimilated to the latter, occurring at 7 years.*

#### Development of the Gender-Age Measure

The gender-age measure was developed from one of Piaget's later more ingenious experiments, the purpose of which was to bring out clearly the operations of duration (the ages themselves) and succession (the seriation of births) in a projective form. While direct questioning is involved in the context of the measure, providing qualitative information about the process and the stage, care is taken to avoid prejudiced answers by cross checking, as children's responses to questions about their ideas of age are likely to be influenced by discussions of the subject in the home which is more likely than discussion of any other temporal concept.

The measure consists of eleven drawings on cards measuring 9 x 11 cm. depicting a brown dog and a grey dog who grow at different rates. The drawings are highly stylised, presenting a side view of each dog.

The decision to use drawings of dogs at different ages of life was made for the same reason that Piaget found it more satisfactory to use drawings of trees rather than people which were likely to elicit automatic responses. But, more important, for our purposes in investigating gender, animal pictures permitted the isolation of size and height from other characteristics of human figures which would have confounded the responses. Also, drawings of dogs which presented no cues about gender assignments other than size, permit the subject to reassign the sex of the dogs as they grow, if he deemed it necessary. This is a feature of the test when a dissonance between size, age, and gender occurs.

Different Growth Rates Between Brown Dog and Grey Dog (See App. 5)

There are six drawings of the brown dog which we have numbered  $B_1$  to  $B_6$ , and five drawings of the grey dog which we have numbered  $G_1$  to  $G_5$ . The sizes of the dogs are such that:

$$(1) \quad B_6 \succ B_5 \succ B_4 \succ B_3 \succ B_2 \succ B_1$$

$$(2) \quad G_5 \succ G_4 \succ G_3 \succ G_2 \succ G_1$$

When the growth rates of the two dogs are compared

$$G_1 \prec B_2$$

$$G_2 \prec B_3$$

$$G_3 = B_4$$

$G_4 \succ B_5$

$G_5 \succ B_6$  as the *rate* of growth of the grey dog overtakes the rate of growth of the brown dog.

#### Administration

S is presented with a 'photograph' of a small brown dog taken on its first birthday. He is then given the other five cards which are randomly arranged and asked to place the 'photographs' in the right order by age, which involves the seriation of the dog's from smaller to larger.

The instructions are:

"This picture of the brown dog (E places B before S) is a 'photograph' taken on the day this brown dog had its first birthday. Each year the dog gets older. Now I want you to arrange the photographs by age. Starting with the first birthday photograph, put the pictures in the right order."

This simple seriation task was performed adequately by all subjects tested over the age of four years. Some subjects prefer to order the picture vertically while most seriate horizontally.

After the seriation task, the child is told that when the brown dog was two years old, on its second birthday, a small grey dog had its first birthday.

E: "Here is a photograph of the small grey dog on its first birthday." E places  $G_1$  next to  $B_2$ .

"And here is a photograph of the same grey dog on its second birthday." E places  $G_2$  next to  $B_3$ .

Pointing to  $B_2, G_1$ ; E asks:

"Which dog is older, the brown dog or the grey dog?"

"How many years is it older than the other dog?"

"Which is the boy dog, and which is the girl dog?"

"Can you be sure that you are right?"

S may refuse to assess gender on the basis of size alone without further information, asking, "What is the dog's name?" If so E says, "All right, let us say that this is the girl dog ( $G_2$ ) and this is the boy dog ( $B_3$ )" The assignment corresponds with the sizes of the dogs as  $G_2$  is very much smaller than  $B_3$ . Then E asks "Which dog is older?" "How many years is it older than the other dog?"

After these questions E presents S with the remaining three 'photographs' of the grey dog,  $G_3$ ,  $G_4$ , and  $G_5$  and instructs him to put them in the right order next to the brown dog. ( $G_3 = B_4$ ,  $G_4 > G_5$  and  $G_5 > B_6$ ).

By correct spatial arrangement of the drawings, the simultaneity of  $B_2$  and  $G_1$ , and  $B_3$  and  $G_2$  is implied without having to ask questions dealing with their correspondence. The child is in fact forced, by preliminary double seriation, to bear the growth rates in mind, whether he judges age by size alone, or by the co-ordination of the starting and finishing points of the growth process.

When the children realize the increase in the rate of growth of the grey dog as compared to the rate of growth of the brown dog, they often express surprise and sometimes even excitement. The reason for this is very likely due to them having already assigned the grey dog a female on the basis of size, and then suddenly noting that it has

outstripped the male dog, not only in growth rate, but in actual size. This creates a dissonance between size, age and gender, which is investigated with further questioning.

E pointing to  $G_4$  >  $B_5$  asks:

"Which dog is older?"

"How many years is it older?"

"Which is the boy dog and which is the girl dog?"

and again pointing to  $G_5$  >  $B_6$ :

"Which dog is older?"

"How many years is it older?"

"Which is the boy dog and which is the girl dog?"

The responses to the questions about gender assignment when it is divorced from age or size reveal how the child copes with the dissonance. On the one hand, he may insist categorically that gender, once assigned, must remain constant irrespective of age or size changes. On the other hand, he may find it quite permissible to change the assignment. If so, he will say, "The girl dog has grown up into a boy dog." E then raises objections such as, "Are you sure that the grey dog is a boy now?" On this birthday (E points to  $G_1$ ,  $B_2$ ) we agreed that it was a girl." and "Can a girl dog grow into a boy dog?"

Further, the enquiry takes the form of a number of direct questions to the child about age. This is also an opportunity to follow through any statements or responses by the child which appeared interesting or relevant.

An example of the standard questions are:

"How old are you?"

"Have you got a brother or a sister? (or friend)"

"Is he/she bigger than you?"

"Is he/she older than you?"

"If you grew bigger than him/her, would you become older?"

"Who will be older when you are both grown up?" (or will you both be the same age?)

"Is your Mother older or younger than you?"

"How do you know?"

"Is your mother still growing older, or has she stopped?"

"Is she still growing bigger, or has she stopped?"

These questions provide further qualitative information about the way the child views ageing -- whether it is related to size and ceases once adult size is reached, or whether it is seen as a continuous process from the point of birth.

#### Pilot Study

Twelve children between the ages of five and ten years were tested to check the adequacy of the procedure. Attention was paid to the phrasing and sequence of the standard questions and the suitability of the drawings. Some modifications were called for.

With regard to the phrasing of the questions, there was initially some indecision about whether to say "this is a photograph taken on the day the brown dog was born", or "the day this brown dog had its first birthday". The latter was found to be more easily understood.

Also, after a number of tests, it was decided to re-do the drawings depicting the growth rate of the grey dog, making  $G_1$  and  $G_2$  smaller than the original, and  $G_4$  and  $G_5$  larger than the original in

Table 10: The scores of children between 5 and 8 years on the Gender-Age Measure in relation to their age.

AGES	5	6	7	8
Scores of 1	19	14	7	0
" 2	6	9	3	4
" 3	0	2	15	21

Age Group	N	$\bar{x}$	S.D.
5 yrs	25	1.24	.43589
6 yrs	25	1.52	.653197
7 yrs	25	2.32	.9
8 yrs	25	2.84	.374165

Anova Summary:

Source	S.S.	DF	MS	F Ratio
Age Groups	40.36	3	13.4533	34.349
Error	37.6	96	.391666	

F = 34.349    df = 3, 96    p < .01

order to emphasize the difference in the rates of growth.

#### Number and Age of Subjects

One hundred children were tested -- from five years to eight years of age, with twenty five children in each group, consisting of boys and girls equally divided. (See table 1)

#### Categorization of Responses into Stages

##### Stage 1. (5 - 6 years)

During the first stage, age is independent of the order of births, and age differences are thought to become modified -- with time conceived as a heterogeneous flux. There is a total lack of differentiation between size and age.

Gender is intuitively linked with size due to the concrete thought of the child. Growing bigger is synonymous with growing older, so that the responses of a child at this stage to the gender-age measure indicates that he believes that if the small grey female dog grew bigger than the brown male dog, not only will she grow older than him but that it is possible for her to grow into boy dog. The young child's intuitions derived from size do not lead them to see any incongruence in such reasoning. However when questions refer to the child itself, a girl for example, will believe that if she grew bigger than her brother, she would grow older, but egocentric self-labelling makes her reluctant to admit that she would therefore grow into a boy. The child at this stage admits it is *possible* but highly unlikely.

##### Stage 2. (6 - 7 years)

The intuitions of the child at this stage become articulated,

leading to either one of two conclusions in relation to the constancy of gender assignment: The child believes that:

- (a) though age differences are not consistently maintained throughout life, age depends on the order of births (*succession*), or
- (b) the differences are maintained (*duration*), but they do not depend on the order of births.

The child who uses the former reasoning maintains that the initial assignment cannot be altered. The strength of this assertion depends on the degree that he has freed himself from the limitations of sized-based intuitions. Many of the children at this stage, referring to  $G_5$ ,  $B_6$  will insist that the grey dog is a boy dog and the brown dog is a girl dog, somehow forgetting that he just previously said that  $G_1$  was a female. When this is pointed out to them by drawing their attention to  $G_1$  and asking, "Didn't you say that at this birthday the girl dog was a girl dog?" They agree saying, "Yes, it is a girl." When their attention is then directed to  $G_5$  they maintain that it is a boy dog without any awareness of the contradiction. Even though they realise that it is the same dog in each case, and that a girl-dog cannot grow into a boy-dog, their error appears to be caused through their *inability to decenter*; they center on the relationship between  $G_1$ ,  $B_2$  and  $G_5$ ,  $B_6$  -- ignoring the continuity.

The child who uses the latter reasoning maintains that the gender assignment remains constant, but when perceiving the size of  $G_5$  in relation to  $B_6$ , will correct his initial ascription saying that he must have been wrong and that it should be altered. The big dog could not possibly be the female, it *must* be the male. The smaller brown

dog *must* be female.

### Stage 3. (8 years)

In the third stage, finally duration and succession become co-ordinated as the child acquires the ability to decenter. The growth rate is treated as a ratio, and it is this ratio which permits the correlation of different rates of growth, hence the conception of durations and ages independently of space and size. Gender categorizations become independent of age and size changes.

### Treatment of Responses and Discussion of Results

The children's responses to the Gender Age Measure were categorized into three stages according to Piaget's criteria of levels of operation described above. Each child's response was given a score of 1, 2 or 3 depending on the stage in which it was categorized.

The one way analysis of variance (1 way anova) was the statistical procedure employed to investigate the developmental trends between the ages of five and eight years of age.

The null hypothesis tested by the analysis of variance is that there is no significant difference between the mean square of the scores between age groups and the mean square of the scores within each age group.

$H_1$  is that the mean square between is significantly larger than the mean square within groups.

The results appear in Table 10.

$F = 34.349, df = 3, 96 \quad p < .01$

The null hypothesis is rejected. The values of the means of the sample age groups tested are significantly different. We observe an orderly progression in the values of the means for each age group. The mean of the five year old group is 1.24 (SD = .44),

the six year olds is  $\bar{x} = 1.52$  (SD = .65), the seven year olds is  $\bar{x} = 2.32$  (SD = .9) and the eight year olds is  $\bar{x} = 2.84$  (SD = .37).

The question that subsequently has to be dealt with is are there any significant differences between any particular age group and the subsequent age group? This is the problem of isolating differences among sample means. Since all the samples were of the same size, on the basis of rejection of the overall null hypothesis, it is justifiable to conclude that the largest mean is significantly larger than the smallest mean, indicating that the Gender Age Measure reveals a developmental trend in the structure of the child's thought between five and eight years of age. However the rationale regarding the stabilization of the postulated gender-age categories (see above) states that this stabilization occurs at the seven year level. Does the data support this?

A comparison of means between successive age groups using the Scheffé procedure was performed. At the .01 level a significant difference between the mean of the six year old and seven year old samples is observed ( $\bar{x} = 1.52$ ,  $\bar{x} = 2.32$  respectively).

Scheffé F = 6.808853, df = 3, 96, p < .01

Further, at the .05 level, the comparison of successive means reveals a somewhat less significant difference between the means of the seven year old sample and eight year old sample ( $\bar{x} = 2.32$ ,  $\bar{x} = 2.84$  respectively).

Scheffé f = 2.8766, df = 3, 96 p < .05

Interpreting the above for the light it casts on the structural

changes in the level of cognitive operations at the various ages, we observe that the five year old sample with a mean of 1.24, the level of operations is predominantly stage 1. The child at this stage reveals lack of differentiation between age and size. He relies on physicalistic intuitive thought dependent on structure to determine age, growth, and gender.

The six year old sample with mean of 1.52, appear to be moving toward articulated intuitions (stage 2). For them, age begins to depend on the order of births (succession), or they are able to see how age differences are maintained (duration) but their inability to decenter leads them to fall into error.

At seven years of age we observe the significant departure from stage 2 to stage 3. The child at this age acquires the ability to decenter enabling him to co-ordinate duration and succession. The growth rate is treated as a ratio, and it is this ratio which permits the correlation of different rates of growth, hence the conception of durations and ages independently of space and time. Gender categorizations become independent of age and size changes.

The above data appears to confirm our postulate that the stabilization of gender-age categories follow after gender-size concepts as they are assimilated to the latter, occurring at 7 years.

Qualitative Trends

Stage 1. Below are relevant extractions from protocols of children giving an indication of the structure of their reasoning at Stage 1. Steven (6:3): Seriates all the 'photographs' of the brown dog ( $B_1$  to  $B_6$ ) according instructions.

E: When the brown dog was two years old, on its second birthday a small grey dog had its first birthday. Here is a 'photograph' of the small grey dog on its first birthday. (E placed  $G_1$  next to  $B_2$ ), and here is a photograph of the same grey dog on its second birthday (E places  $G_2$  next to  $B_3$ ).

E: (Pointing to  $B_2$ ,  $G_1$ .) Which dog is older -- the brown dog or the grey dog?

Steven: The brown dog ( $B_2$ ).

E: How many years is it older than the other dog?

Steven: Two years (erroneously).

E: Which is the boy dog and which is the girl dog?

Steven: (Pointing) This is the boy ( $B_2$ ), and this is the girl ( $G_1$ ).

E: Can you be sure you are right?

Steven: Yes.

E: How?

Steven: They (girl dogs) are smaller and have got long tails.

E: (Pointing to  $B_3, G_2$ .) Here, which dog is older?

Steven: The brown dog. ( $B_3$ )

E: How many years is it older than the other dog?

Steven: 3 years (erroneously).

E: Here are the other photographs of the grey dog in its third, fourth and fifth birthday. Put them in the right order next to the brown dog.

Steven completes the task adequately. By correct spatial arrangements of the brown and grey dogs, the simultaneity introduces preliminary double seriation forcing the child to bear the growth rates in mind whether he judges by size alone, or the co-ordination of the starting and finishing points of the growth process. ( $G_3 = B_4, G_4 > B_5$  and  $G_5 > B_6$ .)

E: (Pointing to  $G_4 > B_5$ ) Which dog is older?

Steven: The grey one ( $G_4$ ).

E: How many years is it older?

Steven: Four years older.

It is apparent that Steven is relying on size-based intuitions. His operational schemas are still centered, making it impossible to bear ratios in mind. The most he is capable of, is to center on the direct comparison between the grey dog ( $G_4$ ) which is now relatively larger, and brown dog ( $B_5$ ) which is relatively smaller. Not only is there an actual increase in size, but a relative increase in size of the grey dog which Steven ascribed female. The dissonance between age, size and gender is investigated by further questioning:

E: (Pointing to  $G_4 > B_5$ .) Which is the boy-dog and which is the girl-dog?

Steven: (Spontaneously.) This is the girl-dog (pointing to the relatively smaller brown dog) and this is the boy-dog (pointing to the relatively larger grey dog).

E: Can a boy dog grow into a girl dog?

Steven: No.

W: Well, are you sure that the grey dog is a boy now. On this birthday ( $G_1 \leftarrow B_2$ ) we agreed it was a girl.

Steven: Oh no! The grey dog is a girl!

Steven's centered intuition derived from size results in the problem eluding him. For him size is equivalent to age, and rate of growth is equivalent to rate of ageing. Gender ascription, in the absence of further discriminating cues is also based on size. This becomes obvious from the following:

E: How old are you?

Steven: Six.

E: Have you got a brother or a sister?

Steven: I've got a brother. He's ten.

E: Is he bigger than you?

Steven: Yes.

E: Is he older than you?

Steven: Yes.

E: If you grew bigger than him, Would you become older?

Steven: Yes.

E: Who will be older when you are both grown up?

Steven: We will both be the same.

E: Why?

- Steven: Because we will be the same size.
- E: Is your mother older or younger than you?
- Steven: Older.
- E: How do you know?
- Steven: She is taller.
- E: And if you get as tall as her?
- Steven: Then we will be the same age.
- E: Is your mother still growing older?
- Steven: Yes; she's growing bigger too!

Jenine (6:4) also demonstrates the inability of the child at stage 1 to maintain equivalences in ageing irrespective of rates of growth.

- E: (Referring to  $G_1 \leftarrow B_2$ .) Which is the girl-dog and which is the boy-dog?
- Jenine: The small one is the girl. The big one is the boy.
- E: Can you be sure you are right?
- Jenine: Yes. The size is not the same.
- E: (Referring to  $G_2 \leftarrow B_3$ .) Which dog is older?
- Jenine: The bigger one ( $B_3$ ).
- E: How many years is it older than the other dog?
- Jenine: (Erroneously) Three.

Also, later in the test, when there occurs a dissonance between size, age, and ascribed gender, Jenine consistently maintains that the larger dog is older. When asked how many years it is older than the other dog, when  $G_4 \succ B_5$  and  $G_5 \succ B_6$ , she replies that the grey dog becomes four years older, then five years older. The child at

stage 1 neither depends on order of births (duration) nor are differences maintained throughout life (succession).

E: (Pointing to  $G_5 \succ B_6$ .) Which is the girl-dog and which is the boy-dog?

Jenine: That one ( $B_6$ ) is the girl now, and that one ( $G_5$ ) is the boy.

E: Are you sure the grey dog is a boy now?

Jenine: Yes.

E: But on this birthday ( $G_1 \prec B_2$ ) we agreed that it was a boy.

Jenine: Yes ... Oh no! I keep forgetting how they grow. The smaller one *must* be the girl and the big one is the boy. They *can't* change ...

Jenine becomes thoroughly confused as she is faced with the apparent contradiction that (a) the boy-dog is always bigger than the girl-dog, (b) she has already categorized the grey dog as a female, now it has grown bigger than the brown dog, yet (c) a girl can't grow into a boy. This is an example of the difficulties that confront a child at the level of physicalistic intuition, when rate of growth and ageing are synonymous.

E: Jenine, how old are you?

Jenine: Six.

E: Have you got a brother or a sister?

Jenine: Yes, a sister. She's three.

E: Is she smaller or bigger than you?

Jenine: Yes, smaller.

E: If she grew bigger than you would she become older than you?

Jenine: Only if she grows bigger than me. But I eat more than her.

E: Who will be older when you are both grown up.

Jenine: We will be the same.

E: Is your mother older or younger than you?

Jenine: Older.

E: How do you know?

Jenine: She's bigger and I haven't grown up yet.

E: But when you grow up will you stop growing older?

Jenine: No, I'll keep growing.

E: When you are as big as your mother will you keep on getting older?

Jenine: No, we'll be the same.

Some children at stage 1 whose protocols reveal the typical difficulties in co-ordinating the age and gender of the dogs, provide evidence of a movement toward articulated intuitions (stage 2):

E: Lawrence is your mother older or younger than you?

Lawrence (5:6): Older.

E: How do you know?

Lawrence: She's bigger. (He pauses, then on further reflection adds)

You can count her candles on her cake and then you look at your candles and you know that you are smaller.

### Stage 2: Articulated intuitions

At this stage, there is a partial connection of primitive intuition, revealing itself either in succession (the part in time becomes divorced from the part in space) or duration (more quickly = less time) which however remains unconnected until the appearance of operational co-ordination at 7 - 8 years (Stage 3).

In the protocols of children at Stage 2 we find: (a) though age differences are not maintained throughout life, age depends on the *order of births*. (b) *Age differences are maintained* by they do not depend on order of births.

With regard to gender, the child maintains that the initial assignment cannot be altered or (b) the initial assignment was incorrect. Some children still intuitively link gender with size, but the strength of the assertion, i.e. whether (a) or (b), depends on the degree to which the child has freed himself from size.

Jacques (6:5) understands the concept *more quickly = less time*.

E: (Pointing to  $G_4$  >  $B_5$ ) Which dog is older?

Jacques: The brown dog.

E: How many years is it older?

Jacques: The grey dog is four years old (counting) and the brown dog is five years old.

E: How many years is the brown dog *older than* the grey dog?

Jacques cannot grasp this, he begins counting again.

E: How old are you, Jacques?

Jacques: Six.

E: Have you got a brother or sister?

Jacques: Yes, a sister. She is younger.

E: If she grew bigger than you would she become older?

Jacques: Yes.

E: Is your mother older or younger than you?

Jacques: Older.

E: How do you know?

Jacques: Because she is taller and she's had more birthdays than me.

Heather (7:1) is still unable to co-ordinate the ratio of duration and succession. She keeps guessing the ages of the dogs. When asked if she would grow older than her friend, Amanda, (8 years), she says no. She does not believe that if she grew bigger she would become older.

E: Who will be older when you are both grown up?

Heather: She will.

E: Is your mother older or younger than you?

Heather: Older and bigger.

E: How do you know.

Heather: I know how old she is. She was born before me.

E: Is your mother still growing older?

Heather: Yes.

E: Is she still growing bigger?

Heather: Yes. Much bigger. She's dieting now.

E: When you are as big as her will you be as old as her?

Heather: No.

### Stage 3: Operational Co-ordination

For the child at this stage succession and duration are fully co-ordinated, rate of growth is no longer analagous to rate of ageing. Ageing is dependent upon order of birth, and these differences are maintained throughout life. Gender categorizations are free of size and age changes.

### Summary

In this chapter we have described the stages and sequence of operations in the development of the child's concept of gender, age, and time. The research strategy is both theoretically and practically related to Piaget's investigations through discovering how the child succeeds in organizing the time of external events, at first, intuitively and then by a set of qualitative operations. The following postulation is demonstrated:

*The stabilization of gender-age categories follow after gender-size concepts as they are assimilated to the latter, occurring at 7 years.*

The findings are categorized into stages and presented in tabular form showing the relationship between the sequence of the stage and age of subjects. Qualitative trends revealing the logical difficulties encountered at each stage are drawn from the children's protocols.

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Appendix 1.

GENDER IDENTITY

Name :..... Sex :.....

Date tested : ...../...../.....

Date of Birth : .../...../.....

Age : ..... Time :.....

SCORES

E presents S with a cut-out picture of a clothed boy.

E : We are going to play a game with this cut-out child.

(1) First give this child a name. S : .....

(2) Is it a boy or a girl ? (Girl = 0, Boy = 2) .....

(3) Could he be a girl if he wanted to ? (Yes = 0, No = 3) .....

(4) Could he be a girl if we put girl's clothes on him ? (E places cut-out dress over boy's clothes) (Yes = 0, No = 4) .....

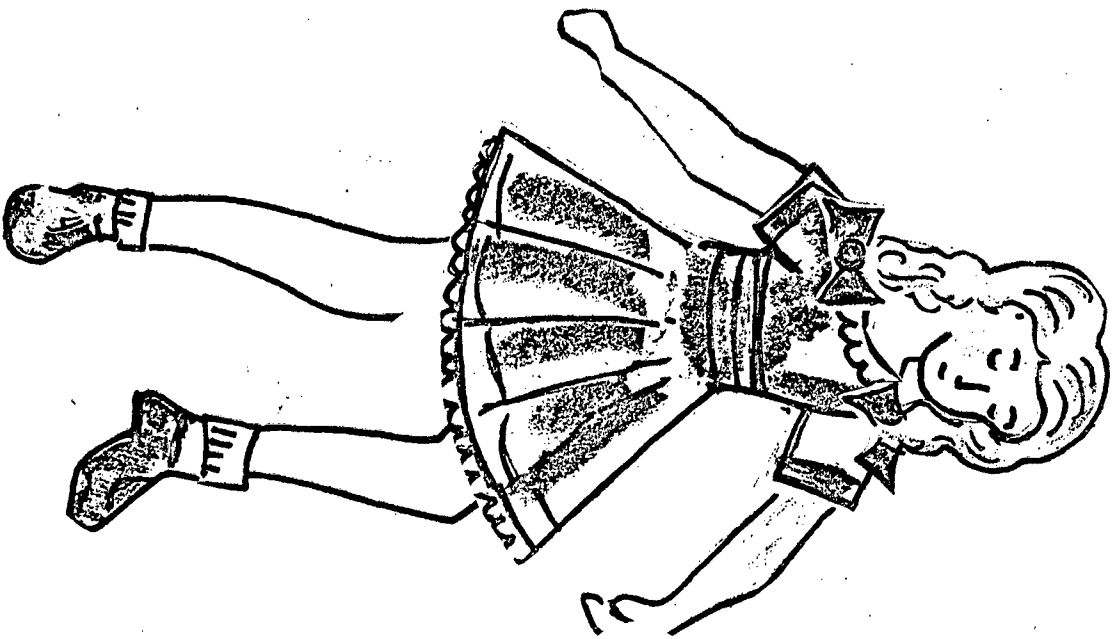
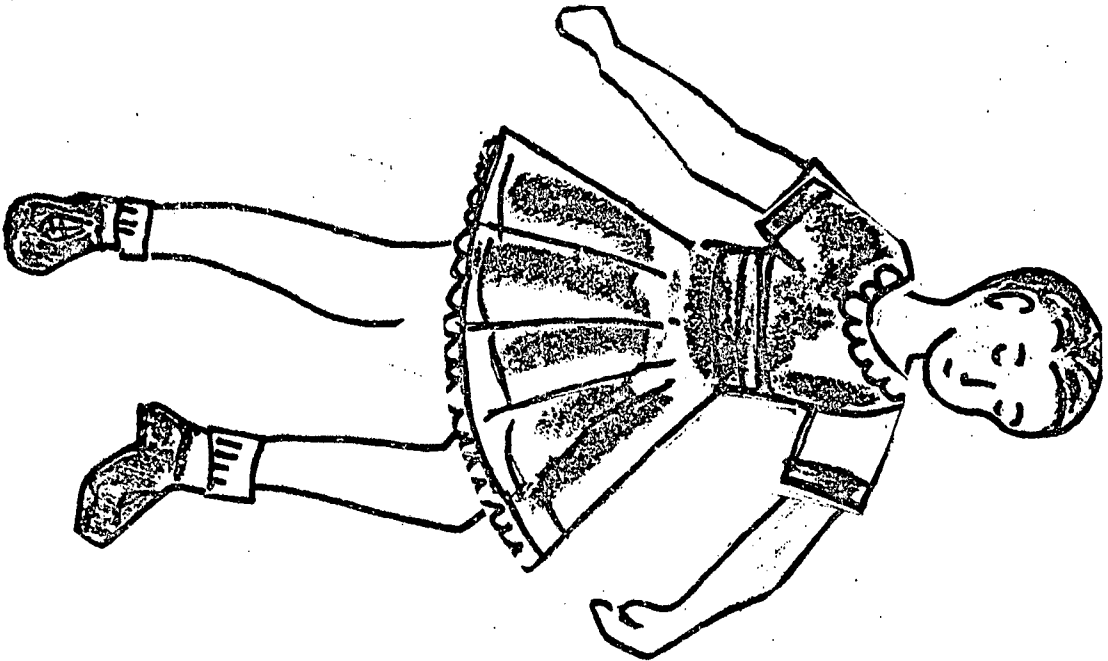
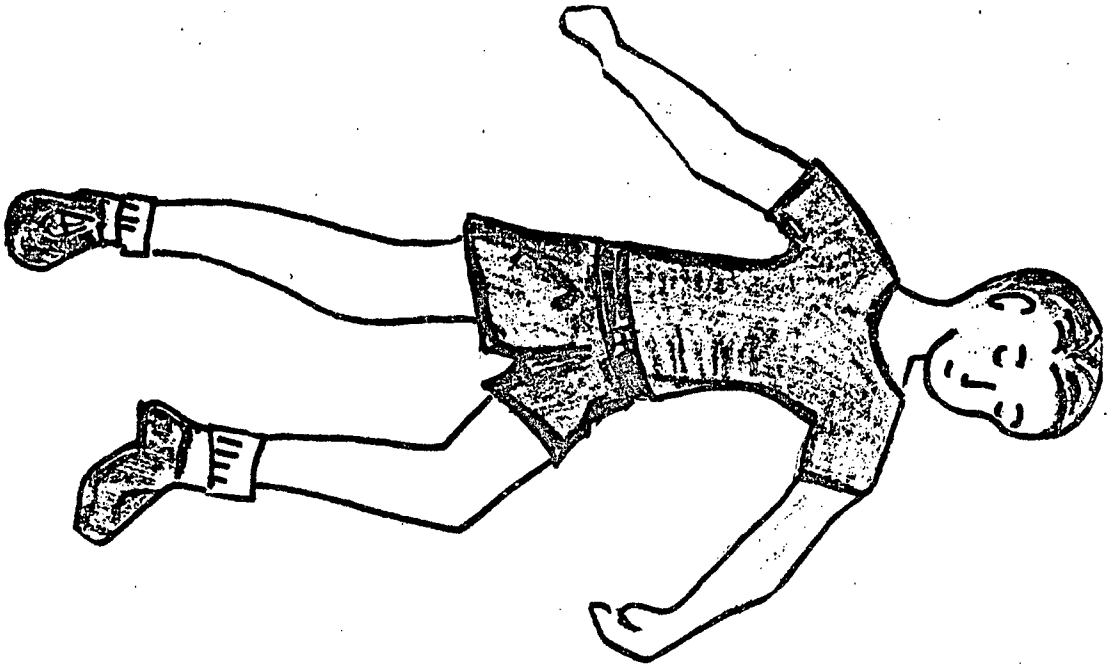
(5) Could he be a girl if we let him grow his hair long and have a girl's hairstyle ? (leaving dress on, E places cut-out girl's hairstyle over boy's hair) (Yes = 0, No = 5) .....

(6) Could he be a girl if he played girl's games with the girls ? (E places figure onto a background of girls playing) (Yes = 0, No = 6) .....

TOTAL: 20/ .....

Further questions and child's comments: .....

.....  
.....  
.....  
.....





Appendix 2.

ENDER SIZE

Name :..... Sex :.....

Date tested :...../...../.....

Date of Birth :...../...../.....

Age :..... Time :.....

: Here are drawings of two dogs I saw sitting in the street. Are they the same kind? How are they different? (S specifies.) Right, they are two different types of dogs. The one is big, has pointed ears and short hair and the other is small with long hair and long ears. They are not alike at all. Now I would like you to tell me, simply by looking at these drawings, which of the dogs is a girl dog, and which is the boy dog.

: .....  
.....

: Can you be sure you are right? S :.....  
.....

a) S bases answer on size.

b) The S consistently maintains gender in size based in spite of objections by E.

c) The S initially bases answer on size, but on further questioning becomes uncertain or changes his mind.

E's objections to (a) : But aren't there big girls and small boys? Aren't there big women and small men?

S's responses :.....  
.....

d) Subject refuses to guess, or requires further information such as dog's name to be certain of gender assignment irrespective of size.

A.



B



Appendix 3.

CLASSIFICATION

Name :..... Sex :.....

Date tested :...../...../.....

Date of Birth :.../...../.....

Age :..... Time :.....

1. S is presented with a heterogeneous assortment of pictures of plants, animals, people and geometric forms.

E : Here are some pictures of different things all mixed up. Now I want you to put together the things that belong together. Sort them out and put them into piles as quickly as you can. Tell me when you are finished.

Time taken :..... S's comments and

E's observations :.....

.....  
.....  
.....

2. S is presented with an assortment of different species of animals. E gives same instructions as above.

Time taken :..... S's comments and

E's observations :.....

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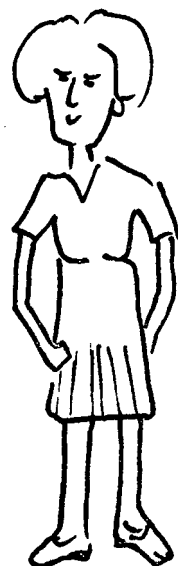
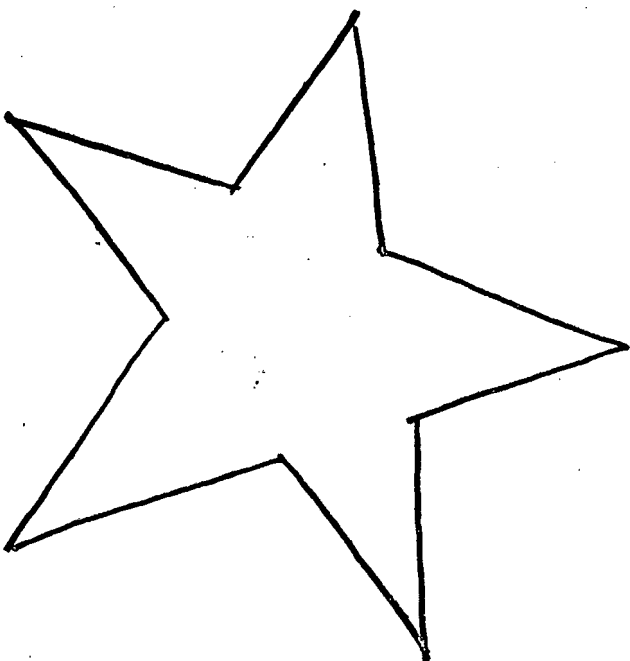
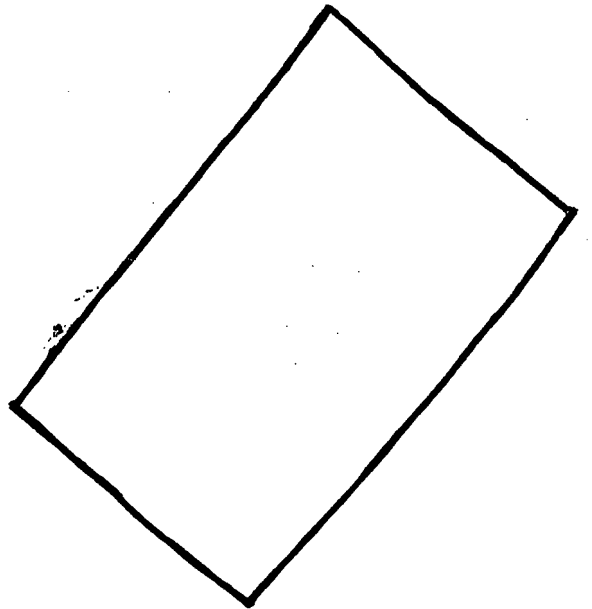
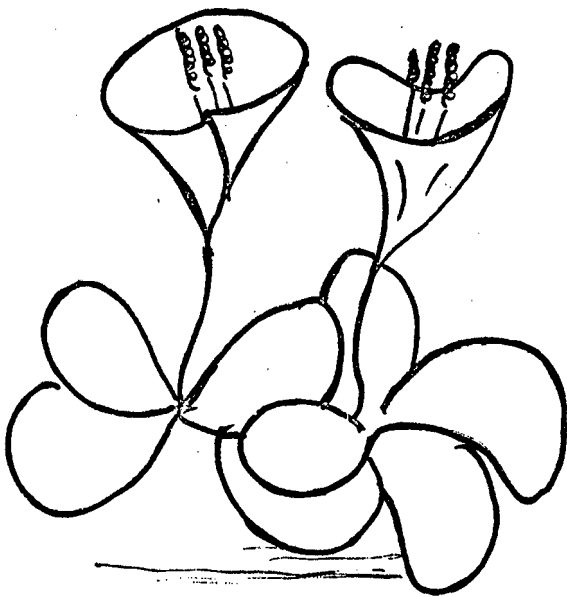
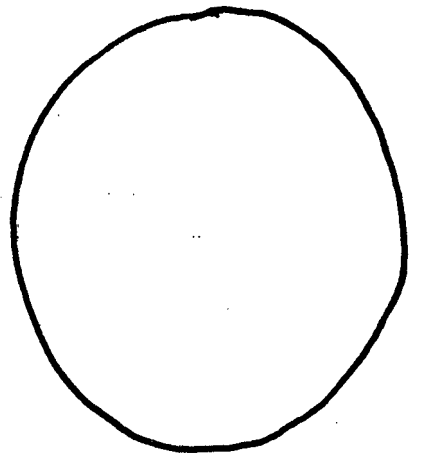
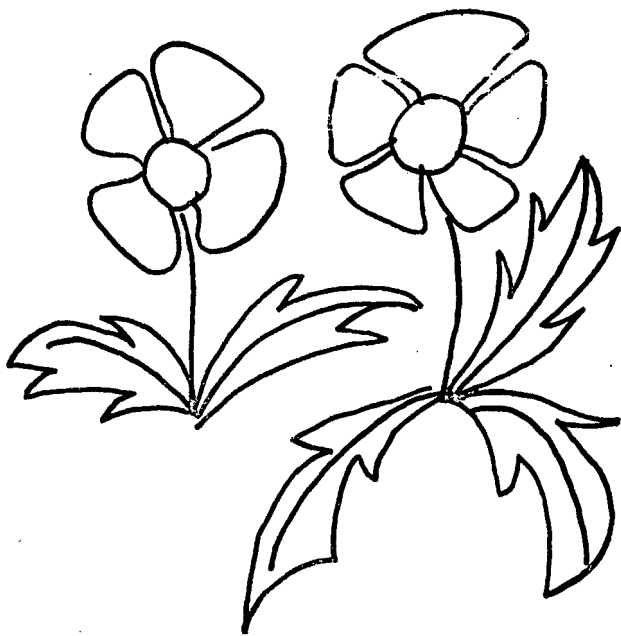
3. S is presented with a shuffled pile of pictures of adults and children, four men, four women, four boys, four girls.

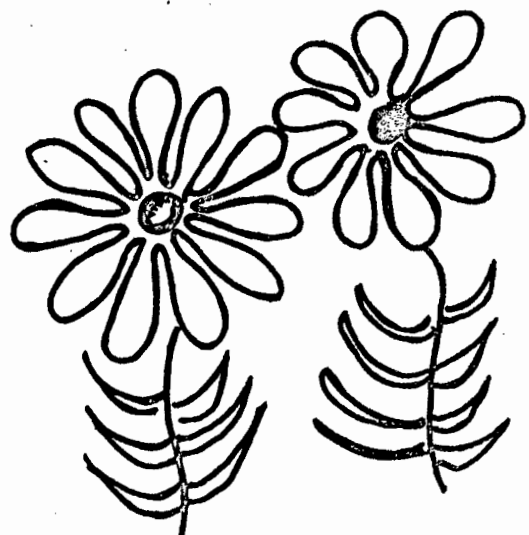
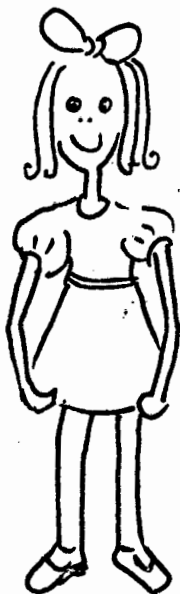
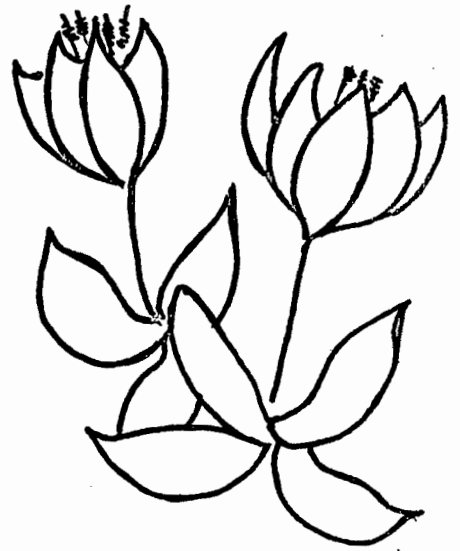
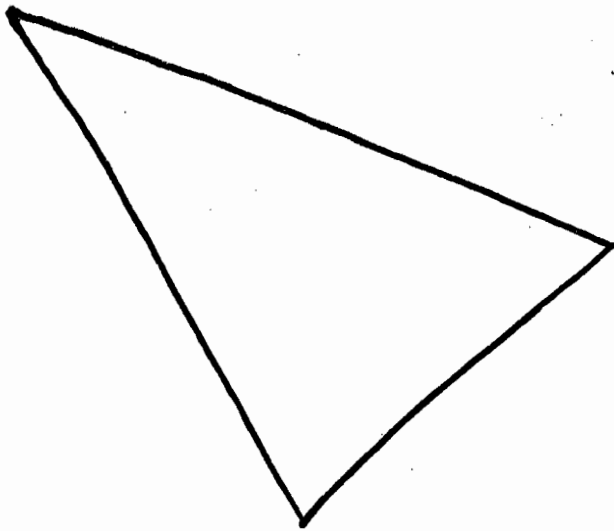
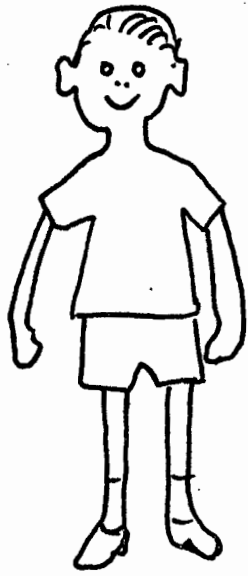
E : Here are some pictures of people all mixed up. Now I want you to put the people into groups where they belong. Put the people together who belong together. Each group must be different. Tell me when you are finished.

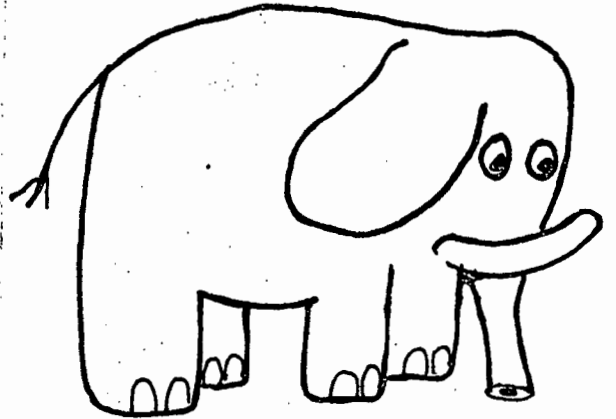
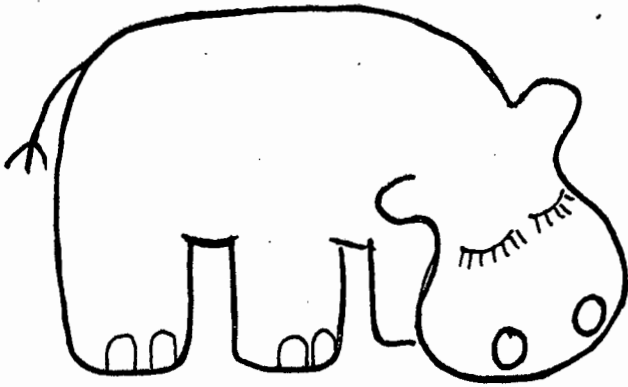
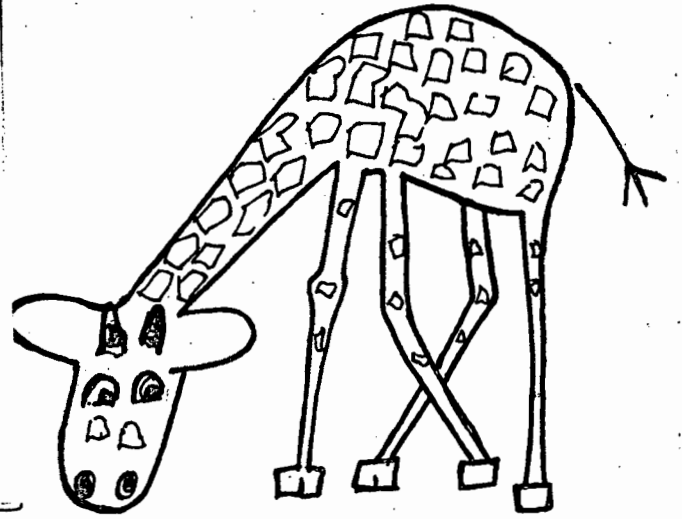
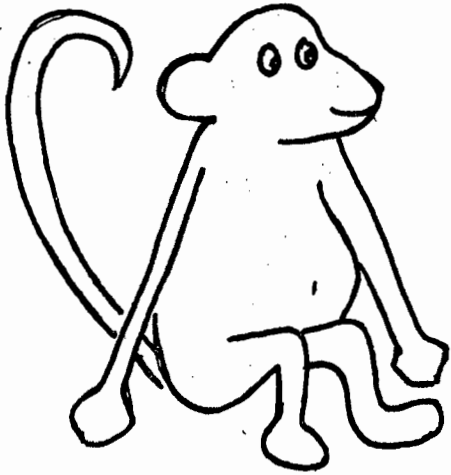
Time taken :.....

Observations :.....

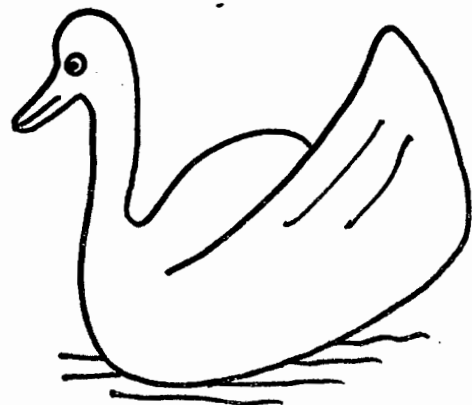
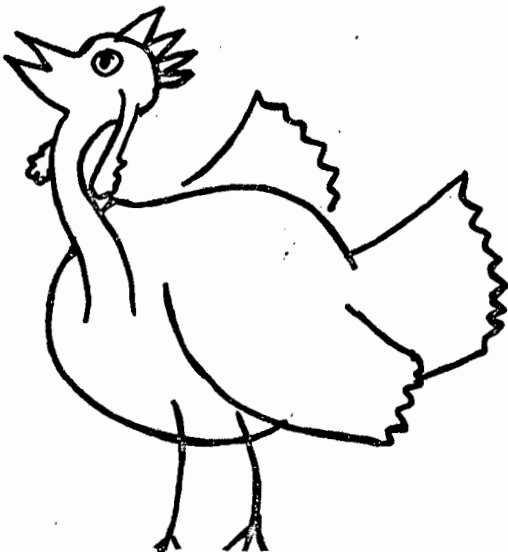
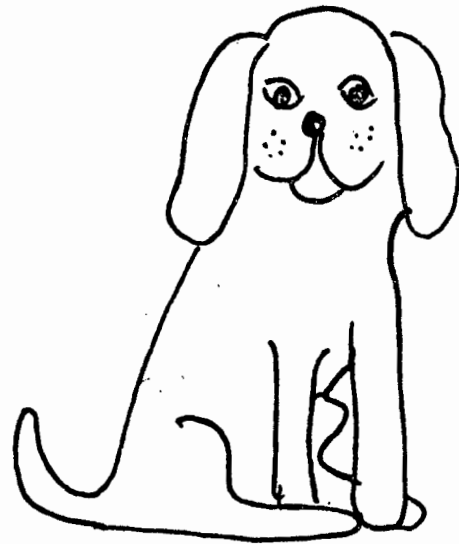
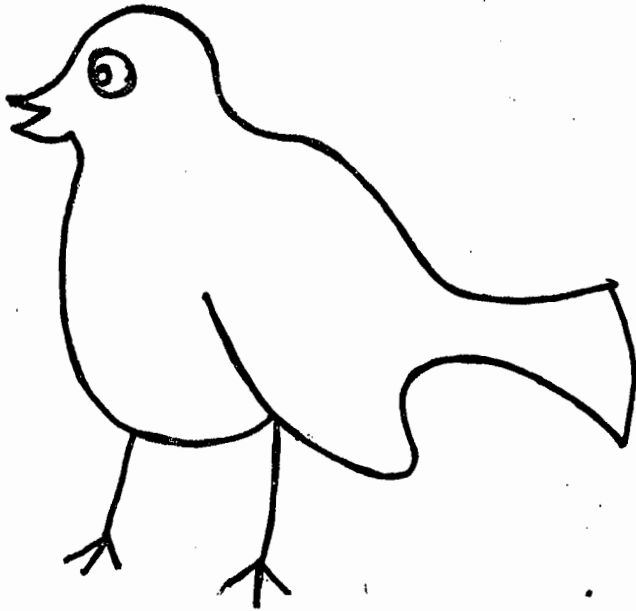
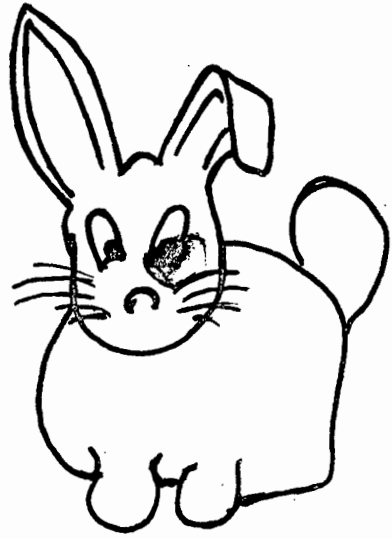
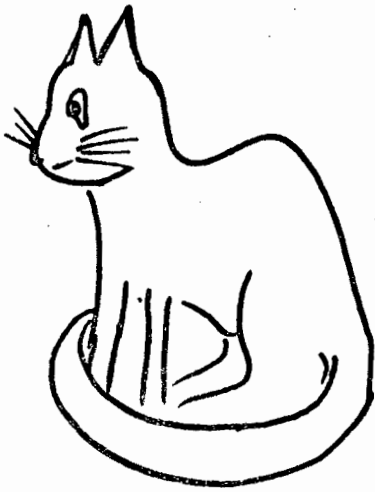
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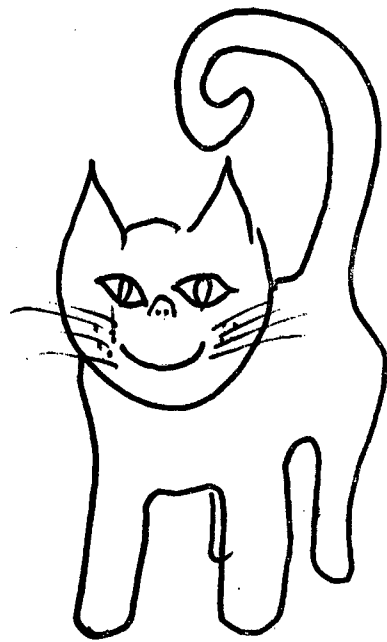
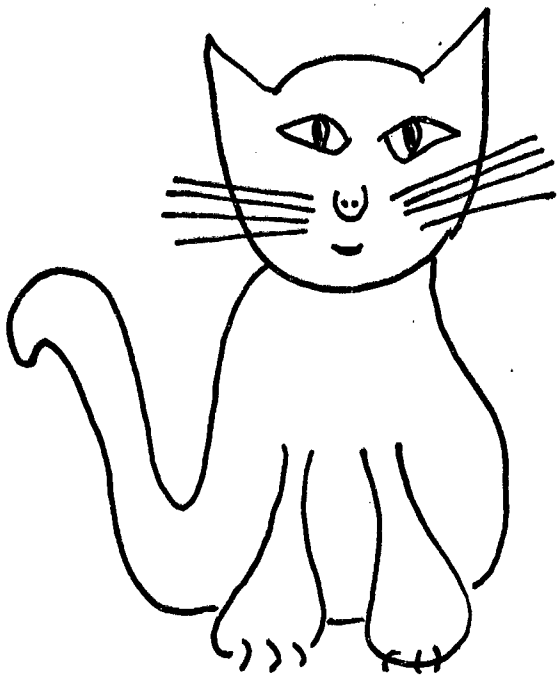
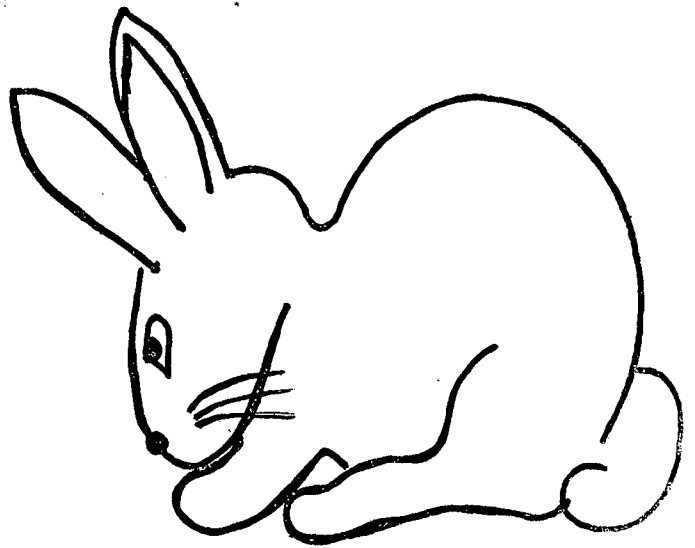
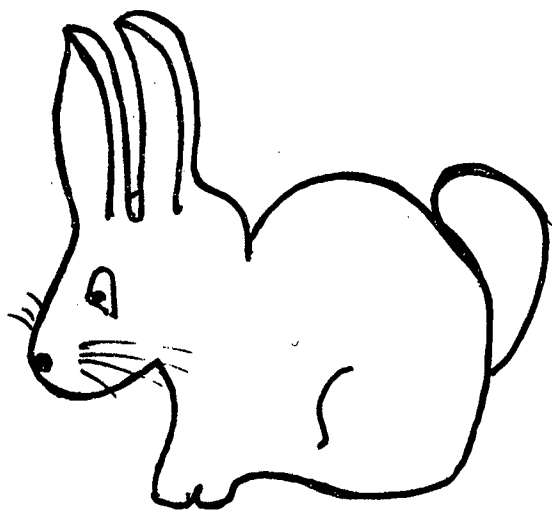


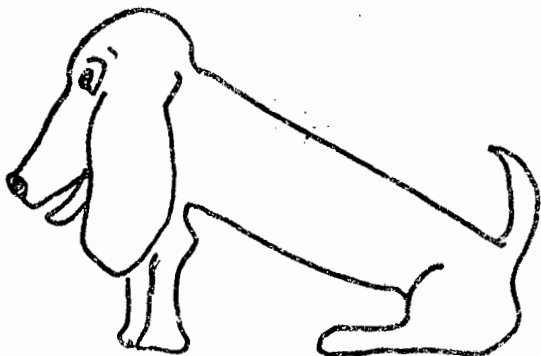
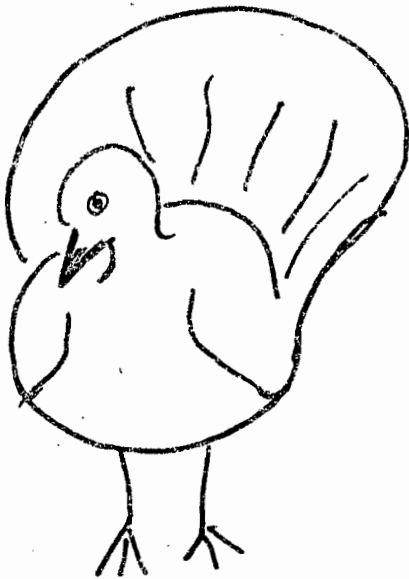
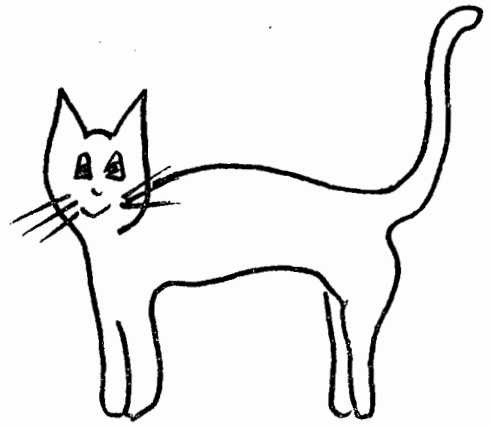
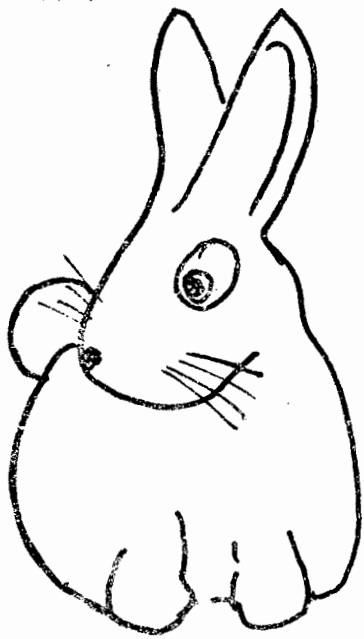




Appendix 3. Species Tank.

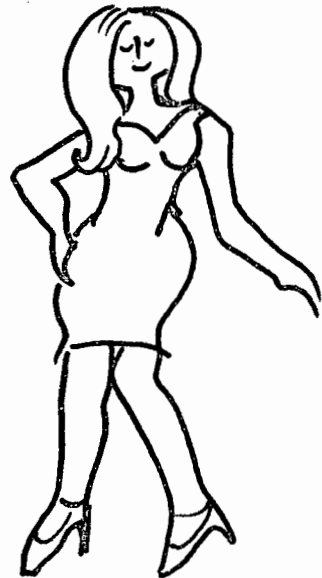


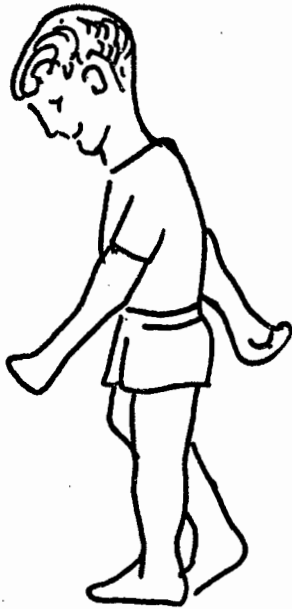
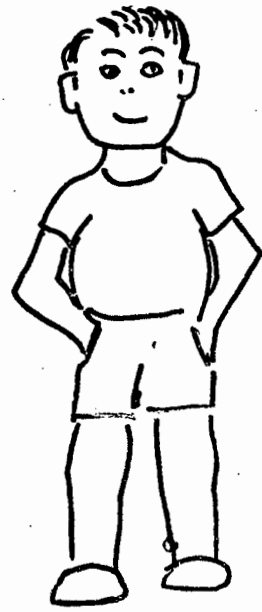




Appendix 3. Gender Tank.







Appendix 4.

ADDITIONAL COMPOSITION TASKS

Name :..... Sex :.....

Date tested :...../...../.....

Date of Birth :...../...../.....

Age :..... Time :.....

1. Flowers

S is presented with a picture of flowers consisting of twenty poppies and two daisies.

E : Look. Are there a lot of flowers or a few in this field ?

S : (A lot) ..... E : What colour are they ? S : (Red and yellow).....

E : The red ones are poppies and the yellow ones are daisies. I want to make a very big bunch.

Must I pick the flowers or the poppies ? S : (The poppies).....

Show me the poppies. (S indicates) E : Show me the flowers.

(S indicates the whole drawing). E : Then will the bunch be bigger if I pick the flowers or the poppies ?

S : ((a) If you pick the poppies).....

((b) If you pick the flowers).....

E : If I pick the poppies what will be left ? S : (The daisies).....

E : And if I pick the daisies what will be left ? S : (Nothing at all)..... Then what will be bigger the bunch of flowers or the bunch of poppies ? S : (The bunch of poppies)

..... And what about the bunch of flowers ?

Will it be bigger or smaller ?

S : Smaller..... E : Why ? S : (Because you've made a bunch of poppies).....

2. Children

S is presented with twelve girls and two boys

E : Are there more girls or more children in this class ?

S : (More girls).....

But aren't girls children ? S : (Yes).....

Then are there more children or more girls ? S : (More girls)

### 3. Gender - Males

S is presented with a group of males consisting of ten boys and three men.

E : Look at this picture. What does it show ? S : .....

All these people are males waiting for the bus. Show me the males. (S indicates) The younger ones are boys and the older bigger ones are men. Show me the boys (S indicates) Show me the men (S indicates)

E : If all the boys got into the bus would there be any males left ?

S : (Yes, the men.)..... And if all the males got into the bus would there be any left ? S : (No).....

E : Then would the bus be fuller - if it had all the males, or if it had all the boys inside ?

S : ((a) If it had all the boys).....

((b) If it had all the males).....

If (a) then, but aren't boys males ? S : (Yes)..... Then, would there be more males or more boys in the full bus ?

S : (More boys).....

### 4. Gender - Females

S is presented with a group of females consisting of ten girls and three women.

E : Look at this picture. What does it show ? S : .....

All these people are females waiting to catch the bus. Show me the females. (S indicates) The younger ones are girls and the older, bigger ones are women. Show me the girls. (S indicates) Show me the women. (S indicates)

E : If all the girls get into the bus would there be any females left ?

S : (Yes the women)..... And if all the females got into the bus would there be any left ?

S (No).....

E : Then would the bus be fuller - if it had all the females, or if it had all the girls inside ?

S : ((a) If it had all the girls).....

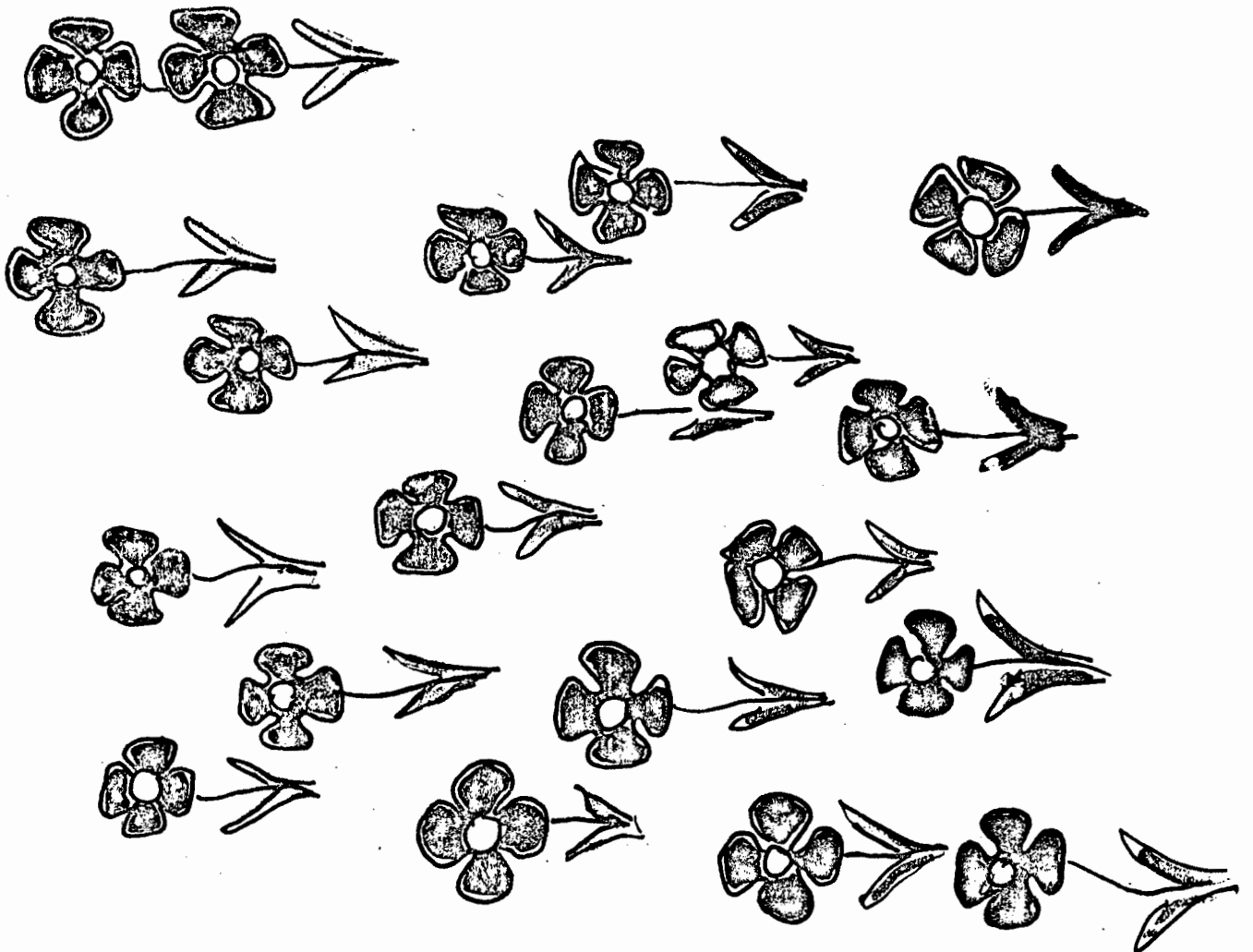
((b) If it had all the females).....

If (a) then, but aren't girls females ? S : (Yes).....

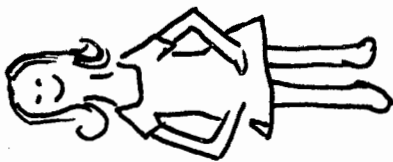
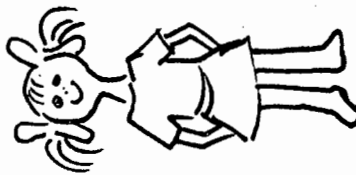
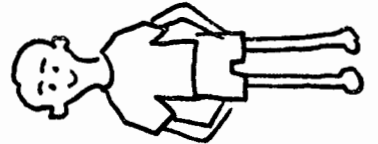
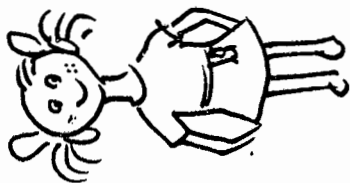
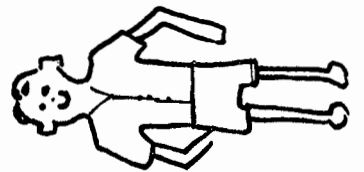
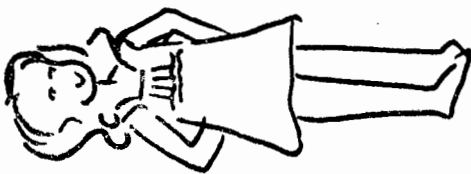
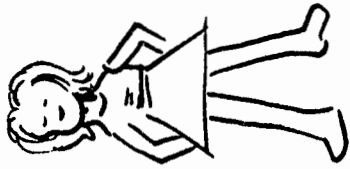
Then, would there be more females or more girls in a full bus ?

S : (More girls).....

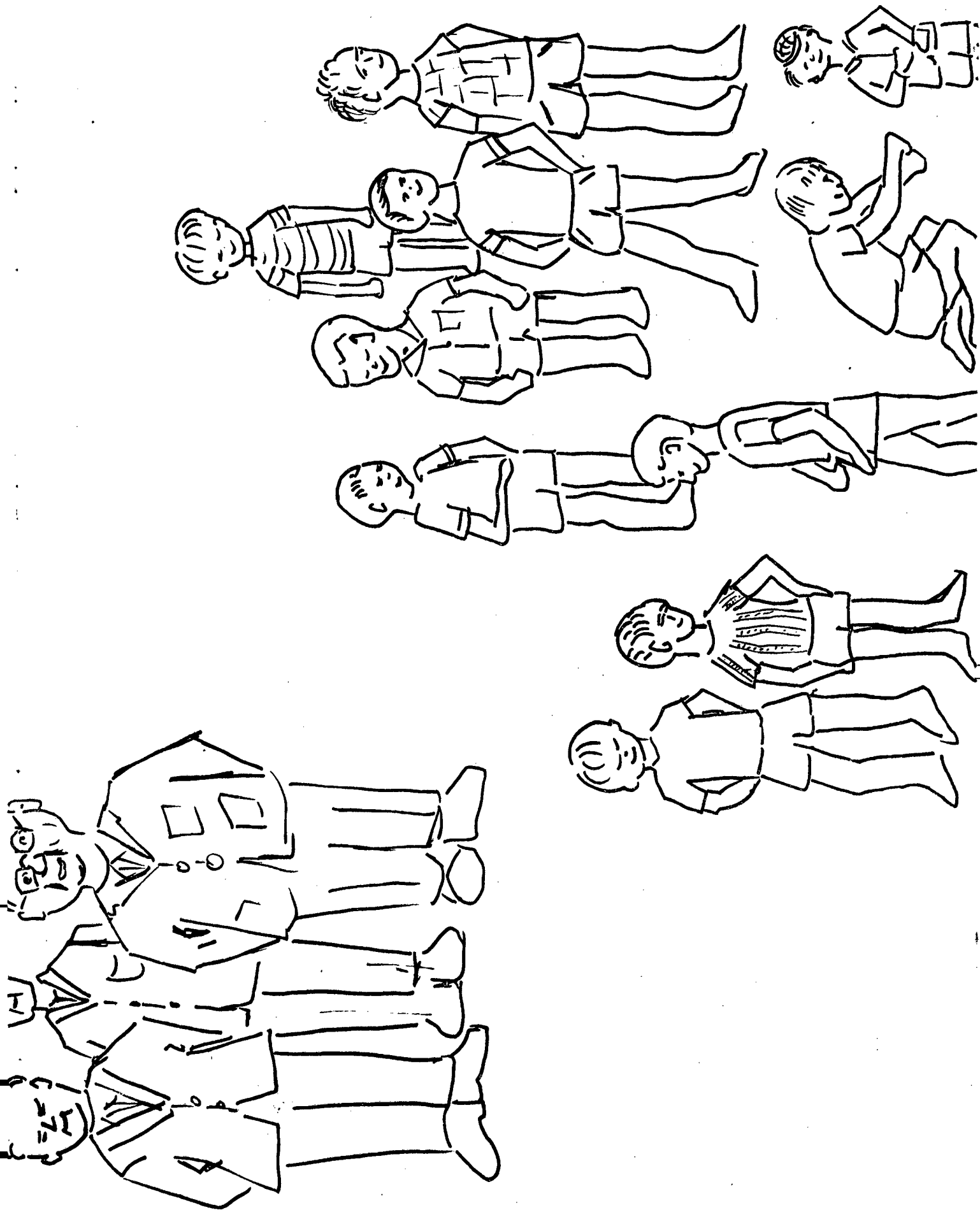
Appendix 4: Flower inclusion.



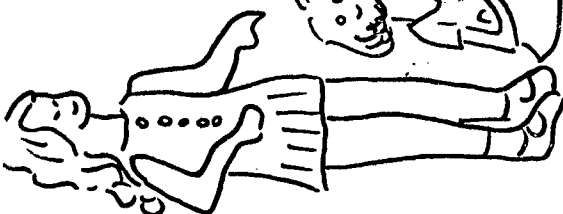
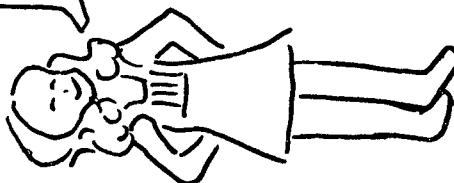
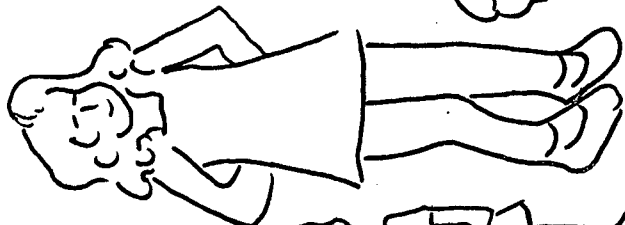
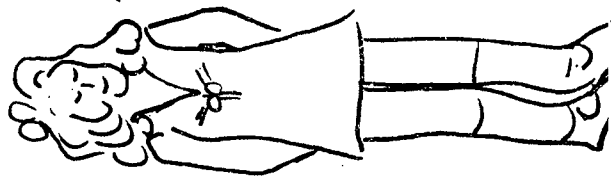
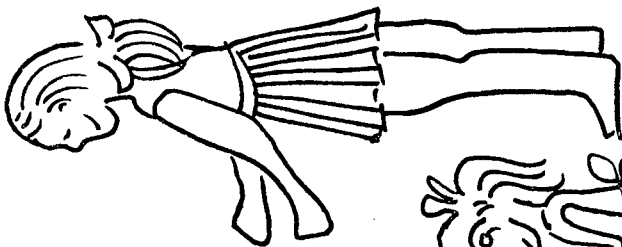
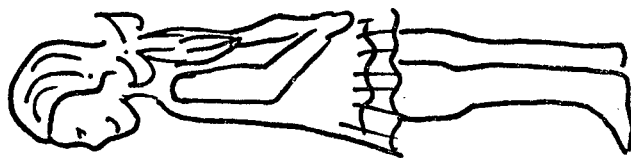
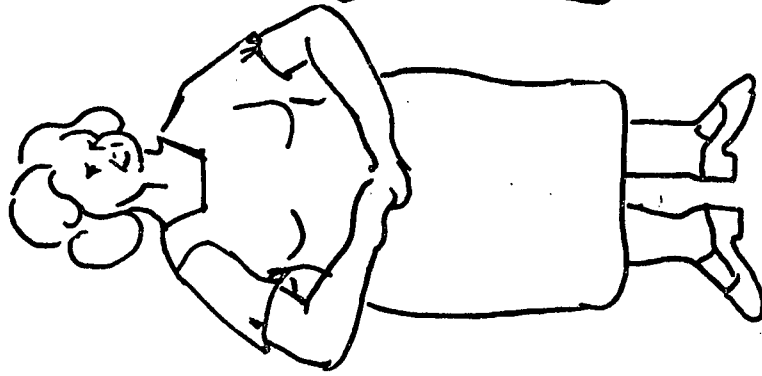
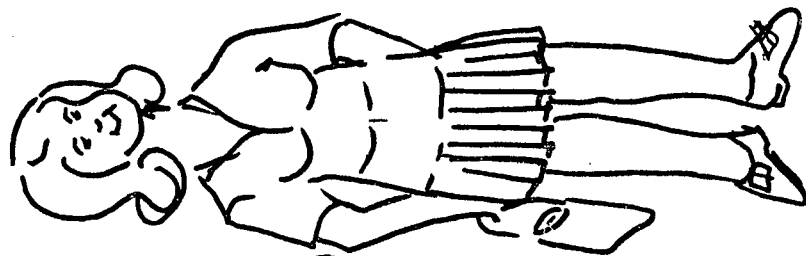
App. 4: Children Inclusion.



Appendix 4 gender-males.



Appendix 4: Gender - Females.



Appendix 5.

GENDER-AGE (TIME)

Name :..... Sex :.....

Date tested :...../...../.....

Date of Birth :...../...../.....

Age :..... Time :.....

S is presented with six drawings of the same brown dog 'photographed' each year on the same date.

E : This first picture (E points to G.1) is a 'photograph' taken on the day this brown dog had its first birthday. Each year the dog gets older. Now I want you to arrange the photographs by age. Starting with the first birthday photograph put the pictures one below the other in the right order.

S : Completes seriation task without assistance .....

S : Requires help .....

After the seriation task.

E : When the brown dog was two years old, on his second birthday, a small grey dog had its first birthday. Here is a photograph of the small grey dog on its first birthday. (E places G.1 next to B.2). And here is a photograph of the same grey dog on its second birthday. (E places G.2 next to B.3)

E : (Pointing at B.2, G.1) Which dog is older - the brown dog or the grey dog ? (B.2) S :.....

How many years is it older than the other dog ? (1 year)

S :.....

Which dog is the girl dog and which is the boy dog ?

S :.....

Can you be sure you are right ? How ? S :.....

.....

S may refuse to assess gender on the basis of size or age without further information such as : "What is the dog's name ?"

S : .....

E : All right, let us say that this is the girl dog (G.2), and this is the boy dog (B.3)

Which dog is older ? (B.3) S :.....,

How many years is it older than the other dog (1 year)

S :.....

4. Seriating the remaining three grey dogs (G.3, G.4, G.5)

E : Here are the other photographs of the grey dog on its third, fourth and fifth birthday. Put them in the right order next to the brown dog (G.3 = B.4, G.4 > B.5, G.5 > B.6)

5. Gender divorced from age or size

(a) E : (Pointing to G.4 > B.5) Which dog is older ? (B.5)

S : .....

How many years is it older ? (1 year) S :.....

Which is the boy dog and which is the girl dog ?

S :.....

(b) And again, E : (Pointing to G.5 > B.6)

Which dog is older ? S :.....

How many years is it older ? S :.....

Which is the girl dog and which is the boy dog ?

S :.....

The dissonance between size, age and gender results in S changing gender assignment (c) .....

or S constantly maintains gender categorization is independent of age + size changes (d).....

Final Check :

F raises the questions : Are you sure the grey dog is a boy now ?  
On this birthday (G.1, G.2) we agreed that it was a girl.

.....

Can a girl dog grow into a boy dog ?.....

.....

How old are you ?..... Have you got a

brother of sister ? (or friend)?..... Is he/she

bigger than you ? (Yes) Is he/she older than you ? If you

grew bigger than would you become older ?.....

Who will be older when you are both grown up ?.....

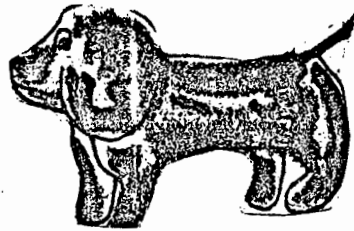
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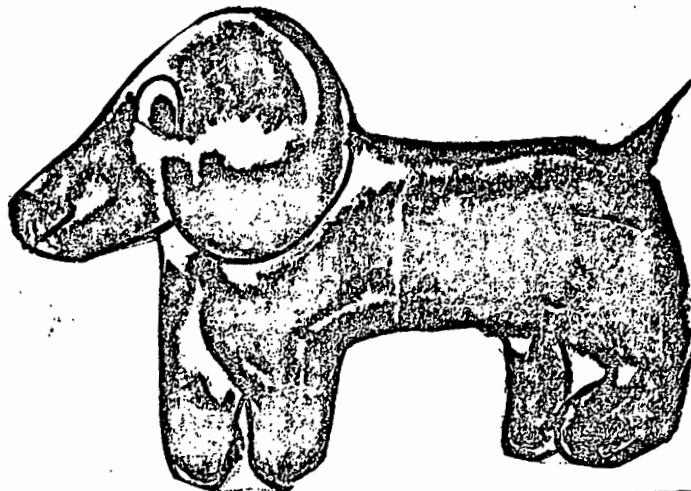
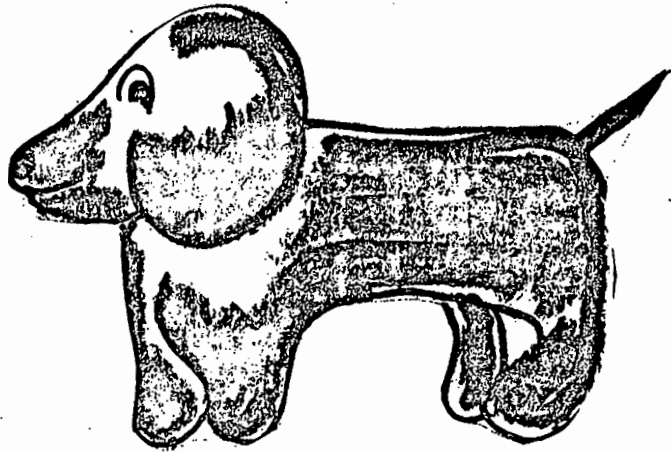
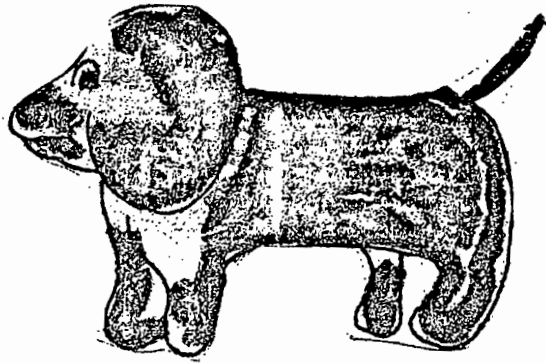
Is your mother older or younger than you ?.....

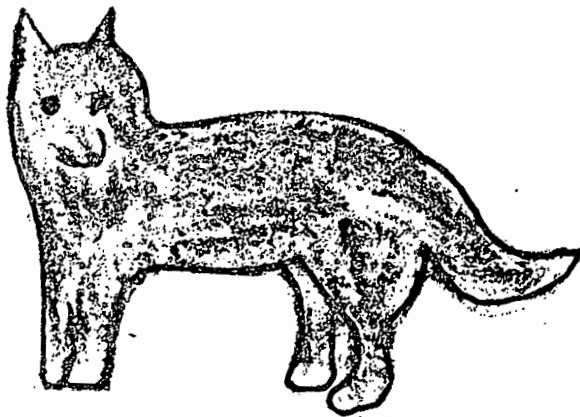
How do you know ?.....

Is your mother still growing older ? .....

BROWN DOG.







GREY DOG.

