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THE INFLUENCE OF SELECTED ASPECTS OF COGNITIVE AND AFFECTIVE DEVELOPMENT UPON PREFERENCES FOR DELAYED VERSUS IMMEDIATE GRATIFICATION

DISSERTATION

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

By

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* * * * * * *

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INTRODUCTION

Clinicians have long used the construct of ego and ego development in assessing individuals. Patients are said to have "poor" or "good" ego development; to have "defective" egos, "precocious" egos; or to have "strong" or "weak" egos. This construct carries a heavy burden in the process of making clinical decisions and dispositions. Yet, despite its yeoman's service, or perhaps because of it, it often loses much of its potential utility by the use of such imprecise, qualitative modifiers as those cited above.

Ego by definition is a global construct in personality theory. If it is to have a maximally useful meaning either within a personality theory or in clinical application this globality must be further articulated and differentiated. Such urgings are by no means novel. Loevinger (1966) has recently argued the significance of ego development as an area in need of serious investigation. The major thrust of psychoanalytic ego psychology has also been in the direction of attributing more and more significance to ego
functions (A. Freud, 1936; Hartmann, 1939 and White, 1963). In a more recent paper on psychoanalysis and developmental psychology Hartmann (1950) has urged such an approach emphasizing the interfacing of psychoanalytic and developmental methods of investigation. In her recent work on developmental lines (1962, 1963 and 1965) Anna Freud has also emphasized the delineation of major areas or "lines" of development and related their study to the assessment of normality and psychopathology in children.

The theoretical and clinical advantages of such an approach are many. Specific functions can be defined and studied in their own right. Their emergence, course of development and factors which facilitate or retard their development can be examined. Their theoretical and practical usefulness can be more precisely evaluated. With such knowledge of specific functions or developmental lines, studies of relationships and mutual influence among areas of development can be undertaken. Lastly, to return to the problem of the assessment of any particular individual, statements regarding an individual's standing on a cluster of developmental lines become much more useful than any kind of global statements. This is even more true if one approaches some ideal
wherein there are normative data on the various developmental lines, when their major interrelationships are specified and when there is relevant knowledge for influencing the development of these more precise functions as opposed to undertaking the task of influencing ego development generally.

Present Problem

It is within this context and in sympathy with such an approach that the present study seeks to examine the relationship of two developmental lines to general ego development. To accomplish this a major area of ego functioning central to general ego development will be studied in relation to two other more specific functions which have been proposed by various theorists to be critical antecedents for it. These functions are construed as developmental lines. Specifically, it concerns the relationships between one aspect of cognitive development (the establishment of the concrete operational stage of intelligence in Piagetian terms) and an aspect of affective development (the ability to differentiate one's own affective experiences); as well as the relationship of these two classes of variables to the ability to delay gratification.

The overall strategy is to select this latter
dimension of ego functioning which theoretically contributes to further ego development and which is also generally considered one index of the level of ego development attained, i.e., the ability to delay gratification. Using this ability as an example of the level ego development in the broad sense and as one index which can be operationalized more readily and with more clarity than ego development in the broad sense, its relationship to two lines of development, the cognitive and affective, will be studied. These particular developmental lines have been selected because: they may be viewed as being conceptually distinguishable and intimately related; are judged to be major dimensions of development and behavior; and, because of the emphasis given by various investigators and theorists to one or the other of them with respect to the kind of direction and control over one's experience and behavior, a part of which is manifested in the ability to delay gratification. For the present investigator, these hypothesized relationships between the cognitive and affective variables selected for study and the capacity to delay gratification derive from a mélange of clinical description and speculation on the nature of impulsivity and its control, the writings and research of several investigators in academic child psychology, and some
emperical findings on individuals' preferences for delayed versus immediate rewards.
BACKGROUND AND RATIONALE

Mischel's Work on Delay of Gratification

The use of concepts related to the development of self control or its assessment suffers from the same criticisms made above with respect to general ego development. However, it too has been used in the clinical setting, its lack of precision notwithstanding. Mischel has systematically studied one behavioral manifestation of self control, preferences for delayed versus immediate gratification, a function which as noted previously is given great significance in the psychoanalytic theory of ego development and which is used in the clinical assessment of ego strength and general ego development.

Mischel's general position rejects the notion that the acquisition of various forms of self-controlling responses such as the ability to delay gratification are achieved by the development of mediational processes in the absence of immediate gratification. This is the Freudian position which intimately links the growth of thought processes to
enforced delay of drive satisfaction. These thought processes in turn are the means by which an individual is able to postpone the need for immediate gratification. Thought is used to master increased tension during delay (Freud, 1911). Mischel's position, grounded in Rotter's Social Learning Theory maintains that, whether an individual chooses an immediate, smaller reward or a delayed, larger reward in a given situation is a function of the relative strengths of the expectancies and reward values associated with each choice. Consequently, much of Mischel's work, particularly his later work, has concentrated upon demonstrating the influence of various situational variables (e.g., the shaping of expectancies or observational learning) upon the establishment of preferences for delayed versus immediate rewards.

Mischel's first study in the area (1958) demonstrated a cultural difference between Caribbean Negroes and Indians with the Negroes preferring smaller and more immediate rewards than the Indians. He also found that children from father-absent homes chose more immediate rewards. A later study (1961c) refined this finding: children aged 8 and 9 from father-absent homes preferred more immediate rewards but at ages 11 through 14 there was no preference difference as a
function of father-absence. This was interpreted to be a result of the increasing influence with advancing age of experiences outside of the home upon trust and expectancies.

The next studies (1961a,b) related preferences for delayed, larger rewards positively to a high sense of social responsibility, accuracy in time estimation, intelligence and negatively to delinquent behavior. Cheating behavior was found to be related positively to preferences for immediate, smaller rewards and the length of delay before cheating occurs was positively related to preferences for delayed, larger rewards (1964).

Investigations of generalized expectancy (GE) and success-failure experiences revealed that: low GE and no success were related to preferences for immediate, smaller rewards even if the rewards were not contingent upon performance; and, that a subject's success experience increases his willingness to work and wait for larger rewards so that a subject demonstrating low GE may come to behave more like a subject with high GE (1965). Delay preferences can also be influenced through the use of live and symbolic models such that pre-experimental patterns of delay preferences can be reversed by the influence
of the models. Subjects were divided according to their pre-experimental preferences for delayed versus immediate rewards. Each subject then either observed a live model who exhibited delay behaviors counter to the subject's own preferences or was presented with a description of a model whose delay preferences were also counter to those of the subject. Both experimental conditions produced changes in the delay preferences of the children when assessed immediately following the modelling procedures. Testing 4 to 5 weeks later revealed that experimentally induced shifts toward more delayed responses were less stable over time than the shifts toward more immediate preferences (Bandura and Mischel, 1965).

Children can also be more successfully influenced to adopt and administer a stringent reward schedule through pre-training on this schedule with an adult who uses the stringent schedule for himself as opposed to training on a lenient schedule or a strict schedule for the child and a lenient one for the adult (Mischel and Hebert, 1966).

Mischel consistently interprets these data as supportive of his Social Learning Theory position of delay patterns as directly related to expectancies of obtaining the reward and as a basis to reject viewing
delay behavior in the context of individual development and differences, particularly in the sense of traits or capacities. Whatever the overall validity of his position, it does not deal with certain properties of his own data which shall be examined shortly.

In one unpublished study (1962) which is discussed in a review (1966) Mischel did examine the relationship between delay behavior and a number of personality and cognitive measures. There were some significant, if confusing, sex differences; preferences for delayed, larger rewards were significantly and positively related to field independence (Witkin's Embedded Figures Test) for girls and not for boys; negatively related to the Mandler-Sarason Test Anxiety Scale for boys and not for girls; negatively related to short-term time estimation for girls and not for boys. For both sexes preferences for delayed, larger rewards were modestly, but significantly, related to WISC performance IQ and not to verbal IQ as well as positively to category width. These rather complex results have not been further interpreted by Mischel.

In one study of particular interest Mischel and Metzner (1962) examined the relationships between delay preferences and age, IQ and time perspective.
IQ, as measured by verbal paper and pencil group tests, was significantly related to preferences for delayed, larger rewards ($r=.29, p .005$) but unrelated to time perspective in this study. Most importantly, preferences for delayed, larger rewards are significantly related to age ($r=.65, p .0001$). The greatest changes in preferences for delayed rewards occurs between children in the third and fourth grades or at the mean ages of 8.8 and 9.5 years for this sample. This substantial shifting in preferences at this age and the general relationship found with age are of interest and the question arises as to what is occurring developmentally to account for the shift.

Obviously, the present investigator's interest emphasizes antecedents of delay behavior which Mischel has de-emphasized and has consistently interpreted his data as rejecting. Mischel has indeed demonstrated the influence of certain situational variables on delay behavior but his data also provide some basis for supporting the relevance of developmental differences among individuals and their capacities for understanding delay behavior. He has consistently found individual differences on his criterion measure of delay. What is more relevant to the question of interpreting delay behaviors as a capacity in some
degree are the differences among his subjects regarding their influencibility and on the stability of their changes in preferences over time. For example, when the period of delay is varied the subjects' preferences for immediate rewards increases as the time interval for delayed rewards is extended (immediate versus 1, 5, 7, 14, 28 days: 1962). What accounts for the differences between the person who switches from delayed to immediate choices when the delay interval moves from 1 day to 5 days and the person who switches on the change from 14 to 28 days or the person who continues to make a delay choice even at the 28 day interval?

Attempts were also made to alter a subject's pre-experimental preference for delayed versus immediate gratification (Bandura and Mischel, 1965). Subjects were exposed to live and symbolic models. Those subjects who exhibited a pre-experimental preference for immediate smaller rewards were not differentially influenced to alter their choice pattern by either the live or symbolic modeling of delay choices. Further, there was no main effect due to modeling for these subjects. It was possible experimentally to induce shifts toward immediate patterns for the subjects who exhibited preferences for delayed, larger
rewards on the pre-experimental measure. Moreover, these latter changes remained more stable over time than did the nonsignificant movement of delay preferences from immediate to delayed.

These data are interpretable in the context of capacities, i.e., it may be that if one has demonstrated a capacity to choose delayed rewards in his pre-experimental choices he can more easily alter his preferences and maintain them at the immediate level. But, if one has demonstrated little capability for delay choices in his pre-experimental choice there is less freedom to alter one's choices in the direction of more delayed preferences and to maintain them at that level. The fact that Mischel can demonstrate some change for this latter group may be the result of the flexibility of behaviors that are generally available to a normal population. However, it still remains that behaviors which are developmentally antecedent in the general population and the normal sequence of development are easier to induce (specifically here, the shift from more to less delayed choice patterns) than are behaviors which again in the general population and the normal sequence of development occur later (specifically here, the shift from less to more delayed choice patterns). This
may indeed be reflecting a limitation in ability or capability for pre-experimental choosers of immediate rewards.

Lastly, the developmental changes demonstrated by Mischel support this argument and raise the further question as to what skills or capacities are being developed by the individual which lead to such a change in delay preferences?

To return to the context of the present study, Mischel's work is included because it provides an experimental procedure for assessing one aspect of an individual's ego development, the ability to delay gratification. It represents the most thoroughly researched behavioral measure of this construct. The primary purpose of the present investigation is not to add to the construct validity of Mischel's measure, rather the primary purpose of the present study may be stated at two levels of abstraction. At one level the study will examine the relationships among concrete operational thinking, the ability to verbalize affective experience, and the capacity to delay gratification. At a more abstract level, the present concern is to investigate the influence of cognitive-affective development upon one dimension of ego development.
Cognitive Development and Delay of Gratification

A number of writers in child development and clinical psychology, often working from quite different perspectives, have emphasized a variety of developmental features in the establishment of self-control or have dealt with the qualitative analysis of its absence, e.g., impulsive character disorders or impulse disorders, which lead to a focus upon the two developmental lines of cognition and affect considered earlier. Perhaps it should be pointed out here that this conceptual distinction of cognition and affect does not imply their absolute distinctiveness in behavior. A statement of Piaget's on the issue represents the assumption of the present point of view:

There is no affective behavior and cognitive behavior. Behavior is always both. Thus, only an analysis, an abstraction for the study of their respective mechanisms separates these two aspects which in reality are always present simultaneously. Hence, if one acknowledges affectivity and cognition (perceptual or intelligent) as two aspects of behavior it makes no sense to wonder which causes which or even which precedes which. One aspect does not cause another aspect or precede another aspect. They are complementary because neither process can function without the other. (Piaget, 1954, cited in Carie, 1986)

The general position of psychoanalytic ego psychology is also compatible with the first half of this citation in that the development of affectivity
is assumed to involve a dynamic restructuring of many cognitive processes in a complementary fashion. There would be some room for dispute about the question of antecedents and causes. A summary of several basic theoretical positions is now in order.

Within the realm of developmental psychology, Luria (1961) has emphasized the role of speech development upon the regulation of one's behavior. Speech and language are viewed as responsible for man's ability to go far beyond his physical capacities allowing him to organize aspects of his active and deliberate behavior so that he can control, inhibit and direct his motor impulses. Speech is used to modify one's environment (e.g., to alter the relative strength of stimuli), enlarge one's experience, acquire new modes of behavior, organize mental activities such as percepts, direct attention and form independent wishes and intentions. Speech training is also used to establish levels of impulse and motor control where previously absent. In short, Luria sketches out a line of development wherein speech is viewed as a primary adaptational means of establishing greater self-regulation over one's behavior.

When speech first emerges it has no control
over behavior, is embedded and fused with action and
the signifier and the thing signified are fused. Speech
then gains sufficient control to initiate actions and
later to inhibit an ongoing action sequence. By age 6
or 7 Luria states that speech becomes progressively
internalized and intimately linked with cognition.
Words gain in significative power and become increasingly
distinct from their action context. As this representa­
tive skill develops, control potential increases and the
last major advance is the establishment of truly sym­
mbolic processes. These symbolic processes enable one
to become more independent of the physical and
immediate impact of his environment increasing his
voluntary control over his behavior.

Bruner outlines a very similar line of develop­
ment (1964, 1966). He sees cognitive growth as the
development of techniques which aid in the representa­
tion in a manageable way of the recurrent features of
a complex environment. This development proceeds
through three sequenced and related systems of in­
formation processing: action or enactive, imagery or
ikonic and language or symbolic. The young child's
information processing is embedded in action and his
responses are therefore tied to the immediate
situation. As the capacity to represent the en­
vironment develops the style of information processing proceeds to the ikonic. Here, the child's representational skills have advanced above the enactive and are relatively independent of action. However, imagery and ikonic thinking are still tied to quite concrete representations of experience. The capacity for cognitively manipulating, altering or recombining one's experience is not yet the dominant mode of information processing.

Bruner also emphasizes language as a major means of transforming experience as well as representing it; as a means toward active mastery as opposed to passive understanding. Transformational rules of grammar provide a syntactic means of reworking realities one has encountered. Children employing ikonic representation are more highly sensitized to the spatial-qualitative organization of experience and less to the ordering principles governing such an organization. They can recognize and reproduce structures but cannot produce new structures based upon a principle. By about 7 years of age the child appears capable of transposing his experiences and not merely copying or re-representing it. There is a shift from perceptual and associative principles to increasingly abstract rules. In order to transcend the immediately
perceptible situation it is necessary to translate one's experience into symbolic form. Some system is required which allows the child to go beyond the present and to deal with the non-present, the experientially remote.

It is interesting to note that both Luria and Bruner hypothesize and provide data to support the use of speech and language to increase a child's performance in the control of his responses over immediate stimuli. The major thrust of both their positions and data is to emphasize the role of this aspect of cognitive development in a developmental process which proceeds from an action embedded level of information processing to an internalized and symbolic process for cognitively reworking one's present and past experiences resulting in responses. Further, the point at which both these investigators pinpoint the most critical shift in information processing skills is within the same span of childhood that Mischel reports such a substantial shift in delay preferences.

With respect to delay of gratification in particular, Bruner challenges the original Freudian position by his emphasis upon the role of cognitive skills.

It has been the fashion, since Freud, to see delay of gratification as the principal
dynamism behind this development—from primary process to secondary process, or from assimilation to accommodation, as Piaget would put it today. Without intending to question the depth of this insight, let me suggest that delay of immediate gratification, the ability to go beyond the moment, also depends upon techniques, and again they are techniques of representation. So long as perceptual representation dominates, it is difficult to develop higher-order techniques for processing information by consecutive inferential steps that take one beyond what can be pointed at.

Once language becomes a medium for the translation of experience, there is a progressive release from immediacy. For language as we have commented, has the new and powerful features of remoteness and arbitrariness: It permits productive, combinatorial operations in the absence of what is represented. With this achievement, the child can delay gratification by virtue of representing to himself what lies beyond the present, what other possibilities exist beyond the clue that is under the nose.

Piaget offers a more comprehensive view of cognitive development which is thoroughly compatible with the views thus far advanced. Because of its superior comprehensiveness it is considerably more useful conceptually and will be employed here.

To summarize briefly his work relative to the line of development being examined here, Piaget has distinguished three operational structures in cognition which he conceptualizes as major sequential stages within each of which sub-stages can be distinguished. This first stage is that of sensory-motor operations (0-18 months of age c.) and it contains six sub-stages.
The stage originates from reflexive mechanisms and develops to the establishment of object permanence and the sensory-motor structuring of one's immediate spatial surroundings. (This corresponds to Luria's preverbal level and Bruner's enactive stage.)

The second major stage is that of concrete thinking operations (18 months to 11 or 12 years of age c.) which includes a pre-operational period (18 months to 7 years). During this period operations are constructed which can operate simultaneously as opposed to in succession only as in the previous stage. An elementary form of logical-mathematical thought structure is developed which although incomplete will form the basis for the development of the formal operations of the third stage. The major property of operations in this stage is their reversibility.

The third and final major stage is that of formal thinking operations (11 or 12 to 14 or 15 years of age c.) in which formal and abstract thought operations characteristic of adult intelligence emerge and are stabilized.

The major stage of most interest for the present investigation is that of concrete thinking operations within which three sub-stages have been distinguished: the preconceptual (2 through 4 years
of age), the intuitive (4 through 7 years of age) and the concrete operational (7 through 11 or 12 years of age). During this period the child progresses from a level of functioning which is dominantly sensory-motor to the use of inner, symbolic manipulations of reality, that is, representative intelligence. Up to approximately 6 or 7 years of age the child's representations of reality, his mental acts, are irreversible and his judgments are rooted more in perceptions than reason. "In a sense, it is sensori-motor experience and coordination that can be reconstituted or anticipated thanks to the ability to use representation." (Piaget, 1967)

Beginning at approximately age 7 there occurs the formation of concrete operations. These operations are characterized by their reversibility which allows the child to transform transitory and uni-directional relationships into a coherent system of objective, permanent relationships. "Intuitions become transformed into operations as soon as they constitute groupings which are both composable and reversible... actions become operational when two actions of the same kind can be composed into a third action of the same kind and when these various actions can be compensated or annulled (Piaget, 1967)." Inhelder (1953)
has articulated two aspects of reversibility. These are negation in which a perceived change in form is cancelled by its corresponding negative thought operation and reciprocity which refers to the discovery of reciprocal relationships and relative relationships. It is these operations which are the instrumentation for the child advancing from information processing subject to the primacy of perception to a level where he establishes distance from the immediate or representations of the immediate and the capacity to truly transform, manipulate, "operate" upon his experience. This is the cognitive skill seen as central for a significant advance in the capacity to delay gratification such as Mischel reported for this age group and it is the relationship between this advance and the development of the operations of negation and reciprocity which shall be examined.

Affective Development and Delay of Gratification

The positions which tend to accentuate aspects of affective development can now be reviewed. According to psychoanalytic theory (Freud, 1911; Rapaport, 1951; White, 1963 and Singer, 1955) aroused impulses press for immediate discharge of tension through overt motor activity. As a function of repetitive association of tension reduction with goal objects and the development
of ego organizations, the absence or imposed delay of need satisfying objects results in the substitution of hallucinatory satisfactions and other thought processes which operate to convert free cathexes into bound cathexes. The capacity to delay or inhibit motor discharge by substituting cathected ideational representations reflects the gradual shift from primary process activity and thought to reality oriented secondary process thinking.

Thus, psychoanalytic theory intimately links the capacity for delaying gratification with its theory of thinking and the establishment of a major mechanism of adaptation, the reality principle. This position is similar to that of Piaget's and Bruner's in that cognitive functioning and cognitive development are intimately linked to the delaying capacity. It differs in that in its most simple form psychoanalytic theory makes delay capacity antecedent to thought development while as shown above at least Bruner would quibble with the issue of antecedents and certainly reverse priorities. Piaget regards such an argument as absurd. What is compatible with the three positions in broad perspective is that these two functions are reciprocally related and contribute to the increased development of each other.
Piaget, of course, gives mental development the central place in accounting for an individual's adaptation and would postulate the necessity of the development of cognitive skills as prerequisites, although not antecedents in the formal sense, for other aspects of development. Indeed, how could a person be able to represent his own affective state to himself without representational skills?

How then can we take account of the position given to awareness of affect and the capacity to differentiate affect with respect to the control of impulsivity by certain clinical writers? A. Freud (1965) states that increased generalized awareness results in increased behavioral control. The body of research relating the Rorschach "M" response to delay capacity and motility control is relevant to this proposition. Shapiro (1965) pinpoints a specific breakdown in the information processing of impulsive characters. They are unable to deal cognitively with the increasing press of an emerging need, wish or intention. Such an emerging need is then hypothesized to become short-circuited into action without cognitive mediation. For Shapiro there is an absence of representational skills with respect to affect. A breakdown in the capacity to represent one's impulses means that
they cannot be dealt with. No evaluation or choice is possible and this results in uncontrolled affectivity.

Greenacre (1950) comments upon an inability to discriminate feelings \textit{qua} feelings in the impulsive character and of the style of translating feelings immediately into action. She particularly points to distortions in the relation of action to speech and verbalized thought. In such cases speech becomes secondary to action. Speech takes on more of the characteristics of motor behavior participating in the motor discharge of tensions in the overall pattern of acting out as opposed to establishing communication or aiding in the encoding of experience into thought. Moreover, Greenacre states that language involved in acting out includes an exceptionally large number of language distortions.

Kaufman (1967) in outlining a therapeutic approach to impulsive children states that first they must be assisted to become aware of the fact that there is a feeling world and subsequently engage in the task of discriminating and differentiating their own feelings. A major goal of treatment is to develop an intellectual framework for the patient which can encompass the patient's emotions and thereby assist in the management of them. Thought needs to be
synchronized with emotion and action.

Kessler (1966) and Kataan (1961) are even more explicit and flatly assert that teaching a child to label his feelings will lead to increased control and mastery. If a child does not learn to discriminate and verbalize his inner feelings, according to these authors, a discrepancy develops between the strength and complexity of the feelings and the available modes of management and expression. If the child could learn to verbalize his feelings he could also learn to delay action and conversely without this ability the delaying function is weakened or absent. The ego is then characterized as being "weak" since it is repeatedly overwhelmed by affects and is also "fixated" upon acting out feelings rather than proceeding to active mastery of them. The verbalization of feelings is flatly assumed to increase ego mastery.

If the differences between the cognitive and affective positions are emphasized two extreme positions can be isolated: one assumes and asserts that cognitive development is most important for establishing the capacity for delay and the other that affective development is. Although some of the theorists involved have stated their positions this nakedly (Bruner and Kataan), the more comprehensive
theorists (Piaget and Freud) provide a basis for compatibility and reciprocity between cognitive and affective functioning. Even so, the major questions still remain as to the justification of either assumption and the relative importance of each function and its relationship to delay behavior. Also, if one proceeds on the assumption of the behavioral unity and the reciprocity of their functioning in development the question of the relationship of these two developmental lines to each other and their influence upon the delaying function is of interest.
The principal intent of this study is to investigate the influence of two major lines of development upon ego development. This is viewed as a first step in an effort to arrive at more precision regarding significant components of ego development, their interrelationships, their assessment and the exploration of methods of influencing and enhancing their development.

In its most general form, the main hypothesis asserts that cognitive and affective development constitute two major developmental lines which have a mutual and significant influence upon ego development. Specific aspects of cognitive, affective and ego development have been selected to represent each of these more global constructs. As such representatives it is clear that these more specific constructs do not represent the full theoretical meaning of the more inclusive constructs. In turn, the operations selected further narrow the degree of meaning represented in that they neither fully exhaust the meaning of the more specific constructs and a fortiori are limited in their
representation of cognitive, affective and ego development broadly construed.

Delay of gratification was selected as an index of ego development while concrete operational intelligence in the Piagetian sense and the ability to verbalize and, by inference, to differentiate one's affective experience were selected as pertinent indices of cognitive and affective development respectively. To restate the main hypothesis in the language of these more specific constructs and in a more precise and differentiated form:

The level of cognitive functioning attained during the period of concrete operations is positively and significantly related to the ability to delay gratification.

The ability to verbalize and differentiate affect is positively and significantly related to the ability to delay gratification.

And, that when these particular cognitive and affective variables are viewed in concert, that is, taken as multiple predictors, they will demonstrate a relationship to the ability to delay gratification which is significantly greater than the relationship demonstrated for each separately.

The measure of delay of gratification will be a series of 22 behavioral choices involving the selection
of a less valued but immediately attainable object versus a more valued but not immediately attainable object. The instrument was constructed following the methodology of Mischel (Mischel and Gilligan, 1964).

It will be recalled that the cognitive skill of central theoretical interest in this investigation has to do with the ability to go beyond a level of information processing subject to the primacy of perception to a level at which it is possible to transcend immediate experiential input or representations of it. Such a skill allows one to cognitively transform, manipulate and operate upon his experience. This is the kind of cognition which Piaget refers to as concrete operational intelligence.

To assess the attainment of concrete operational intelligence, a series of four Piagetian tasks were selected. These were the conservation of liquid and weight, lateral discrimination and projected space. The first two tasks, are more properly viewed as representative of the negation process while the latter two, lateral discrimination and projected space, are representative of the process of reciprocity.

Negation is more formally defined as a cognitive process in which a perceived change in form is
cancelled by its corresponding negative thought operation (Inhelder, 1953). At a more descriptive level, in both the conservation of liquid and weight procedures, the child is required to entertain simultaneously the invariance of some property of the stimulus material while other properties undergo perceptual changes. For example, the form of an object can be altered without changing its weight. In order to perform successfully the child must go beyond the perceptual input cancelling the perceived change by a thought operation which simultaneously entertains variance and invariance in multiple properties of an object.

Elkind has developed standardized versions of Piaget's procedures (1961,a) and these were employed here with the modification suggested by Piaget (1967,b). In general, for both conservation tasks, the child was asked if the stimulus materials were initially equal with respect to the attribute in question, to predict their equality or inequality if this form were altered, to state if any change had occurred after the form had actually been altered and to explain the reason for his decision. The additional procedure suggested by Piaget required the child to construct two objects which were perceptually different but would be the same with respect to another dimension, mass and weight in those
casos. In summary, after the initial equating of the objects the child was required to predict, judge, explain and construct.

The last two cognitive measures, lateral discrimination and projected space, were selected as representative measures of the process of reciprocity. Reciprocity refers to the discovery of reciprocal and relative relationships. Descriptively, with respect to the present measures, successful performance required the child to see relationships from points of view other than his own. It required going beyond viewing relationships as absolute to viewing them as relative.

The lateral discrimination procedure was that outlined by Piaget (1928) and put into standardized form by Elkind (1961,b) with one exception. In this task the child was asked to judge the relative position of objects placed in front of him. Piaget suggested that the same questions might be asked of the child again after he had moved to the opposite side of the table and Elkind adopted this suggestion. In this investigation following a procedure developed by Lee (1963), the subject was asked the questions from his own vantage point. The subject was then asked what the relative positions of the stimulus material would be
if he were to view them from the opposite side of the table without actually moving. A child who responded in an absolute mode may have done so and answered correctly if he was allowed to view the materials from either side of the table. This is not the case when his physical perspective remains unaltered while his judgmental perspective changes. Further, such a procedure again requires the child to overcome immediate perceptual experience in order to judge correctly.

The spatial projection task follows that of Piaget and Inhelder (1948). Here the child was required to judge how a landscape containing a group of objects, represented in model form before him, would look if photographed from his own and several other perspectives. Successful performance here required a global projection system which can at once coordinate the relative positions of the various objects, left-right, before-behind, with multiple observation points. Here again the child had to transcend his own immediate perceptual experience in order to vary certain of the relationships among objects while the positions of the observer varied.

In order to measure the development of the child's ability to verbalize and differentiate his affective experience two projective instruments were
employed. The *Children's Insight Test* (CIT) presented a series of verbal stems describing basic plot situations to which a child must respond in terms of what the child involved did and how he felt (Engel, 1956,a). A series of seven cards taken from the *Thematic Apperception Test* (TAT) used by Kagan, Moss and Sigel (1960) in a study which sought to assess the ability in children to label affect was also used. The responses to both of these instruments were broken up into response units and scored for no affect expressed or affect expression which in turn may have been either feeling expressed *qua* feeling or feeling expressed in some action. Two types of stimulus materials, verbal and pictorial, were selected to compensate for those children who might have been responsive to one mode and not another.

With respect to the cognitive predictor variable some check was required as to whether a more general cognitive variable may have been of more significance with respect to the criterion than the specific aspect of cognitive development selected for investigation. Therefore, a measure of IQ was employed and treated as a predictor variable.

In a similar manner, within the realm of affective development a more general variable may have
been of more significance than the specific variable selected. Specifically the ability to fantasize about and represent one's personal experience generally may have been more relevant to the ability to delay gratification than the more specific ability to fantasize about and represent one's affective experience. This generalized fantasy capacity has been linked to delay behavior by Singer (1956, 1961). The Rorschach M determinant was used as a measure of this more generalized fantasy ability.

The M determinant has been related to various aspects of this ability to represent and think about one's personal experience which for brevity's sake is being termed generalized fantasy ability. Barron (1955) related high M production to people judged to be intelligent, inventive, introspective, contemplative, socially appropriate and self aware. King (1960) related frequent M production to greater interpersonal awareness and sensitivity. Goldberger and Holt (1961) found M production predictive of an ability to think about topics other than the immediate experimental situations in sensory-deprivation conditions. Page (1957) has correlated M production with frequency of reported daydreaming. In addition, there have also been a variety of studies relating M production to
delay of gratification (Siipola and Taylor, 1956; Singer and Herman, 1954; Meltzoff and Levine, 1954; Meltzoff, Singer and Korchin, 1953; Singer, Meltzoff and Goldman, 1952; and Singer, Wilensky and McCraven, 1956). Since all of these studies employed measures of delay other than Mischel's it will be of peripheral comparative interest to note the relationship of Mischel's work to this body of research.

Lastly, the age selected for study was eight year old children. This is within the age range in which Mischel observed the most dramatic shift in delay capacity (Mischel and Gilligan, 1964). It also represents a central point in the emergence and development of concrete operational intelligence.
METHOD

Subjects

Subjects were sought for this study who would meet the following criteria: Caucasian, at least average intelligence, eight years old and of a relatively homogeneous middle class background. The Ss were from the second and third grades of one school in the Columbus, Ohio public school system. Initially, forty-eight Ss were requested. When it was found that a sample of this size could not be obtained in this one school without including two children below age eight and one above (2 boys and 1 girl) it was decided to reduce the sample size by discarding these three Ss. Another girl was absent and she was added to the discarded Ss reducing the sample to 44 Ss, 22 male and 22 female.

The age range of the Ss was from 8 years, 0 months to 8 years, 11 months and the IQs ranged from 95 to 131. The selection of a school in a middle class living area and the occupation of the S's father was used as a check for social class. Most of the sample came from professional and business families.
None of the father's occupations represented an occupational status or likely income level below middle class although some, perhaps 2 to 10, may have been upper middle class.

Measures

Delay of Gratification

Following the procedure of Mischel (Mischel and Gilligan, 1964) a large pool of reward choices was constructed and administered to a comparable (age, sex, IQ, range, and social class) sample of children in a different public school. This pool of items consisted of choices between smaller and larger rewards (e.g., plastic checkers and checker board or plastic checkers) and were administered in two different formats. First, the children were asked simply to choose "The one you would really choose if you could have it." They were shown the actual items they were to choose between. The responses were used to establish the first criterion for final item selection. The pilot Ss must indicate a clear preference for one item over another, that is, the children's choices define what is a more valued and less valued reward. The cut-off point employed was an 80 to 20% split. Items were only included if at least 80% of the pilot sample
(N=20) chose it in this first condition.

Second, another series of choices was offered to the children with an additional requirement that if one chose the more valued reward he would have to wait to receive it. The child was told he would "have to choose between one thing he could have today, right away or another thing which he could have at a later time, like three weeks from today." The delay intervals employed were 3, 4 and 5 weeks. The children's choices to this questionnaire established the second and final criterion for item selection which is that the children should split approximately even in their preferences when it involves the added dimension of immediate versus delayed rewards. The actual cut-off employed was 40-60% or 60-40% split in preference for immediate versus delayed reward. In summary, the final scale included only those items which: (1) in a straight choice the larger and more valued item was actually preferred by the children and (2) in an immediate versus delayed reward situation approximately 50% of the children chose the immediate reward and 50% chose the delayed reward. This item selection procedure resulted in a final scale containing 22 items offering choices among amounts of money, edibles, toys and children's reading material with delay intervals of
The experimental group was divided into small groups of approximately 10 children per group for administration of this instrument. The same experimenter who administered the pilot instrument administered the delay of gratification measure to the experimental population. Different experimenters would then administer all subsequent measures in the study. The following instructions were given to the Ss.

What I want to do today is to have you help me choose between 2 things you want. I'm going to ask you to pick between 2 things you want. If you pick one you can't have the other. Some things you can have right now and some things you have to wait for.

Answer each question to show what you would really take. This is not a test. There are no right or wrong answers. Just put an "X" in front of the one you really want.

For example, the choice might be:

_________________________$1.00 in 3 weeks
_________________________50¢ today

If you took the $1.00 in three weeks you could not have the 50¢ today. If you took the 50¢ today you could not have the $1.00 in three weeks.

I am not interested in which thing in each pair you think is better. What I want you to do is to decide which thing in each pair you choose to take. Remember you have to wait for one thing but could have the other right away.

Any questions?

Go ahead and fill in the example. Put an "X"
in front of the one you really choose to have.

I will offer you 22 such choices. Choose whether you want the smaller one now or the more valuable one later. Choose very carefully because in one of the choices you will really get what you choose. So, if you picked the smaller one today, that's what you will really get. And, if you choose the more valuable one later, that's what you will really get. You won't know which one of your 22 choices you'll really get until the very end, so be careful to choose what you really want on each set of choices. What you get will be different from what the other groups of children have gotten.

Wait for me to show you each pair of things before you make your choice. Do not turn your page until I tell you.

Each item was presented on a separate page of the test booklet along with reminders that the Ss should wait until shown the items before choosing, should put an "X" in front of the one they really wanted, should not check both since they could only have one and that they should not turn the pages until instructed to do so. All the 3 week, 4 week and 5 week items were grouped together to minimize confusion of the time dimension. In addition, a calendar was displayed for each of the time periods with the appropriate number of weeks colored in and used to graphically depict how long the delay period was. This was presented and explained at the beginning of each group of items and used as a reminder of the length of the delay interval presented first. The objects the child was to choose between were displayed before each choice.
For the money items the children were shown a graphic representation of the amount of money in nickels for the immediate and the delayed choice. When the children completed the booklets they were collected and those choosing the immediate rewards on one of the items were given that reward while those choosing the delayed reward in the same item were told they would receive it at the end of the designated interval. A different item was used as the reward item for each group of Ss and the children were told this.

The questionnaires were scored for the number of delayed reward choices.

Concrete Operational Intelligence

Four tasks have been selected to assess the degree to which functions relevant to concrete operational intelligence have been established. The measures are adaptations of those employed by Elkind (1961a,b), Piaget (1928, 1948) and Lee (1968).

Conservation of Liquid

Two cylindrical jars of equal height and diameter (1 1/2 inches) and one taller narrower cylindrical jar (1 inch in diameter); a 1 inch square and a 1 1/2 inch square jar of equal height; and a small pitcher of water were employed as materials.
The S was tested individually (as is the case with all subsequent instruments) and seated across from E. The S was presented with the two cylindrical bottles of the same size while E poured water into both. E then asked the S, "Do the two jars have the same amount of water in them?" If the child answers "no" then water is added to the jar until he affirms their equality. E then said, "If I pour the water from this jar into this one" (E points from the shorter, wider jar to the taller, narrower one) "will it have the same amount of water as that one?" (pointing again to the shorter jar)

Then S answers and his response is recorded. E then says, "Let's do it. Let's pour this water (shorter jar) into this one" (taller jar). E does so and says, "Now, do they both have the same amount of water? Do both jars have just as much water in them?" S's response is recorded. S is then asked "why" and his explanation is recorded. If he has given an appropriate conservation response he is then presented with the two different sized square jars and a small pitcher of water. E then says, "Here are two different jars. I want you to pour the same amount of water into each of them. Pour as much water into this one as you pour into that one. I want both of
them to have the same amount of water. Do you have any questions?" If S pours approximately the same amount of water into both jars (the water level in the narrower jar must be discernibly higher than that in the wider jar) he is credited with having passed.

Conservation of Weight

Play-doh of one color was employed as material. Two clay balls of identical size, shape, weight and color were placed on the table in front of S. E then said to S, "These balls have the same amount of play-doh, do they both weigh the same? Do they have the same amount of weight?" If S doubts the equality in weight E then adds to or takes away from the balls until S agrees that they are equal. Then E says, "Suppose I roll one of these balls out into a hot dog, will the weight be the same for the hot dog as it is for the ball? Will they both have the same amount of weight?" S responds and his response is recorded. E then says, "Let's do it. Let's roll this ball into a hot dog." E does so without picking up the ball.) "Now, does the ball weigh the same as the hot dog? Do they both have the same amount of weight?" S's response is recorded. He is then asked "why" and his response is recorded. If he has given an appropriate conservation response he is then
presented with a large mound of play-doh while $E$ has a small amount of play-doh and says, "I am going to make a pancake with some play-doh." ($E$ makes a pancake and places it on the table in front of $S$.) "Here it is. Can you make a ball for me that would have the same amount of weight as this pancake has? Make it so that both the pancake and your ball will have the same amount of weight. Do you have any questions?" If $S$ makes a ball of approximately the same weight (horizontal diameter smaller than the pancake while the vertical diameter is higher than the pancake) he is credited with having passed.

**Scoring:** Scoring criteria were the same for both conservation of liquid and weight. A score from 1 to 4 was assigned for each task in the following manner.

1 - No performance correct or no evidence of conservation of any kind. The prediction and verification responses were incorrect.

2 - Evidence of "passive" conservation, i.e., subjects were able to accurately predict and verify the equality of amount of liquid and weight with changes in form.

3 - This presupposes level 2 plus an adequate explanation. The subject must give an explanation which shows at least implicit awareness of the principle involved in conservation. An example of an adequate explanation is, "Because first they had the same amount and then you poured it in the
skinny one and it looked higher but they are the same." An example of an inadequate explanation is, "Because when you rolled it out into a hot dog you spread the weight out more and it looks like it weighs more."

4 - This presupposes level 2 and 3 plus an adequate performance on the constructive task. For conservation of liquid the subject must pour to a higher level in the narrower jar and for weight he must construct a ball whose diameter is smaller than that of the width of the pancake but larger than the pancake's height.

**Lateral Discrimination**

The materials for this instrument were a penny, a pencil and a key.

S was seated opposite E and asked, "Show me your right hand,...your left hand,...your right leg, ...your left leg,...my (i.e. E's) right hand,...my left hand,...my right leg,...my left leg." E places the penny and pencil before S with the pencil to the right of the penny as S views it and asks, "Is the pencil to the right or to the left of the penny?, Is the penny to the right or to the left of the pencil?" Then E says, "Now, if you were sitting here where I am would the pencil be to the right or to the left of the penny? Would the penny be to the right or left of the pencil?"

E now places a key between the pencil and the penny saying, "Now I am going to put this key here and
you answer these questions from where you are, from your position. Now, from where you are sitting is the pencil to the left or the right of the key? Is the penny to the left or the right of the key? Is the key to the left or right of the penny? Is the key to the left or the right of the pencil? Is the pencil to the left or right of the penny? Is the penny to the left or right of the pencil? Now let's pretend again that you are sitting here where I am and answer these questions. Now, if you were sitting here..." At this point the last six questions were repeated in the same order with the introduction to each question being E's reminder that the S was to answer as if he were in E's position.

**Scoring:** The following four levels were assigned to each response:

1 - No adequate performance. The child's own point of view is not firmly established.

2 - Child accurately responds to his own point of view although he may still be viewing the object's positions in an absolute and non-relational manner. (Ego-centric)

3 - Child accurately responded from the point of view of others. (Socialized)

4 - A completely relational point of view is established in which performance on all tasks is adequate. (Objective)
Projected Space

The materials for this task consisted of a model landscape, a small doll and 4 sets of 8 photographs of the landscape.

The model of the landscape consisted of 3 rocks (one large pink, one flat long blue and one small tall green) which were arranged at roughly the 3 points of a triangle on a piece of green Ozite tile. A red house was situated on top of the green rock and a path of cork chips led down the rock from the house. The pink rock's summit was "snow" covered. A red cross was on the summit of the blue rock. A black shield surrounds 3 sides of the model. In each of these 3 sides is a 4" x 5" covered opening.

There were eight color photographs (3 1/2" x 5" of the model each of which was taken from the approximate eye level of a child viewing the model. One photograph was taken from each of the four sides of the model and one from each of the four corners. (The model is represented in Figure 1 and the positions from which the photographs were taken are represented by the letters A,B,C...H.) Each of the eight photographs were randomly arranged and glued on an 11" x 16" card and there were four different random card arrangements. The materials
Figure 1. Landscape Scene for Projected Space Task (Letters referred to positions of photographs.)
were developed by Lee (1968) after those described by Piaget (1956).

S was seated before the open end of the model (i.e., position A of Figure 1). E then says, "See these rocks? We will pretend that they are mountains." Time is allotted for S to explore the mountain scene from his seated position only. E resumes, "Here is a doll. If he took a picture of these mountains from here (The doll is placed at S's eye level before position A.) which picture do you think he would have taken?" The first set of eight pictures was shown to S and he was allowed as much time as he wished to select a picture. After S chose E continued, "Now, suppose the doll came around to this window (position B of Figure 1, directly opposite S) and took a picture from here. Which picture would he have taken?" The second set of eight pictures was presented to S. E, "How about if he took a picture from here (position C of Figure 1, to S's left) which picture would it be?" S is then shown the third array of eight pictures. Finally E says, "And here?" while moving the doll to position D of Figure 1 to the right of S. Then the fourth set of eight pictures was shown to S. If S did not get all four questions correct E then said, "We are going to do this all over again."
I am going to show you the pictures again and ask you the same questions. Before we do this I am going to remove the screen and let you turn the model around any way you want and look at it. Go ahead and take a good look." The screen is removed and $£$ is allowed to turn the model and examine it from different perspectives. When $S$ is through $E$ replaces the screen and repeats the previous 4 questions in exactly the same manner as described above.

**Scoring:** The following 4 levels were assigned to performance on this task:

1. Picture choices corresponded to the child's own point of view or an apparently random choosing as if all pictures were equally suitable for all points of view.

2. Some attempts at discrimination are evident but there are relapses to level 1. An attempt is made to discriminate different points of view which fails. Accuracy is low.

3. Certain of the relationships are varied with observer position changes but there is still no comprehensive coordination of viewpoints. Accuracy is high and errors approximate correct perspectives.

4. Mastery of the various perspectives is complete. Accuracy is perfect at least on the second set of trials.

**IQ**

The Kuhlman-Anderson, Form B had been administered to all $S$'s by the school as part of its routine
testing. Testing took place when each S began second grade.

Labelling of Affect

Thematic Apperception Test

Cards 1, 3BM, 3GF, 5, 6BM, 14 and 17BM of the TAT were administered in that order. Generally, the overall procedures recommended by Murray (1943) with modifications as suggested by Bellak and Adelman (1960) regarding the administration of picture projective techniques to children were followed.

With the child facing E and adequate rapport established, E said, "We are going to play a story telling game. I have some pictures here that I am going to show you and for each picture I want you to make up a story. Tell what has happened before and what is happening now. Say what the people are feeling and thinking and how it will come out. You can make up any kind of story you please. Do you understand? Here is the first picture."

Any questions the S had were answered as close as possible to the wording and emphasis of the instructions. After the first story the subject was reminded of the instructions (unless he had fulfilled them faithfully) emphasizing what he has neglected. This was repeated after the second story but not
thereafter.

**Children's Insight Test**

The full 13 items of the boy's or girl's forms of the *Children's Insight Test* (CIT) were administered to the appropriate sex subject according to the procedures stated by Engel (1958b). The S was told, "I am going to tell you about some children and what happened. After telling you about each boy (girl) I will ask you what you think he did and how he felt."

Each story item was read as neutrally as possible. Then S was asked, "What did he (she) do?" and after answering that, "How did he (she) feel?" If the S answered "I don't know" to either of these he was asked, "Well, what do you think he (she) did?" or "How do you think he (she) felt?"

After the first three items the question "How did he (she) feel" was no longer asked. (The items of both the boy's and girl's forms are presented in Appendix 1).

**Scoring:** The scoring procedure for the TAT and CIT was the same. Protocols were broken up into response units which were then assigned a score. A response unit was defined as any group of words which expressed a thought. The emphasis was on dividing the responses into units of meaning, units which added meaning to the previous communication. The
unit did not have to be a grammatically complete sentence. Grammatical units (e.g., the subject of the action under consideration) could be implied from other units in the total response. The following example is divided into response units:

When he got home he told his Mama he got an F on his paper and so he went in his room and got an F in spelling.

Each unit was then assigned one of these basic scores: manifest feeling (m), feeling expressed in action (a) or no feeling expressed (0). The scores for manifest feeling and feeling expressed in action were combined into a total Affect Expression (A) score.

The m score was defined as any response unit which expressed feeling qua feeling. These may range from some minimal, qualified expressions to rather moderate, straightforward and unqualified expressions to rather intense, exaggerated expressions of feeling. Examples of parts of response units indicating manifest feeling are: "felt said," "He wished," "real mad," "kind of unhappy," "very glad" and "probably sad."

The a score was defined as action which in itself clearly expresses feeling or clearly implies the presence of feeling. Here again, the range was from nearly neutral actions or qualified and tenta-
tive actions to rather direct, problem oriented, assertive, energetic, involved and self-mobilizing actions to indications of intense motor discharge, acting out, loss of control and intense actions. Specific examples of portions of response units indicating feeling expressed through actions are: "probably cry," "tried to improve," "ignored them," "cry," "argue," "search," "sulked," "kick," "fight," "scream" and "beg."

The 0 score was applied to all response units not scored as either m or a.

Rorschach

The standard set of 10 cards was administered. Generally, the administration procedure followed those of Ames et al. (1952) in their study of children's responses to the Rorschach.

With the child seated opposite E, E said, "I have some things to show you." E presents the first card and asks, "What do you see?" If the child hesitates E may further inquire, "Tell me all about it" or "What does it look like to you?" If the S still hesitates, refuses or says he doesn't know E will explain, "People see all sorts of things and I want to know what this might look like to you." When the child has given one response E will respond
with, "Yes, fine, can you tell me anything else?"
If S responded in the form of a question E turned
the question back to him. For example, S: "Is
that a rabbit?", E: "It could be a rabbit."

The inquiry was conducted following ad-
ministration of all the cards. For location the
S was asked, "Show me the..." or "Put your finger
on the..." For determinants questions such as "Tell
me about the...," "What makes you think of a...,
"What reminded you of a..." or "How could you tell
it was a..." were employed.

If a child failed to respond to cards I and
II in their initial presentation and did offer a
free association in the inquiry these were to be
included while noting where they occurred. No
cards beyond Cart II were to be treated in this
manner.

When a child refused a card he was asked
to examine it a little longer and allowed to do so.
If no response was then made no further attempts
to elicit a response were employed.

**Scoring:** Protocols were scored for the M
determinant as defined by Klopfer et. al. (1954)
and Ames et. al. (1952). M was defined as human
figures seen in movement in human activity. Follow-
ing Rorschach's and Ames' practice, human figures for the popular location of Card III were scored M whether or not human movement was described, so long as a specifically human figure was produced. The precise scoring criteria employed were:

1. Human response to popular area of Card III.

2. Kinesthetic quality in human concepts.
   a. Action even with human reality qualified.
   b. Humans in any live posture unless their reality is qualified.
   c. Humanlike movement in animals but not trained animals.
   d. Movement controlled by an individual even if reference is also made to inanimate movement.
   e. Parts of a human in action.
   f. Human face with a lifelike expression.

Procedure

Ss were administered the Delay of Gratification measure in small groups of approximately ten children per group. The experimenter who conducted this administration had no further contact with the Ss.

A week later individual testing was begun by two Es. Each E had two separate sessions with each S he was to see. In one session the four measures of Concrete Operational Intelligence and the TAT were administered. In the other session the CIT and the Rorschach were administered. E1 tested 10
boys and 10 girls and $E_2$ tested 12 boys and 12 girls. $S$s were assigned to the $E$s by the school principal to facilitate administrative requirements of the school within the limits of assigning an equal number of $S$s and an equal number of boys and girls to each $E$. The four $S$s who were later discarded came from $E_1$'s group. $E_1$ administered the Piagetian tasks and the TAT in session one and the CIT and Rorschach in session two. $E_2$ followed a reverse order. Most testing sessions ranged from forty minutes to an hour in length. Both $E$s were male graduate students in psychology and $E_1$ was the investigator.

Scorer Reliability

All materials were scored by the investigator. Since many of the scoring procedures involved scorer judgment a check on the reliability of judgments was made. The measures for which this was performed were the four measures of concrete operational intelligence, the CIT-TAT measures of $m$, $a$, $A$, for the total number of response units, $R$, and the Rorschach $M$ determinant. For each of these measures 12 of the 44 protocols were selected randomly. A second scorer was trained by the
investigator and he scored each of these randomly selected protocols. The correlations (Pearson r's) between scorer one and two are presented in Table 1.

TABLE 1

SCORER RELIABILITY*

<table>
<thead>
<tr>
<th>Test</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation of Liquid</td>
<td>1.000**</td>
</tr>
<tr>
<td>Conservation of Weight</td>
<td>1.000</td>
</tr>
<tr>
<td>Lateral Discrimination</td>
<td>.959</td>
</tr>
<tr>
<td>Projected Space</td>
<td>.904</td>
</tr>
<tr>
<td>CIT - TAT m</td>
<td>.972</td>
</tr>
<tr>
<td>CIT - TAT a</td>
<td>.845</td>
</tr>
<tr>
<td>CIT - TAT A</td>
<td>.926</td>
</tr>
<tr>
<td>CIT - TAT R</td>
<td>.994</td>
</tr>
<tr>
<td>Rorschach M</td>
<td>.981</td>
</tr>
</tbody>
</table>

*N = 12

**Pearson Product Moment Correlations

These correlations are at an acceptable level and allow for sufficient confidence in the uniformity of scoring criteria applied by the investigator to the total sample.
RESULTS

A number of analyses were made to assess differences due to school grade, sex and experimenter. The results with reference to school grade are presented in Table 2. Inspection of the table reveals that the only significant difference present is on the total number of response units (R) for the TAT-CIT ($t=2.61$, $p<.05$). The Ss in grade 3 were more verbose in their responses to the TAT-CIT. Because of this significant difference in response length Pearson r's were computed between Grade 2-R and the criterion, delay of gratification ($r=.070$) and Grade 3-R and delay ($r=.118$). These correlations are not significantly different from C or each other ($z=.124$). Since this difference in response length results in no statistically meaningful difference with the criterion the data were not further analyzed separately by grades.

The date on E differences are presented in Table 3. E2 was assigned a group of Ss whose
## TABLE 2
GRADE DIFFERENCES ON MAJOR VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Grade</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay of Gratification</td>
<td>2</td>
<td>10.33</td>
<td>5.72</td>
<td>.71</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>12.14</td>
<td>6.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concrete Operations</td>
<td>2</td>
<td>9.87</td>
<td>3.09</td>
<td>.30</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>10.14</td>
<td>3.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>2</td>
<td>16.52</td>
<td>6.94</td>
<td>.56</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>15.33</td>
<td>6.52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>2</td>
<td>6.96</td>
<td>3.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7.67</td>
<td>3.76</td>
<td>.64</td>
<td>----</td>
</tr>
<tr>
<td>Total Response Units*</td>
<td>2</td>
<td>86.04</td>
<td>45.31</td>
<td>2.61</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>135.05</td>
<td>74.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rorschach M</td>
<td>2</td>
<td>.87</td>
<td>1.53</td>
<td>.34</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1.00</td>
<td>1.20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rorschach R</td>
<td>2</td>
<td>13.87</td>
<td>5.77</td>
<td>.35</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>13.29</td>
<td>4.95</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*TAT-CIT

Grade 2 N = 23
Grade 3 N = 21
### TABLE 3

EXPERIMENTER DIFFERENCES ON MAJOR VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>E</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>E₁</td>
<td>2.50</td>
<td>.50</td>
<td>.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>2.46</td>
<td>.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>E₁</td>
<td>8.45</td>
<td>.25</td>
<td>.28</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>8.43</td>
<td>.28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ</td>
<td>E₁</td>
<td>110.73</td>
<td>9.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>113.13</td>
<td>9.45</td>
<td>.81</td>
<td></td>
</tr>
<tr>
<td>Delay of Gratification</td>
<td>E₁</td>
<td>9.95</td>
<td>6.50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>13.63</td>
<td>5.06</td>
<td>2.08</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Concrete Operations</td>
<td>E₁</td>
<td>10.45</td>
<td>3.25</td>
<td>.86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>9.67</td>
<td>2.69</td>
<td></td>
<td></td>
</tr>
<tr>
<td>m</td>
<td>E₁</td>
<td>16.45</td>
<td>8.24</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>15.58</td>
<td>5.02</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>E₁</td>
<td>6.30</td>
<td>3.64</td>
<td></td>
<td>1.35</td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>8.13</td>
<td>5.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Response Units*</td>
<td>E₁</td>
<td>116.50</td>
<td>66.90</td>
<td>.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>103.54</td>
<td>63.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rorschach M</td>
<td>E₁</td>
<td>.40</td>
<td>.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>1.33</td>
<td>1.47</td>
<td>2.73</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Rorschach R</td>
<td>E₁</td>
<td>11.40</td>
<td>2.44</td>
<td></td>
<td>2.58</td>
</tr>
<tr>
<td></td>
<td>E₂</td>
<td>15.42</td>
<td>2.03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*TAT-CIT E₁ N = 24   E₂ N = 20
preferences for delayed gratification were significantly higher than those of $E_1$ ($t=2.08$, $p<.05$). Since these $S$ assignments were made independently by the school principal who had no knowledge of the $S$s' performance on the delay measure this difference may safely be interpreted as a chance occurrence.

The difference between $E_1$ and $E_2$ with respect to Rorschach performance (For $M$: $6=2.73$, $p<.01$ and for $R$: $6=2.58$, $p<.05$) requires examination. Taking the more significant and more relevant difference, $M$ production, Pearson $r$'s were computed with the criterion again. $M$ production for $E_1$'s $S$s and delay correlated .194 and for $E_2$'s $S$s the correlation was .193. These correlations are also not significantly different from zero nor from each other ($z=0.00$). Since this is the case the data were not further analyzed separately by $E$.

Lastly, the data with respect to sex differences are presented in Table 4. Inspection of Table 4 reveals that there is a significant difference between boys and girls and their expression of feeling through action in response to the TAT-CIT measure ($t=3.90$, $p<.01$). Here again correlations were computed between these measures, $a$, for each sex and the criterion. For boys the correlation was .043 while for girls it was .389. Again, neither of these values is significantly different from
TABLE 4
SEX DIFFERENCES ON MAJOR VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sex</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>M</td>
<td>8.47</td>
<td>.25</td>
<td>.25</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>8.40</td>
<td>.39</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>IQ</td>
<td>M</td>
<td>111.27</td>
<td>10.40</td>
<td>.50</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>112.77</td>
<td>9.44</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Delay of Gratification</td>
<td>M</td>
<td>11.68</td>
<td>5.65</td>
<td>.26</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>11.23</td>
<td>6.25</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Concrete Operations</td>
<td>M</td>
<td>10.55</td>
<td>2.36</td>
<td>1.20</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>9.45</td>
<td>3.01</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>m</td>
<td>M</td>
<td>14.82</td>
<td>5.61</td>
<td>1.14</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>17.14</td>
<td>7.51</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>a</td>
<td>M</td>
<td>9.59</td>
<td>4.97</td>
<td>3.90</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>5.00</td>
<td>2.32</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Total Response Units*</td>
<td>M</td>
<td>114.73</td>
<td>64.62</td>
<td>.53</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>104.14</td>
<td>66.09</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Rorschach M</td>
<td>M</td>
<td>1.00</td>
<td>1.31</td>
<td>.35</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>.36</td>
<td>1.55</td>
<td></td>
<td>----</td>
</tr>
<tr>
<td>Rorschach R</td>
<td>M</td>
<td>13.59</td>
<td>5.14</td>
<td>.05</td>
<td>----</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>13.59</td>
<td>5.65</td>
<td></td>
<td>----</td>
</tr>
</tbody>
</table>

*TAT-CIT

Male N = 22
Female N = 22
zero nor significantly different from each other ($z=1.633$).
In this case also, there was no necessity to further analyze the data by sex and we could then turn to the analysis of the data for the total sample with respect to the predictor variables selected for study.

The mean performance levels for all subjects ($N=44$) is presented in Table 5. This mean performance

**TABLE 5**

**MEAN PERFORMANCE ON ALL MEASURES**

<table>
<thead>
<tr>
<th>Cognitive Measures</th>
<th>Affect Measures</th>
<th>Delay of Gratification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>S D</td>
</tr>
<tr>
<td><strong>Liquid</strong></td>
<td>2.72</td>
<td>1.37</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>2.75</td>
<td>1.48</td>
</tr>
<tr>
<td><strong>Lateral</strong></td>
<td>2.81</td>
<td>.92</td>
</tr>
<tr>
<td><strong>Space</strong></td>
<td>1.72</td>
<td>1.01</td>
</tr>
<tr>
<td><strong>IQ</strong></td>
<td>112.02</td>
<td>9.84</td>
</tr>
</tbody>
</table>

$N = 44$

level attained on the measure of delay of gratification falls very nearly at one-half the number of items on the scale. (The number of items was 22.) This provides some basis for increased confidence in the comparability of the sample upon which the instrument was
constructed and the experimental sample. Rorschach M performance was at the expected level for this age and the IQ of this group was slightly above average.

The performance on one of the Piagetian measures was below what is expected for this age group. Lee (1968) found that 8 year old children had very nearly attained true conservation (this would mean a mean score between 3 and 4) on the conservation of liquid task. Most Ss in this sample performed correctly upon the prediction and verification questions but fell short of giving adequate explanations and particularly so regarding adequate constructions of conservation of liquid.

The mean performance on conservation of weight falls at the expected level for 8 year olds (Elkind, 1961a) as does the mean performance on lateral discrimination (Lee, 1968, Elkind, 1961b, Piaget, 1928) and projected space (Lee, 1968, Piaget and Inhelder, 1948). To summarize the attainment levels with respect to concrete operations, Ss mean performance levels on the two conservation tasks evidence an ability to correctly predict and verify the operations, with somewhat fewer Ss able to adequately explain the operations or perform them. As a group, true conservation has not been established. With respect to lateral discrimination the
group is approaching a socialized point of view, i.e., being able to accurately respond from the point of view of others but is falling short of truly relational or objective functioning. Lastly, on projected space, group performance is at the level of responding from one's own point of view and beginning attempts at discrimination (at Piaget's Substage IIA and B).

The intercorrelations among the cognitive measures are presented in Table 6. It will be recalled

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservations of Liquid (I)</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conservations of Weight (II)</td>
<td>.504*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lateral Discrimination (III)</td>
<td>.162</td>
<td>.119</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Projected Space (IV)</td>
<td>.012</td>
<td>-.015</td>
<td>.193</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ</td>
<td>.047</td>
<td>.256</td>
<td>-.101</td>
<td>.005</td>
<td></td>
</tr>
</tbody>
</table>

*\( p < .01 \)

that the two conservation tasks were conceptualized as representative of the negation process; that the lateral discrimination and projected space tasks were conceptualized as being representative of the process of
reciprocity; and that all four were representative of concrete operations. As such, one would theoretically expect each of these measures to be positively and significantly correlated with the others. Further, one would expect the two measures of the negation process to be related more highly to each other than to the two measures of the reciprocity process while the converse is to be expected for the reciprocity process. Inspection of Table 6 reveals that this is the case for the negation measures but the measures of reciprocal operations are neither significantly related to each other nor to the measure of negation. They are essentially unrelated. There is not the expected degree of homogeneity among these tests. This is somewhat problematic. Lee (1968) presents data in which the theoretically expected relationships among three of these measures (conservation of liquid, lateral discrimination and projected space) were obtained. It seems unlikely that the lack of such relationship in the present investigation can be attributed to procedural differences between the two studies since the materials were identical; the procedures in the present study followed closely that of Lee's; and the present investigator was assisted by Lee in the standardization of his procedure. There
may of course be a sampling difference. Both samples were Caucasian, middle class and of average intelligence. However, Lee's sample was all male. A more telling difference may be that Lee's sample covered children from age 5 to 17. It may be that with this age group sample the upper ranges of the tasks are not entering into the analysis of their interrelationship.

The lack of relationship of the measures of concrete operations to the Kuhlman-Anderson IQ creates no such theoretical difficulties since this test was designed to assess general intellectual ability (following a different theoretical model of cognitive functioning than Piaget's) and employs a variety of tasks quite dissimilar to those designed by Piaget to assess the development of concrete operations.

Table 7 presents the intercorrelations among the measures of affect. The extremely high correlations

<table>
<thead>
<tr>
<th></th>
<th>m</th>
<th>a</th>
<th>A</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>m</td>
<td>----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>.160</td>
<td></td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>.852**</td>
<td>.624**</td>
<td>----</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>-.122</td>
<td>.132</td>
<td>-.020</td>
<td>----</td>
</tr>
</tbody>
</table>

**p .<01**
of $m$ and $a$ with $A$ should be ignored. They are spurious since the $m$ and $a$ scores compose the $A$ score entirely. With this exception, there are no significant relationships among the measures of affect and the individual measures can be viewed as independent. The low and non-significant correlation between $m$ and $a$ leads to the conclusion that these two indices of affect expression should be interpreted separately, as distinctive modes of dealing with affect, if you will, in their relationship to the criterion.

The inter-relations between cognitive and affective measures are presented in Table 8 for the sake

**TABLE 8**
INTERCORRELATIONS OF COGNITIVE AND AFFECT MEASURES

<table>
<thead>
<tr>
<th>Cognitive Measures</th>
<th>Affect Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$m$</td>
</tr>
<tr>
<td>Conservation of Liquid</td>
<td>.133</td>
</tr>
<tr>
<td>Conservation of Weight</td>
<td>.086</td>
</tr>
<tr>
<td>Lateral Discrimination</td>
<td>-.050</td>
</tr>
<tr>
<td>Projected Space</td>
<td>-.034</td>
</tr>
<tr>
<td>IQ</td>
<td>-.099</td>
</tr>
</tbody>
</table>
of demonstrating the statistical independence of these measures which is consistent with theoretical expectations.

It might be well to recall the specific sections of the main hypothesis as the data relevant to each section is reported. First, with respect to concrete operational intelligence it was stated that the level of cognitive functioning attained during the period of concrete operations is positively and significantly related to the ability to delay gratification. Table 9

**TABLE 9**

**CORRELATIONS OF COGNITIVE PREDICTORS TO DELAY OF GRATIFICATION**

<table>
<thead>
<tr>
<th>Cognitive Measures</th>
<th>Delay of Gratification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conservation of Liquid</td>
<td>.071</td>
</tr>
<tr>
<td>Conservation of Weight</td>
<td>-.041</td>
</tr>
<tr>
<td>Lateral Discrimination</td>
<td>-.109</td>
</tr>
<tr>
<td>Projected Space</td>
<td>.117</td>
</tr>
<tr>
<td>IQ</td>
<td>.005</td>
</tr>
</tbody>
</table>

presents the correlations of these cognitive measures with the criterion as well as that for IQ. None of these relationships approach statistical significance
and they offer no support for the hypothesis. In addition the correlation between IQ and delay is non-significant.

The second section of the main hypothesis asserted that the ability to verbalize and differentiate affect is positively and significantly related to the ability to delay gratification.

Table 10 presents the correlations between the measures of affect and delay of gratification as well as that for Rorschach M. Here again, although these relations are of greater magnitude in absolute terms than those for the cognitive measures, they fail to reach statistical significance. It is interesting to note the direction of relationship for the m score.
It is not only not significantly related to the criterion but the direction of relationship, if any confidence may be placed in it as a trend, is in the opposite direction of that predicted. In any case, the data fail to confirm the hypothesis.

The final section of the hypothesis stated that if the cognitive and affective variables were taken in concert they would demonstrate a relationship to the ability to delay gratification significantly greater than the relationship demonstrated for each separately. To test this hypothesis each of the cognitive and affective measures was treated as a multiple predictor of the criterion. A multiple correlation was computed \( R = .498 \) which also failed to reach significance, thereby offering no support for this final section of the main hypothesis. One final test was performed to determine the proportion of variance in the measure of delay which is attributable to the 9 predictor measures and these data are presented in Table 11. The ratio of the \( M^2 \) Deviations/MS Total provides an estimate of the fraction of the variance in the criterion, delay of gratification, which is not attributable to the multiple regression for the 9 cognitive-affective measures. Its complement, .05, is the estimate of the proportion of the variance
TABLE 11
ANALYSIS OF VARIANCE OF REGRESSIONS

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Degrees of Freedom</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>9</td>
<td>399.8</td>
<td>44.42</td>
<td>1.24</td>
</tr>
<tr>
<td>Deviations</td>
<td>34</td>
<td>1213.1</td>
<td>35.68</td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{MS_{\text{Deviations}}}{MS_{\text{Total}}} = \frac{35.68}{37.51} = .95
\]

attributable to the predictor variables treated as multiple predictors. This is virtually a psychologically meaningless proportion of the variance.

To summarize the data, the cognitive and affective measures taken independently demonstrated no significant relationships to the ability to delay gratification and no significant relationship with the criterion was evident when these cognitive and affective variables were treated as multiple predictors.
DISCUSSION

If the data are taken at face value the implications for the original problem are uniformly disconfirming. The purpose of the investigation was to explore the significance of the relationship of two major developmental lines, the cognitive and the affective, for ego development. Concrete operational intelligence and the ability to label affect were selected as theoretically pertinent representatives of cognitive and affective development to be related to delay of gratification which was to represent ego development. Each of the measures of these two major predictor variables failed to show any significant relationships to the criterion when taken independently. There was also no significant relationship evidenced when they were treated as multiple predictors of delay. The amount of variance accounted for is minimal.

A variety of considerations, methodological and theoretical, in the nature of alternative explanations to those of the present theoretical position will be considered shortly. Whatever the validity and importance
of any alternative explanations, it is clear that the specific variables employed are not sufficiently meaningful and potent to overcome the influence of alternative independent variables or whatever limitations may be due to the present measuring instruments.

The present investigation offers little positive information toward increased understanding of how an individual's capacity to control and direct his own behavior develops. Each of the cognitive variables taken individually demonstrate no significant relation to the ability to delay gratification. The specific hypothesis that this particular aspect of cognitive development is particularly relevant to an individual's ability to delay gratification must be rejected. As tested here, there is no basis for holding that an individual's ability to process information at a level not dominated by immediate perceptual input but at a level which can truly transform his experience is a cognitive skill which would meaningfully enhance his ability to delay gratification. Neither is there any basis for holding the hypothesis derived from the more clinical theorists that the ability to delay gratification is enhanced by the ability to verbalize feelings. Of course, when one turns to the position which asserts the indissociability of cognition and affect there
again is no positive evidence supporting the view. Such validation would have required a significant contribution from the cognitive and affective variables independently.

Each of these inferences is subject to the limitations of the procedures employed so that they do not clearly provide a basis for rejecting the meaningfulness of cognitive and affective variables broadly construed with respect to delay of gratification. For the same reason, these data also do not disconfirm the assumptions regarding the mutuality and indissociability of the two predictor variables. Negatively, it is clear that it would be very unlikely that attempts to experimentally demonstrate antecedent-consequent relationships between the variables as defined in the present investigation would be fruitful. Again, within the limits of the variables as defined here, there is no reason to believe that efforts to develop procedures which would enhance and facilitate an individual's cognitive and/or affective development with a view to increasing his ability to control and direct his own behavior would have much likelihood of success.

With so little of the variance accounted for the relevance of alternative hypotheses is increased
and the question of methodological limitations is raised. The issue of alternative hypotheses will be examined first. Throughout his work on delay of gratification Mischel has consistently argued against the fruitfulness of investigations which view delay of gratification as a capacity, ability or complex personality variable and pursue an elaboration of the individual differences within such a theoretical context. His own emphasis is upon the investigation of the effects of social learning variables which might influence delay of reward behavior. He is particularly critical of models which attribute delay of gratification to complex intra-psychic mediational processes with which the theoretical basis of the present study is in sympathy. His own central theoretical hypothesis asserts that delay of reward behavior is a function of the relative strengths of the expectancies and reward values associated with each choice. He has consequently investigated and demonstrated the effects of such variables as expectancies about response consequences, observational learning, social characteristics of models, cultural differences and some aspects of child rearing conditions upon delay of reward behavior. The present investigation provides no basis for challenging Mischel's emphasis on the
significance of social learning variables.

Another approach to the question of alternative hypotheses which remains within the broad theoretical predelictions of the present investigation would be to look at other aspects of cognitive and affective development. If it is a given that the development of concrete operational intelligence and the ability to verbalize and differentiate feelings is of no consequence regarding the ability to delay gratification, this of course does not necessarily rule out the relevance of other dimensions of cognitive and affective development. It is possible that dimensions of cognitive development such as cognitive complexity, transpositional operations, or time sense and orientation may be influential. Within the affective sphere, the development of a moral sense, of interests, involvements and personal investment outside of oneself or the establishment of particular kinds of value patterns may be of particular importance. Indeed, these alternatives were considered in the course of designing the present study.

Turning to the methodological limitations, the first regards the relation of the measures employed to the constructs they were intended to assess. Certainly when one is investigating con-
structs of the order in this investigation any set of operations will never fully exhaust the theoretical meaning of the construct. A limited battery was employed in the present study and it is possible that a more extensive battery for each of the variables or simply an equally limited battery of different operations for the cognitive and affective variables may have yielded different results. It is the investigator's opinion that this is less likely to be the case regarding the operations for concrete operational intelligence. However, Goldschmid and Bentler (1968) have recently made just such an argument. They have criticized the lack of consistency of tasks employed in the assessment of conservation leading to insufficient information regarding such psychometric properties as reliability, task homogeneity and item difficulty level. Standardized procedures with such information available would have enhanced the level of certainty involved in the interpretation of the negative data.

The lack of the theoretically expected homogeneity among the cognitive tasks is problematic. Possible reasons for this were delineated in the previous chapter. It was tentatively concluded in the previous chapter that the upper ranges of the tasks were
not entering into the analysis of their interrelationships. This would be due to limitations in cognitive attainment for many of the Ss in this sample. If a wider age range of Ss had been sampled a better distribution of performances on these tasks may have resulted. As it is, they could not all strictly be treated as several related measures of concrete operational intelligence but required individual analysis in relation to the criterion. Whatever the methodological cause of this lack of homogeneity, its existence does impose limitations on the inferences to be made from the data. It is not known what kind of relationship with the criterion a sampling of cognitive performances more in line with theoretical expectations for the cognitive variables considered in themselves would have yielded.

Other investigators have demonstrated significant relationships between various conservation tasks and IQ (Goldschmidt, 1967, 1968; and Feigenbaum, 1963). In the present study each measure of conservation was differentially related to IQ and none was significantly related to IQ. The highest correlation was .256 between conservation of weight and IQ. Goldschmidt (1967) reports a correlation of .24 between another group IQ test (Pintner-Cunningham) and conservation of weight
in a sample (N=102) sufficiently large for a correlation of this order to be significant. The lack of such relationship in the present study may be due to sampling error or differences in the measuring instrument for IQ (Kuhlman-Anderson). The Kuhlman-Anderson has been judged to be somewhat less verbal than most group intelligence tests (Buros, 1953). Conservation tasks, on the other hand, demonstrate a somewhat higher relationship to verbal indices of IQ (WISC vocabulary score) than to measures including other than verbal tasks (Goldschmid, 1967). It has been argued that verbal ability influences the child's comprehension of the task and his explanation of his performance (Flavell, 1963).

A similar kind of methodological problem presents itself with the affective measures. Theoretically and upon the basis of other data (e.g., Kagan et al., 1960) it was expected that the TAT-CIT m score would be positively and significantly related to the Rorschach M score. The Kagan sample extended in age from 8 to 15 years of age. Here again, the age level and narrow span of age range in the present study may be related to the problem. Kagan's study demonstrated a consistency in the tendency of individuals aged 8 to 15 to ascribe affect
states across a variety of stimulus conditions (TAT, tachistoscopic presentation, figure sorting and Rorschach). The consistency demonstrated may not be present or as strong in 8 year olds and the strength of the demonstrated effect may be due to the older Ss in his sample. This inconsistency in the data of the present investigation remains a problem and raises questions regarding the meaning of the m and M scores.

The present findings and the methodological problems discussed above have some clear implications for future research employing these specific variables or employing other cognitive-affective variables. One desirable design change would be to sample a wider age range. This would not only help to rule out some of the problems enumerated above but would also allow for the interesting comparison of developmental changes among the variables, e.g., whether they follow parallel, divergent or interactive courses of development. It would also be desirable to have a wider range of measures particularly with respect to the affective variables so that more confidence may be placed in the interpretations of the data. I would extend this to the criterion variable also particularly employing observational ratings of behavioral impulsivity.
SUMMARY

This study sought to investigate the influence of two major lines of development, cognitive and affective, upon ego development. The theoretical background derived from a variety of academic and clinical workers with emphasis upon Piaget and ego-psychology. Specific aspects of cognitive, affective and ego development were selected to represent each of these more global constructs. Delay of gratification was selected as an index of ego development while concrete operational intelligence in the Piagetian sense and the ability to verbalize and, by inference, to differentiate one's affective experience were selected as relevant indices of cognitive and affective development respectively. Significant positive relationships were predicted between concrete operational intelligence, the ability to verbalize affect and delay of gratification. It was further predicted that the cognitive and affective variables treated as multiple predictors would demonstrate a significantly greater relationship to delay of gratification than would either variable independently.
Delay of gratification was assessed by a series of 22 choices between less valued but immediately available rewards versus more valued but not immediately available rewards following the procedures of Mischel. Concrete operational intelligence was assessed by four Piagetian tasks: conservation of liquid and weight, lateral discrimination and projected space. Two projective instruments were administered and scored for verbalization of affect. IQ scores were available on all subjects. The Rorschach was administered and scored for M production as an index of generalized fantasy ability. The subjects for this study were 44 (22 male and 22 female) Caucasians, between 8 years 0 months of age and 8 years 11 months of age, of middle class social background with IQs ranging from 95 to 131.

Pearson product moment correlations were computed among each of the major variables and between them and the criterion. An unexpected lack of homogeneity was found among the measures of concrete operational intelligence. None of the cognitive or affective measures demonstrated a significant relationship to delay of gratification. When taken as multiple predictors the relationship was also not significant and the amount of variance attrib-
utable to all of the predictors proved minimal. It was concluded that within the limitations of the procedures employed the specific aspects of cognitive and affective development investigated demonstrate no meaningful relationship to delay of gratification. Methodological limitations and difficulties of the present study were also discussed.
APPENDIXES
APPENDIX A

Children's Insight Test: Boy's Form

1. A boy came home from school and found that his dog had run away.
   What did he do?
   How did he feel?

2. A boy had a friend with whom he played very often. His friend then had to move to another town.
   What did he do?
   How did he feel?

3. A boy wanted to be on the football team but was not chosen.
   What did he do?
   How did he feel?

4. A boy always got good marks in spelling. One day they had a spelling test and his paper came back with an F on it, which means that he flunked the test.
   What did he do?

5. There was a birthday party and a boy was invited. He was told that all the kids had to take a gift. He asked his mother to get a gift that he could take with him. But his mother had forgotten to get a gift and all the stores were too far away to get to in time.
   What did he do?

6. A boy saw another boy beat up a smaller boy.
   What did he do?

7. A boy was very sick in bed for a long time and
then had to stay in the house for a long time and not move around much.

What did he do?

8. A boy went to a new school where he didn't know any of the children.

What did he do?

9. A boy's father wanted to have a man-to-man talk with him one day. His father told him that he had heard that he had been taking some cookies he was not supposed to.

What did he do?

10. A boy wanted to wear his cowboy boots to school but his mother wouldn't let him.

What did he do?

11. A boy had a teacher he didn't like at all.

What did he do?

12. A boy found out that some children had been saying bad things about him.

What did he do?

13. A boy wanted a bike for Christmas. But it was only summer and Christmas was far, far away.

What did he do?
APPENDIX B

Children’s Insight Test: Girl’s Form

1. A girl came home from school and found that her dog had run away.

What did she do?
How did she feel?

2. A girl had a friend with whom she played very often. Her friend then had to move to another town.

What did she do?
How did she feel?

3. A girl wanted to be in a school play but was not given a part.

What did she do?
How did she feel?

4. A girl always got good marks in spelling. One day they had a spelling test and her paper came back with an F on it, which means that she flunked the test.

What did she do?

5. There was a birthday party and a girl was invited. She was told that all the kids had to take a gift. She asked her mother to get a gift that she could take with her. But her mother had forgotten to get a gift and all the stores were too far away to get to in time.

What did she do?

6. A girl saw another girl being mean to a smaller girl.

What did she do?

7. A girl was very sick in bed for a long time and then had to stay in the house for a long time and not move around much.
What did she do?

8. A girl went to a new school where she didn't know any of the children.

What did she do?

9. A girl's father wanted to have a talk with her one day. Her father told her he had heard that she had been taking some cookies she was not supposed to.

What did she do?

10. A girl wanted to wear her party dress to school but her mother wouldn't let her.

What did she do?

11. A girl had a teacher she didn't like at all.

What did she do?

12. A girl found out that some children had been saying bad things about her.

What did she do?

13. A girl wanted a doll for Christmas. But it was only summer and Christmas was far, far away.

What did she do?
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