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A STUDY OF THE EXPRESSION OF MOTILITY IN THE ACTION AND FANTASY MODES USING TWO LATENCY AGED GROUPS OF CHILDREN

The Ohio State University
Ph.D. 1980

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A STUDY OF THE EXPRESSION OF MOTILITY IN THE ACTION AND FANTASY MODES
USING TWO LATENCY AGED GROUPS OF CHILDREN

DISSERTATION

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

By
Susan Gail Farber Straus, B.S., M.A.

* * * * *

The Ohio State University
1980

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To My Mother and Father
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I. INTRODUCTION AND RATIONALE

This study is concerned with the relationships between motor behavior and the developing ability to represent movement in mental imagery or fantasy in normal latency-aged children. Relationships between overt and fantasied expressions of movement are of interest because of a need to better understand the factors contributing to a child's ability to control his motor behavior, his activity level and expression of impulses. Children from grades one and five were chosen for study since theory and past research suggests the intervening years to be a period of transition in the development and use of mental representation to influence behavior. It was felt that a study of the action-fantasy relationship in two latency aged groups of children would add unique information about this age range as well as suggest changes evolving over this age period. A review of the literature suggests that an individual's characteristic activity level and ability to conform to situations requiring inhibition of movement relates to his ability and tendency to use fantasy. It is also suggested in the recent literature that the use of fantasy is a cognitive ability that develops with age and can be modified by training within age limits.

While previous studies conducted with adults, university students and select groups of children suggest that relationships between action and fantasy expressions of motility exist, very few studies have investigated these relationships in normal children. In addition to
variations among individuals within age groups, there may be variations between age groups. A study of children in early and late latency seemed indicated from a theoretical and practical standpoint since it is during the childhood years that an individual gradually develops the ability to use mental imagery, abstraction, and fantasy, and gradually achieves control over his motor behavior so that he is able to conform to the expectations and requirements of his environment. In addition to increasing our understanding of normal development, it was hoped that the present study would have clinical applications in terms of understanding and treating those children who appear "hyperactive," distractible, impulsive and disruptive because of an inability to modulate their own motor behavior. For example, if it was found that children who were unable to regulate their motor activity were also deficient in their ability to use mental imagery and fantasy to represent movement, it could be valuable to design specific programs to enhance these cognitive skills. If age differences were found within this relationship, the effectiveness of cognitive training could be age dependent.

Theoretically, motility plays an important role in psychoanalytic and ego psychoanalytic schools of thought. In psychoanalytic psychology, motility and the control of motility by the ego are a major focus. According to theory it is through overt motor activity that the impulses press for immediate discharge. Also fundamental to this theory is the hypothesis that with ego development and the emergence of a capacity to use mental imagery, fantasy and thought, the individual develops the ability to delay and inhibit overt motility, as well as organize and direct impulse discharge. As ideation comes more under the control of
the ego, the child's behavior becomes more adaptive (Rapaport, 1967). As Rapaport emphasized, "one of the main assumptions in psychoanalytic psychology is that in the final analysis all controlling and inhibiting organizations within the psychic apparatus serve the purpose of controlling the sluices of motility in order to prevent prohibited impulses from obtaining hold of and directing motility" [p. 352]. Taking this into consideration, Rapaport stated that "the study of the control of motility should therefore play a crucial role in our evaluation of personality" [p. 353]. Psychoanalytic ego psychology, with its emphasis on the ego, views motility as characteristic of the human species and one of several inborn structural apparatuses of the ego whose existence and functioning predates conflict between the id and the environment. Motility is seen as being at the core of ego development along with such functions as perception and memory which adaptively serve the individual.

Other partial formulations found in the psychoanalytic literature dealing with motility are reviewed by Mittelman (1954). He writes that motility has been viewed as a component of the sexual instinct or muscle erotism; as an executive function, largely under conscious control; as an avenue of tension discharge - such as expressive or affective motility and in play as a way of overcoming anxiety by changing a passive experience into an active one. Mittelman, himself, proposes that in addition to being intimately connected with nearly all other functions of the individual, "motility is an urge in its own right with its own patterning of skill and of expression" [p. 143]. He views motility in the same sense as the oral, excretory and genital urges, in that there are identifiable body organs that carry out and/or are the sources of the activity, there
is a quality of urgency to the activity, and that activity leads to pleasure and satisfaction. According to Mittelman, intensity and patterning of motility are linked to the maturation of the organism as well as with cultural customs.

Despite its theoretical significance, the research literature on motility, especially as it relates to other aspects of personality structure or development, is quite sparse and fragmented.

Motility, as it relates to personality, became of interest to research psychologists with the development of the Rorschach Psychodiagnostic Test and the significance Rorschach placed on the human movement responses given to the ambiguous inkblots. Rorschach (1921) observed that an inverse relationship existed between the tendency to give kinesthetic responses to the inkblot stimuli and the degree of general motility overtly manifested by subjects. Rorschach also considered an individual's tendency to perceive humans in motion on the inkblots as an indication of a capacity for a rich inner fantasy life. The perception of humans in movement was correlated with "stable, measured mobility," according to Rorschach [p. 78], and it was asserted that "kinesthetic engrams, therefore act as inhibitors of physical activity; motor activity inhibits kinesthetic engrams" [p. 80]. He observed the relationship between perceived movement, inhibited overt motility and imaginative tendencies but did not provide a theoretical formulation nor experimental data to accompany his observations. Werner (1945) noted that Rorschach's observations fit with his "sensoritonic" theory of motion perception which hypothesized "a common dynamic property, 'tonicity,' underlying both sensory and motor responses." According to Werner, available tonic
energy can be released through one of two channels: it can be released through body movement or alternatively, through spatial displacement and the illusion of motion resulting from an increase in tonicity in a sensory area. Thus if motor impulses are checked, the individual becomes either more susceptible to motion in the environment, or recreates movement by recalling previously satisfying acts.

Motivated by the observations of Rorschach and Werner, a number of studies were done in the 1950's relating motility, as expressed in either overt action or as expressed on the Rorschach, to other personality variables. Of special interest to the research study being proposed is a series of studies which investigates the relationship between the expression of motility in overt action and motility in fantasy or mental representation. In general, data from studies done with adults seem to indicate that individuals who characteristically express motility in overt action tend to express less motility in fantasy as measured on inkblot tests and that individuals who characteristically are inhibited in their overt motility tend to express more motility in fantasy. These findings provide support for Rorschach's clinical observations. However, findings from studies which manipulate the amount of overt motility experienced by subjects, and then assess subjects' tendencies to fantasize motility, are contradictory.

While a limited amount of research has been done on adult populations, even fewer researchers have investigated how the expression of motility is organized in children. Studies published to date dealing with children have been fragmentary, with researchers looking at brain damaged and retarded children (Werner, 1945), high school students (Wolfensberger,
et al., 1962) and the physically handicapped (McCully, 1961). In two unpublished papers, a mixed clinical population (Hurwitz, 1954) and a normal population (Riess, 1957) of young latency children were studied with respect to human movement (M) on the Rorschach. Also relevant are two studies (Singer, 1973; Pulaski, 1973) which focus on fantasy play. To date, there has been little attempt to study the broader patterns of expression of motility in various modes. None of the studies surveyed have systematically looked at the relationship between action and fantasy expressions of motility in a developmental manner across ages in a normal population. None of the studies reviewed have considered the action-fantasy relationship as a function of sex, although the literature on the Rorschach (Ledwith, 1959; Ames, Metraux, Rodell and Walker, 1974) suggests that girls' production of human movement (M) responses on the Rorschach differs from boys' in certain ways (girls produce more M's) but not in others (girls' responses are equally as vigorous as boys'). Furthermore, Cromwell, Baumeister and Hawkins (1963) in their review of the literature on activity level, hint at the utility of using other dimensions in addition to quantitative ones in the study of activity. Studies with children have not clearly differentiated the quantitative aspect of motility, that of activity level, with the ability to inhibit motor responses. Previous studies comparing these two aspects of motility suggest that they are two different phenomenon, and that generalizations should not be made from one to the other. While previous studies on the action-fantasy relationship have considered the vigorousness of the fantasy responses, none has taken into account the degree of differentiation of motility responses. That this quality is an important one to
consider is strongly suggested by Werner's organismic theory which views development as a progression from a global and undifferentiated state to an integrated and differentiated one. More specifically, Santostefano's application of differentiation to development within expressive modes suggests that this is a useful concept to investigate.

Drawing upon organismic theory in addition to cognitive and psychoanalytic ego psychology, Santostefano (1977) ties together the dimension of differentiation and the use of action and fantasy in his biodevelopmental theory of personality development. In this theory, action, fantasy and language are seen as organizational modes of ego behaviors which follow a developmental course. While Santostefano's published work to date relates primarily to the expression of motives and affect, his conception of action, fantasy and language as components of a developmental hierarchy, and his conception of development within each of the action, fantasy and language modes as following a transition from lack of differentiation to articulation and integration, might prove a useful framework for investigating the organization of expression of children's motility. His theory will be discussed in more detail in a later section of this chapter.

If Santostefano's ideas are applied to the expression of motility (viewed as an ego behavior or as an urge in its own right) one would expect developmentally less mature individuals to express motility predominantly through action, to have difficulty inhibiting and regulating overt motility. More mature individuals would be capable of inhibiting and regulating their overt motility. They would also be able to use fantasy to a greater extent in expressing motility than less
mature individuals. Studies with adults (Singer, Meltzoff and Korchin, 1952) tend to support the idea of an inverse relationship between action and fantasy expressions of movement. However, Santostefano's emphasis on the developmental aspect of the transition from action to fantasy as a dominant expressive mode underlines the importance of studying the organization of motility in action and fantasy in children, and across ages, rather than making inferences from adult studies.

The present study will investigate the relationship between motility as expressed in action, and motility as expressed in fantasy in latency-aged children. This relationship will be studied by evaluating fantasy representations of motility on the Holtzman Inkblots, both quantitatively and qualitatively, of children rated on activity level by their teachers and assessed by an objective measure of motor control ability.

Quantitative assessment of fantasied expressions of motility on the Holtzman will involve counting the total number of motility units in a protocol. In the past, researchers have focused primarily on human movement responses. Since the focus of this study is on the tendency to represent motility rather than the object or agent of it, all expressions of movement (human, animal and inanimate) will be counted. Ames et al. (1974) comment on how "addable the three types of movement scores are, how in some important way the three types of movement scores are interrelated to the point that they are somewhat interchangeable, and how evidently they share in some common pool of meaning" [p. 274]. Qualitative assessment will involve rating the degree of differentiation and the level of vigorousness of motility responses. A Rorschach Motility Rating Scale designed by Santostefano will be applied to the Holtzman
Inkblot responses and used as a means of identifying and evaluating fantasy representations of motility.

Before describing the proposed study in more detail, brief reviews of the literature on motor behavior and fantasy will be presented. In the review of motor behavior, aspects of general motor development, activity level and motor control will be covered. Theories of motor behavior will be presented, and lastly, experimental approaches will be explored. In the review of fantasy, the problem of definition and conceptualization will first be considered. Several developmental theories on the evolution of fantasy will also be presented. Finally, attempts to explain and assess the developmental course of the representation of movement in fantasy will be discussed. Following these reviews, the theoretical and research literature which relate these two areas will be covered.
II. REVIEW OF THE LITERATURE

Motor Behavior

Attempts to classify the motoric behavior of children emphasize the scope of the topic at hand. For example, Bela Mittelman (1954) groups infant and child motor phenomenon into the following five categories:

1. so-called random movements of infants.
2. affectomotor patterns - motor patterns that accompany emotional reactions such as joy, fear.
3. well-organized, vigorous rhythmic patterns, often referred to as "autoerotic" behaviors such as rocking.
4. skilled motor activity, including posture, locomotion and particularly manipulation.
5. motor phenomena that are indispensable elements of the function of another organ or another striving, i.e. motor patterns that subserve oral activities [p. 144].

However, the developmental literature seems to focus primarily on skill acquisition. The developmental literature on the acquisition of overt motor control, motor inhibition and activity level seems to be quite limited and devoted primarily to casual observations and theory.

In the 1930's several longitudinal studies were conducted which documented and described general age periods for the acquisitions of many movement skills. Shirley (1931) conducted a longitudinal study of babies from birth to the age of two. From her study, Shirley outlined in detail the progression of skill development in the very young child and drew
several conclusions on the nature of motor development. She stated that motor development follows a pattern which is best accounted for on the basis of maturation. From her observations she concluded the existence of five "major orders" through which all babies pass, each consisting of several stages and following a definite sequence. The five orders were development of passive postural control, active efforts toward locomotion, locomotion by creeping and walking with support and walking alone. She also noted the variability among babies in terms of their delight in motor play and the strenuousness of their activity. Individual differences in rate of development were also said to exist and were accounted for on the basis of differences at birth which persisted, differences in babies' delight in activity, conditioning or parental training.

Nancy Bayley's longitudinal research (1935) on the motor and mental development of infants during the first three years of life also pointed to regular sequences in maturation. However, in contrast with Shirley who concluded that the developmental sequence depends on a regular order of appearance of specific abilities, Bayley felt development depends on rapid increments in the entire level of ability. Thus the sequence of growth is invariable only in a general way and in regard to a general level of maturity. She postulated that the order in which specific abilities occur in a given child depends on opportunities for practice, chance, interest and amount of activity. From her testing she also concluded that motor growth is most rapid in the early months of an infant's life and gradually decelerates. While Bayley acknowledged that it is often hard to separate tasks of motor and mental abilities, she maintained, nevertheless, that during the first twenty one months there
is a more rapid growth in motor areas than in mental areas. She found a high correlation between performance on motor tasks at adjacent ages but a low level of predictability between a child's motor performance on tasks administered six months apart. A gradual increase in the functional independence of motor and intellectual abilities was indicated by the finding of a relationship between motor coordination and mental abilities during the first 15 months of life, but a lack of predictability from motor scores to mental ability scores after the age of 15 months.

Also in the 1930's and 40's Arnold Gesell made significant contributions to the field by systematically observing infants and children and generalizing on the nature of motor development as well as behavior in general. He was also one of the first to emphasize the importance of movement skills as indicators of social and emotional growth in the young infant. Gesell (1946) felt that there was a sequential order inherent in the structuring of child behavior. He wrote of an overall trend toward a higher level of maturity despite a developmental course which is uneven, zig-zags and sometimes spirals backwards. He also observed that developmental trends tend to repeat themselves at ascending levels of organization. Drawing upon his biological background Gesell noted that physical development proceeded simultaneously in a head to foot direction and from the center of the body to its periphery. Furthermore, he pointed out that motor development is characterized by increases in functional complexity.

As discussed by Gallahue (1976) in a review of biologically-oriented research on motor development, changes in the direction of increased complexity have been generally attributed to processes of differentiation
and integration. Differentiation is associated with the gradual progression from gross, global movement patterns of infants to the more refined and functional movements of children as they mature. Integration refers to bringing various opposing muscle and sensory systems into coordinated interaction with one another.

While research on motor development flourished in the 1930's and 40's it was largely ignored for the next three decades. During this period, however, Mittelman (1954) gathered observations from his analytic practice and his work with children. He believed that motility was an urge or drive in its own right, and cited as evidence the repetitive movements of children, the driven-like manner in which they engaged in movements which seem to serve no other visible purpose aside from the experience of movement. These behaviors were especially evident in the ten month to four or five year period, according to Mittelman. He described a natural sequence consisting of restlessness, leading to activity, leading to satisfaction and relaxation, and hypothesized that if motor activity is blocked, restlessness, anger and anxiety are aroused. Mittelman felt that the motor urge was strongest during the first five years, and this coincided with the period of most rapid development of motor skills. He felt that it was during this period that motor actions were the primary avenues for the functions of mastery, integration, reality testing and control of impulses. While motor effectiveness was seen to increase with age, the motor urge was believed to decline after the age of five or six. After this age the child's motor activity shows a greater tendency to be goal-directed or periodic, expressing itself in the form of games or excursions. Mittelman speaks
of the transition from non-adaptive into adaptive behavior as dependent upon both the maturation of neuromuscular patterns and learning. It is Mittelman's view that actions become controlled first as a result of conflict with the parents and of pain and anxiety resulting from motor mishap. Later these control processes are internalized.

In brief, it can be said that the literature reviewed has accounted for developmental changes in motoric action with biological-maturational and cultural-social explanations. Until recently, research and experimental studies of motor development were concerned only with the acquisition of skills during the first few years of life, neglecting the fact that motor development is a life-long process. While the studies reviewed stop short of fully illuminating the processes underlying behavioral change, the biological concepts of differentiation and integration offer a possible means of understanding changes in motor behavior and need to be studied further.

Quantitative changes in activity and qualitative changes in motor behavior have only recently been studied as separate entities. In the past, the two constructs of motoric activity level and motor inhibition ability have been conceptually linked by those such as Rorschach. Researchers, also, have tended to confound activity level and motor inhibition and have generalized from one to the other. However, findings from a study by Maccoby, Dowley, Hagen and Degerman (1965) investigating the relationship between IQ, activity level and motor inhibition suggest that the ability to inhibit movement be distinguished from general activity level. Similarly, Loo and Wenar (1971) using both observational ratings and objective measures of activity level found this variable to
be unrelated to ability to inhibit motor impulses in a group of nursery school children. The study showed that highly active children are not necessarily poor in motor-inhibition, and provided evidence for four motoric styles; high activity level-high motor inhibition, high activity level-low motor inhibition, low activity level-high motor inhibition, and low activity level-low motor inhibition. In both of the above studies, motor inhibition was directly and positively related to performance on intelligence tests, whereas activity level was not related to test performance.

A study by Brantley (1973) found the correlates of motor control (motor inhibition plus ability to balance) and activity level to differ when using intellective functioning and personal adjustment characteristics as variables. Sex differences were also found among her sample of fourth graders.

In addition a pilot study done by the present author investigating these variables confirmed the absence of a significant relationship between characteristic activity level as rated by teachers, and motor inhibition as measured on an objective task, in a small sample of latency aged children.

Previous failure to differentiate between activity level and motor inhibition variables may in part account for the discrepant findings among researchers relating motoric activity or motor control to other constructs such as motion perception or representation of movement in fantasy. In sum, past research suggests the need to carefully define and differentiate the two variables of motor inhibition ability and activity level in future studies.
Activity Level

As mentioned, the focus in the area of motor development has been on the acquisition of new behavior; the concept of motor output has been relatively neglected. Differences in conceptualizing and measuring activity, and very low levels of reliability between various modes of measurement have produced a body of knowledge which is scattered and disorganized. Recently much attention has been paid to the "hyperactive" child, and attempts have been made to explain extreme levels of activity on physiological and emotional grounds.

Individual differences in motor expression and receptivity were noted early in the 1900's by Pavlov, who classified nervous systems according to the balance of excitation and inhibition. Later, in the 1930's and 1940's, Gessell and Shirley noted variations among babies movement skills, intensity, interest and delight in movement.

In their research, Fries and Woolf (1953) explored the activity level of newborn infants and hypothesized about the influence of activity level on personality development. These authors conceptualized a continuum of five "congenital activity" levels (levels of neuromuscular excitability resulting from hereditary, intrauterine and birth factors) including hypoactive, quiet, moderately active, active and hyperactive. The extreme levels were seen as being more vulnerable to psychopathology than the intermediate levels. According to Fries and Woolf, at any given time the child's "activity pattern" reflects both congenital activity level and the modifying influence of temporary body changes, emotional states and responses to parental attitudes. By tracing clinical cases the authors
speculated that congenital activity level affected parent-child relationships, psychosexual development, the manner in which the child tested reality and achieved mastery over the environment, the use of defense mechanisms and the form of symptoms in psychopathology. The possibility that the quiet infant may be predisposed to the mechanisms of regression, denial and fantasy was raised in one of the several case histories reported on by these authors.

Attention was also called to activity level as an individual difference by the work of Thomas, Chess and Birch (1968). They viewed activity level as a relatively stable, constitutionally determined, temperamental trait, intrinsic to and characteristic of the reactor. These researchers postulated that individuals are born with a characteristic activity level, a component of behavioral style, which is relatively stable but not unchangeable. They felt that activity level like other temperamental traits can undergo a developmental course which can be influenced by a variety of environmental factors.

While activity level is assumed to be a relatively stable trait, it has generally been found to diminish with increasing age after the fifth or sixth year of life (Mittelman, 1954). Studies on sex differences in activity level report inconsistent findings (Maccoby and Jacklin, 1974). Those studies that do report a sex difference find boys to be more active and more vigorous in their behavior than girls. However, these differences may be due to experimental situations, methods of assessing activity level and sex stereotyping by raters. The idea that human activity level might have a genetic component to it has been suggested by a number of workers, including Thomas, et al. (1968). A significant
heritability factor for activity level, comparable to that for intelligence, was found in a study by Willerman (1973). The same author also found a substantial hereditary component for "hyperactivity."

Research on activity level has shown that it is a phenomenon not necessarily correlated with performance on intelligence tests, impulsivity or ability to inhibit movement (Wenar and Loo, 1971). On the other hand Werry (1972) cites findings from clinical populations suggesting that "hyperactivity" is a trait frequently associated with impulsiveness, short attention span, excitability, clumsiness, learning disorders and neurological abnormalities.

Theoretical approaches to explaining activity level have been fragmentary and generally unsubstantiated by neurological findings. Cromwell, Baumeister, and Hawkins (1963) succinctly review some of the major theories relating to activity level and these will be summarized in the following few paragraphs. One very general theory states that activity level is a function of motor neuron firing. An explanation of hyperactivity based on this theory might be that diffuse lesions throughout the brain trigger off abnormal neuronal discharges. Alternatively, localized cortical damage might prevent the functioning of neurones from inhibitory areas. Another major neurological conception having implications for activity level is arousal state. In its resting state, brain activity is characterized by synchronous wave patterns consisting of high amplitude, fast rhythm alpha waves. When a stimulus is introduced this pattern diminishes. Speculations based on this theory include the idea that an inverse relationship exists between the baseline amount of alpha activity and the overt motor activity level.
Both psychoanalytic theory and Hull-Spence learning theory view activity level as a function of general drive. When needs are unsatisfied, the organism's drive-level heightens, leading to restless behavior. Restless behavior diminishes or ceases when needs are filled and satisfaction occurs. In addition, psychoanalytic theory views activity level as a function of anxiety.

A theory of activity level by Strauss, Lehtinen and Kephart is based on an energy reservoir concept and the idea that a covert cycle of events occurs in the brain between the receiving of a stimulus and the acting out of an overt response. It is postulated that a certain amount of energy is normally used up during the cycle. However, in some individuals the energy is not fully used. In these cases when the final overt response occurs the excess energy causes more forceful actions to be emitted. While the idea of excess energy is appealing, this particular theory seems to account for intensity of behavior rather than quantitative differences in activity.

The following two theories accounting for unusually high levels of activity are similar in that they propose that sensorimotor behavior compensates for an inability to utilize visual stimuli and visual associations. Gellner's theory describes a neurological deficit which makes some children unable to interpret and respond meaningfully to visual stimuli. Consequently these children seek out kinesthetic, tactual and proprioceptive stimulus input and in so doing maintain a higher level of activity. Zaporozhets (1957) emphasizes the normal transition in children from motor-touch associations to visual associations as predominant orienting behaviors to the environment. In normal
development visual associations gradually develop so that the child does not have to come in direct contact with objects in order to respond to them. Carrying this theory one step further to explain abnormal behavior, it could be speculated that neurological impairment could hinder or prevent the transition from the motor-touch stage to the visual association stage. In such cases children would continue to rely on motor-touch systems and appear highly active.

The above theories of activity level are interesting but merely speculative. When neurological structures or functions are implicated, physiological findings frequently fail to substantiate them. Also a common weakness in most of these theories is that they do not account for the wide range of activity levels found in the normal population and the stability of activity level over time.

Motor Control: Inhibition of Motor Responses

Motor inhibition, one component of response inhibition, is an ability to delay or withhold a previously learned or preferred motoric response. It is a topic of psychological importance since society expects children, almost as soon as they begin to respond, to learn how to inhibit particular responses. Since response inhibition is such an integral part of behavior it has been given a significant place in several child development theories. While many theorists have addressed the concept of response inhibition there have been relatively few attempts to back up theory with developmental research.

Response inhibition is discussed as a developmental ability which gradually increases from the pre-school years through the latency years
of childhood. In addition to chronological age differences, individual differences have been found among children of the same age (Maccoby et al., 1965; Loo and Wenar, 1971; Costantini, Corsini and Davis, 1973). These studies employed similar measures of inhibition, including a Walk-A-Line Slowly test, designed by Hagen and Degerman. The relationship between motor inhibition and intelligence (Maccoby et al., 1965; Loo and Wenar, 1971), and between motor inhibition and cognitive impulsivity-reflectivity (Costantini and Hoving, 1973; Costantini et al., 1973; Bucky and Gross, 1972) were also investigated. Significant and positive correlations were found between inhibition ability and intelligence, and between inhibition ability and cognitive reflectivity. Most of the studies found in the literature used populations consisting of preschoolers. One exception was the study by Bucky and Gross which showed that motor impulse control increased from age five to fifteen and then leveled off. Another study on latency aged children (Costantini et al., 1973) found an increase up to the age of seven but none between seven and nine. These studies, together, indicate a need for caution in generalizing from one age group to another and a need for replicating research.

A review of the research literature points to the fact that very little attention have been paid to the other component of motor control, that of motor acceleration. Costantini et al. (1973) propose that developmental change and individual differences in motor control be conceptualized more broadly to include motor acceleration as well as inhibition. In their study of 4, 7 and 9 year olds, they found that the ability to accelerate movement was correlated with ability to inhibit
movement, and that both acceleration and inhibition abilities increased developmentally. They concluded that with respect to development of motor behavior, the ability to speed up a response is as significant as the ability to slow down a response. Looking more closely at the developmental differences between inhibition and acceleration, these investigators found that 7 year olds did better than 4 year olds on inhibition, but significant differences in acceleration turned up only between 4 and 9 year olds. On the inhibition task, 9 year olds did not do better than 7 year olds. These differences were interpreted by the authors as meaning that inhibition and acceleration are components of a more generalized ability, but that the tests used for each may be measuring somewhat different abilities. The finding that the correlation for inhibition of movement and age was somewhat higher than that for acceleration and age was accounted for by the possibility that the task for acceleration was not adequate. In their study a six foot walkway was used and the authors speculate it was not long enough to assess acceleration accurately.

From the literature just reviewed, it appears that further research is needed involving the broader aspects of motor control. While motor acceleration has been looked at as one aspect of motor control, tests to assess it which are accurate, comparable to tasks of motor inhibition and applicable to children of differing ages, have yet to be developed and implemented in the research. In pretesting, the present investigator attempted to modify the motor acceleration task used by Costantini et al. (1973) by extending the walkway to fifteen feet, but again acceleration could not be measured accurately and reliably.
Fantasy Concepts and Definitions

The term "fantasy" has been poorly and inconsistently defined in the psychology literature. Psychologists writing about fantasy refer to a variety of divergent behaviors ranging from pathological primary process thinking to the formation of creative, new ideas. Similarly, psychologists referring to a number of different terms such as "perception," "hallucinations," "illusions," "images," "imagination," "symbolic representation," and "fantasy," may all be speaking about the same concept.

Norman Munn (1965) cites several definitions of imagination including, "manipulation of symbols, but manipulation not so highly directive as in reasoning," and "manipulation of images in such a manner as to produce new patterns" [p. 350]. Klinger (1971) conceives of fantasy as "covert ideation other than that required directly to perform present tasks" [p. 9] and Rohwer speaks of imagery as a "reconstitution from memory of an experience - the objects involved and the kinesthetic sensations associated with it" [Cited in: Singer, 1973, p. 31]. Wolff and Levin (1972) address fantasy as "the formation of dynamic mental images." Similarly, Santostefano (1977) views fantasy as "manipulation" of mental images or symbols. The present investigator finds the last two definitions of fantasy most appealing and appropriate for the research at hand.

Perhaps underlying the problems of definition is a basic difference in the conceptualization of the nature of fantasy. Traditional psychoanalytic psychologists looked at fantasy as strictly a drive reducer, or a
cathartic, and attempted to explain its nature on the basis of a deficiency hypothesis (the child fantasizes in the absence of gratification).

More recently there has been a change toward viewing fantasy as a constructive ability rather than as a compensatory defense. For example, Hartmann (1958) suggests that fantasy may not arise only out of frustration or deferred gratification but may serve adaptive functions from the start with its own autonomous energy source. Erikson (1963) conceptualizes imagination not only as a release of tension but also as a constructive coping mechanism (Freyberg, 1973). Similarly, Kris views imagination as regression in the service of the ego — a process which occurs under the control of mature personality structures rather than under the control of more primitive processes (Freyberg, 1973).

Fantasy is viewed primarily as a cognitive ability by psychologists such as Piaget and Singer. Piaget (1962) considered imagery a complex and active process and conceptualized it as "internalized imitation," reduced in scale and only aware of by the subject. Linking fantasy with general intellectual growth, he saw the image as a means by which the child moved beyond concrete thought to operational thought. "Ludic symbolism," or the fantasy play of children, was considered a necessary step in their cognitive development. Piaget emphasized the adaptive aspect of fantasy in that it develops, fixes and retains new abilities. Its compensatory function (its use in improving upon reality and neutralizing fears) was acknowledged but not emphasized. In contrast to Freud, who felt that fantasy develops out of frustration, Piaget felt that fantasy play can only develop and subsequent higher cognitive development can only take place in the relative freedom from anxiety and absence of
grossly unmet needs. Singer (1973) views fantasy as a "constructive and useful cognitive skill." He suggests that the opportunity for regular contact with at least one parent who can serve as a model for imitation and opportunity for some private, unstructured time, are necessary for the development of fantasy.

The significance in viewing fantasy as a cognitive skill rather than from a purely psychoanalytic perspective is that there is the potential for modifying and training of the skill. A study by Freyberg (1973) demonstrated that children with a low predisposition toward imagination and imaginative play can be helped to increase the use of these modalities through exercise and training.

Developmental Course of Fantasy

The developmental course of fantasy has been the topic of many researchers and theorists' work. Erikson (1963) speaks of imagination with regard to play. It is first acted out using the body and objects close at hand. There is a progression from using very small to life-sized objects in imaginative play. The final step, according to Erikson, is to no longer need to execute thoughts overtly with the body or with objects. Covert actions then form the basis for imagination and whole scenes are compressed in space and time.

Piaget (1962) feels that imagery takes a long while to develop from birth and grows out of the child's imitative capacities. It appears in the form of symbolic play at approximately 18 months of age, although there are rudiments of fantasy play beginning at about 12 months. Piaget states that at about 18 months of age the child turns from exercise and
practicing games to symbolic games involving make-believe or role playing. Klinger (1969) hypothesizes that both fantasy in the form of private imagery and make-believe play are in evidence in children from an earlier age than claimed by Piaget. Singer (1973) has observed that by age 3-4 there are indications of imaginary play disposition and that 3 and 4 year olds tend to engage in less make-believe play than 5 year olds. Piaget, Klinger, and Singer, like Erikson, comment upon a decrease in overt manifestations of make-believe play beginning at about age 6 to 7. They believe that as overt imaginative play drops out of the repertory it becomes internalized into the form of "images in the mind," implicit interior monologues, daydreams and fantasies. Singer points out that although there is speculation that overt make-believe play continues in the form of internalized, covert fantasy, there is little evidence of how internalization occurs.

The view that fantasy becomes internalized at about age 7 (the end of the pre-operational period according to Piaget) is supported by the results of two research reports found in the literature. The first, a study by Wolff and Levin (1972) investigated the ability of 5-1/2 and 9-1/2 year olds to generate and use dynamic images. The results of this study suggested that at age 5-1/2 the child's ability is minimal, but that by 9-1/2 the child is capable of forming and using covert dynamic mental imagery. The second study by Levin, McCabe and Bender (1975) using 4 and 7 year olds to investigate the development of visual imagery as an organizing strategy in associative learning, pointed out that 4 year olds (pre-operational children) were unable to make use of visual imagery even when they were allowed to engage in relevant concurrent motor
activity. In this study the visual imagery called for imagining an interaction between two concrete objects, or in other words, imagining an action of one object upon another. The seven year olds, on the other hand, were able to make use of motor imagery. A previous study by Levin is cited as showing that 6 year olds are in a transitional stage for being able to generate imagery of action without the benefit of concurrent motor activity.

As a result of their research Levin, et al. (1975) conclude that the period between 4 and 8 years of age is a transitional period in the development of imagery and its use in a dynamic sense to guide learning and overt behavior.

Another method of studying fantasy and its development has been through the use of movement responses, particularly human movement responses, on the Rorschach. Movement on the Rorschach has been viewed by many as something more and different than a percept or illusion. Furrer (1960), speaking in particular about the human movement response, uses the phrases, "complete projection" and "escape into fantasy" to define the meaning of movement on the Rorschach. He feels that by giving a movement response to an inkblot in which there is no real trace of movement, the individual is filling the inkblot with his own psychic material and performing a creative act [p. 316].

Longitudinal and cross-sectional research (Ames, et al., 1974; Ledwith, 1959) indicates a significant increase with age in the total number and percentage of movement responses on a Rorschach protocol. Ledwith found, for example, that at age 6, 27% of all responses contained movement of some sort; at age 8, 35% involved movement and at age 10, 39%
involved movement. Ames et al. report that human movement responses
generally do not appear before the age of 6, although animal movement
responses appear somewhat earlier. Fox (1956) and Meili-Dworetzsky
(1956) both have attempted to explain the meaning of movement on the
Rorschach, its significance and the reason behind the general increase in
movement with age.

Fox (1956) explains children's increases in Rorschach movement
responses in Piagetian terms. He explains that the "centered" thought of
the very young pre-operational child does not allow him to focus on more
than a single aspect of the blot at one time. The child's concrete
mindedness and his failure to keep several aspects or relations in mind
simultaneously, make it difficult for him to envision motion, an abstract
quality.

Meili-Dworetsky (1956) also found in her developmental studies that
rigidity of primitive mental structures adds to the very young child's
inability to imagine movement on the Rorschach. Contributing to this
rigidity is the absence of Piaget's "reversibility" in the young child's
repertory. However, Meili-Dworetsky's research pointed out that the
capacity to see more than one aspect of an ambiguous figure is a neces­
sary but not sufficient condition for movement production. Influenced
by Gestalt psychology and Piaget's genetic psychology, Meili-Dworetzsky
attributed the development of increased movement responses at least in
part to the process of increasing differentiation, flexibility and
complexity of the mental capacities. She noted that the occurrence of
movement, unlike other Rorschach determinants, does not show a clear
relation to exposure time of the inkblot, and concluded that the
production of movement responses does not merely depend on the amount of delay or the amount of time the subject can attend to details or images of the blot.

Meili-Dworetzsky made a point of differentiating between human and other forms of movement on the Rorschach, saying that human movement is of a higher form. However, she cited the important finding that both human and animal forms of movement tend to increase during the whole of childhood. She attempted to explain why young children, who so readily imitate people and animals in movements and expressions, tend to produce static percepts of humans and creatures on tests like the Rorschach. Her explanation, based on Piagetian principles, involves the nature of representation and its development. The young child's form of representation is characterized by its dependence on action. At 5 years of age the child 'plays' the dog or the father. He 'represents them alive' when he engages in imagination. According to Piaget, it is not until puberty that representation becomes fully independent of action. According to Meili-Dworetzsky, this gradual process is reflected in the gradual increase in movement on the Rorschach.

In a similar way, Santostefano (1977) discusses the transition from one form of representation, or "mode of expression," to another. According to his theory, an individual represents experiences, as well as motives and drives, in action, fantasy and language modalities. The mode which predominates is determined by his or her developmental status at the time. The youngest of children use only action as their mode of expression, but with time they come to rely increasingly on fantasy. Due to mismatches between personal needs, abilities and external demands,
developmental deviations occur and mature individuals continue to rely predominantly on primitive modes such as action, rather than more mature modes such as fantasy or language. Santostefano feels that the Rorschach is an effective method of obtaining samples of fantasies or images. He has recently designed a scale to systematically evaluate movement on the Rorschach as an aid in the study of motility expressed in fantasy, and the relation between fantasied movement and other relevant phenomena.¹ Drawing from the ideas and observations of the psychologists discussed above, it can be said that the period beginning at age 6, or slightly earlier, is one of transition. The many changes which occur in the years immediately following, including the apparent development of dynamic imagery, the diminishing of overt make-believe play, the increase in motor control, the acquisition of concepts such as reversibility and the increase in imaginative responses and movement responses on the Rorschach, makes this period an interesting one to study in terms of the direct relationship between overt movement and fantasied expressions of movement. The following section deals with several theories which attempt to explain such a relationship.

¹Unpublished work, Rorschach Motility Scale, copyright, 1978.
Developmental Theory Relating Motor Behavior to Representational Processes Such as Fantasy, Imagery, Thought and Language

It is generally agreed that self-control undergoes quantitative and qualitative changes from birth to early adulthood. It is weakest during the first few years, reaches a high point between 6 and 9 years of age and is likely to regress with the onset of puberty. With increasing age, behavior is said to become more orderly, organized and precise (Wenar, 1971). As an important component of self-control, motor control is said to follow a similar pattern. Just how these changes in motor control come about is the main focus of many developmental theories. Several theories will briefly be reviewed here and an attempt will be made to highlight aspects of each relevant to the development of motor control.

Freud and the Ego Psychologists

Freud (1911) presented a theory in which he asserted there was a relationship between control of motor activity and developing mental processes. He stated that the newborn infant has no ability to delay motor reactions. It responds immediately with overt motor activity to impulses and internal tensions. Eventually, in the absence of immediate gratification, a mental image or hallucination of the need-satisfying object occurs. While Freud does not explain how the mental image spontaneously occurs, he asserts that it is partially tension-reducing and functions to temporarily hold motor activity in check. Gradually the child learns to employ ideation intentionally and as his environment increasingly calls for restraint of motor discharge, he engages in this mode more frequently. It is out of these early forms of ideation and hallucination, that the process of thought develops.
According to Freud, thought is endowed with qualities which make it possible for the mental apparatus to support increased tension when motor discharge must be delayed. It is seen essentially as an "experimental way of acting" and as a mental process which intervenes between a need and overt motor activity [p. 41]. Thought is actually viewed as an internalized action or an action taking place in an abbreviated form and on a symbolic level. In Freud's view (1923) thinking in pictures comes before thinking in words. The mental capacity to delay and guide motor behavior increases as mental activity becomes more stable and elaborate. What is interesting in Freud's theory is that he not only asserts temporal and functional relationships between mental activity and motor control, but a structural relationship as well. In other words, mental activity resembles motor activity with the exception that it takes place internally or covertly. Similar relationships are proposed by Piaget in his stage theory of development and these will be described shortly.

As was seen above, Freud believed that fantasy emerged from frustration and libidinal conflict. Psychoanalytic ego psychologists after him, such as Erikson, Hartmann (1958) and Rapaport (1967b), disagreed in that they felt fantasy, along with other ego functions, was not specifically linked to libidinal conflict. According to their conceptualization, fantasy arises independently of libidinal conflict. It is seen as one in a set of behavioral-cognitive structures which enables adaptation to the environment through channeling, selectively regulating and controlling expressions of behavior. Ego psychologists are in agreement with Freud on the essential point that increased internalization, including fantasy and thought, bring about better controlled and more reality-
adaptive overt behavior.

Piaget

According to Piaget (1952) the young child spends approximately the first two years of life in a sensorimotor stage during which he acquires skills and adaptations on an overt action level. Throughout most of this stage overt actions are not accompanied by cognitive or conceptual representations of behavior. The child takes delight in action - practicing or exercising simple actions already in his repertory and acquiring new actions in the process. By the end of the sensorimotor stage, the child can spontaneously and deliberately vary his actions. However, for lack of accompanying conceptual representations he is quite limited in his ability to plan ahead. During this action-oriented first stage, the child defines objects by the actions that he performs on them. His action schemata are irreversible, meaning that they take place in their entirety without any alteration in sequence. Action schemata are uncoordinated with other actions and therefore not part of longer range plans of action. Because of the absence of mental representation and the consequences of not being able to plan, the young child's adaptability to his situation is seriously limited (Baldwin, 1967).

The beginnings of imagery occur toward the end of the sensorimotor period and the stage comes to a close when the child becomes "capable of holding objects in his mind," i.e. the permanence of an object becomes independent of manipulating it. The pre-operational stage, immediately following the sensorimotor stage and lasting from approximately two to seven years of age, is characterized by representational, but not yet
conceptual, thinking. During this time the child's internal picture of the world gradually grows. According to Piaget, mental representation begins as internal copies of overt actions. Imagery is viewed by Piaget as a complex active process growing out of overt imitations and taking the form of "internalized imitation," or imitation which is reduced in scale and not observable to others (Berlyne, p. 313). With the increased use of imagery during this stage the child becomes increasingly able to coordinate, plan and guide his actions at will. However he still has difficulty understanding relationships among objects, until approximately age 7, when he enters the stage of concrete operations. He then becomes able to form dynamic mental images involving transformations of objects themselves or systematic changes in their spatial position (Wolff and Levin, 1972). Operational thought, according to Piaget, develops from internalized representations of certain overt actions in much the same way as imagery grew out of imitation years earlier. Also during this stage the child's cognitive structures become organized into interrelated systems enabling him to acquire an understanding of reversibility, relations, classes and numbers and apply this understanding to concrete and practical problems.

Comparing Piaget's and Freud's views on action and fantasy for a moment, we see that in several very basic ways they are similar. For one, actions appear ontogenetically before mental representation in both theories. Secondly, mental representation originates as internalizations or images of overt actions in both theories. Lastly, mental representation enables overt action to become more planful and adaptive to the real world.
Bruner's cognitive theory (1966) proposes three modes or stages by which the child represents his experiences. The actual sequence of stages is similar to that proposed by Piaget and even Freud, though the timing and cause of transitions from stage to stage differ from theorist to theorist. During the enactive stage, the first stage of development, the child's actions are the means by which he comes to know and represent the world about him. By the age of one (which is late for Freud, but early for Piaget), the child is already beginning to accompany his actions with mental representations in the form of pictorial images. The technique of representation through imagery develops gradually until imagery becomes relatively free of overt action. This ability characterizes the second stage - that of ikonic representation. Bruner speculates that particular actions and images separate through a process of constructing spatially organized, atemporal, visual representations. He states that there are probably many factors affecting the gradual loosening of the world of imagery from the child's world of action, but adds that the separation of imagery from action is never complete. From the ikonic stage, the child moves into the period of symbolic representation - a stage which is characterized by a newly developed ability to use language to represent both action and imagery. In contrast to Piaget, who talks only of internal motivating mechanisms, Bruner feels that transitions from stage to stage are affected just as much by external influences as by internal influences.
For Soviet developmental psychologists, as well as Piaget and Bruner, the imagery process is linked in an integral way to overt or covert motor activity. Zaporozhets (1957) discusses three stages of development leading to "voluntary psychically regulated movements." In the first stage motor behavior is regulated by means of external-orienting investigatory activity. Motor-touch associations characterize the child's interaction with and investigation of his situation. During this stage the child must come into direct contact with objects in order to respond to them, and consequently a high level of activity is exhibited. Motor-touch associations serve as a foundation for the formation of visual associations characterizing the second stage of development. Visual associations are more economical for the child, in the sense that he does not have to have direct contact with objects and move from place to place to investigate. They also enable more distant foresight and planning of motor activities. As visual associations develop and become more stable, the child becomes increasingly able to regulate his movements on a higher level. This is later facilitated by connecting earlier forms of associations with words. When this occurs the child no longer has to perceive the situation, nor come into direct contact with objects. Representations in the form of words suffice to orient the child and enable him to plan and control subsequent motor activity.

To Luria (1957), another Soviet developmental psychologist, "voluntary" motor behavior is regarded as that which is initiated and guided by an "intention," "plan" or "image," which includes verbal components.
According to Luria, motor behavior is eventually controlled by a verbal plan which imparts a motor plan with a feedback system linking the two plans. While he speaks of the guiding role of images, his developmental sequence involving acquisition of voluntary motor behavior focuses primarily on the role of speech, elaborating on what Zaporozhets called stage three. In his theory, Luria (1957; 1964) proposes several stages in which speech, labeled the second signal system, gradually becomes internalized and directive of the child's own motor behavior. In the early stages of development, speech is only a means of communication with others. Only later does it become a means by which the child organizes his own action. In stage one, the speech of others plays an impellent or initiating function. The child responds with a voluntary action to a verbal instruction, but is unable to alter or inhibit it. In stage 2 (beginning at approximately age 3) the child's own overt speech assumes some degree of regulating functions, helping him control behavior at times and hindering him at others. At this stage his action is regulated by the motor impulsive aspect of speaking words rather than by the semantic aspect of his speech. By stage 3, the child becomes able to use his own external speech to stabilize his responses and this eliminates the diffuseness and motor impulsiveness of his behavior. This use of speech is established between the ages of 4 and 6, but continues to develop after age 6. In stage 5, there is a shift from external to internal regulating speech of the child. By age 9 - 11 years, speech as a regulating mechanism finally becomes contracted and internalized and is employed in the mastery of new motor tasks and problems. Internal speech
is closely bound up with thought and the child regulates his activity by verbally formulated rules - the "highest self-regulating system" in Luria's scheme (Luria, 1964, p. 620).

Mediatonal Theory

Like the other theories reviewed so far, the mediational theory of human conceptual development asserts that there is a transition beginning in early childhood, from a sensorimotor level of functioning to a level mediated by symbolic representational responses. According to this theory, behavior is controlled in a relatively direct manner by the stimulus environment at the sensorimotor level of development. With development there is an increase in the tendency for human problem solving and behavior in general, to be controlled by symbolic representations or "mediators" which intervene between a stimulus and an overt response. Kendler (1972) hypothesizes that young children are deficient in two different mediational processes. The first type of deficiency, labeled a "production deficiency" refers to a failure of an environmental stimulus event to produce a hypothetical mediator, even though it may be in the repertory of the subject. The second type of deficiency, labeled a "control deficiency," involves the failure of a potential mediator to control behavior. According to Kendler stage one of the child's mediational development is characterized by both types of deficiencies. In the second stage, control deficiencies decline but production deficiencies continue. In the third stage both deficiencies are minimal. Tentative research findings by the author support these hypotheses. In a rather intricately designed developmental study, it was found that
between kindergarten and fourth grade control deficiency declined rapidly, but production deficiency showed relatively little change. After fourth grade, a considerable decline in production deficiency occurred. Thus by fifth grade or age 10, the child is fairly capable of both producing and using internal representational mediators to control his behavior.

**Santostefano's Model of Organizational Modes**

The foundation of Santostefano's model rests upon ego-psychoanalytic, Piagetian and organismic-developmental concepts. Since the contributions of the ego-psychoanalytic and Piagetian theories have already been presented, only Werner's organismic-developmental principles upon which Santostefano's work are based will be reviewed here before going on to a discussion of Santostefano's ideas.

Development was conceptualized by Werner (1957) as proceeding from "a state of relative globality and lack of differentiation, to a state of increasing differentiation, articulation and hierarchic integration" [p. 126]. It was viewed as a process by which the individual gradually differentiates himself from objects in the environment and develops the capacity to employ substitutive means to achieve the same goals and to accept alternative goals as satisfying the same mean. Consequently, the individual is better able to delay and plan action.

With regard to the development and organization of mental functioning, Werner (1963), like Piaget, assumed that mental processes could be classified into several different functions. In his scheme these are hierarchically organized with some processes at higher developmental levels than others. The lower level functions appear earlier and come to dominate the functioning of the individual. Gradually, higher level
functions develop and eventually supercede the lower-level functions. While lower-level functions are subordinated and controlled by higher-level functions, they are never totally replaced but remain potentially available for use in the individual's behavioral repertory. Different level functioning can bring about the same goals and consequently are labeled by Werner, "analogous processes." Applying these principles to cognitive development, the individual goes through stages where first sensorimotor behavior dominates, then perceptual-ideational activity emerges and then finally conceptual-representational activity dominates. While conceptual-representational activity dominates in the mature individual, sensorimotor behavior is never lost and remains potentially available for use under certain situations.

Although Werner proposed that the above principles apply to all behavior, his concepts have been primarily applied to cognitive behavior. Santostefano (1977) extends the above organismic concepts of alternative means and ends, articulation, differentiation, integration, distancing of the self from the environment and delay of behavior, to functions other than cognitive activity, namely to the expression of drives and affect. Santostefano proposes that action, fantasy and language are alternative analogous processes or "alternative modes" for expressing the same drive or affect. Action expressions of a drive involve physical manipulation of a drive satisfying object (a sib might be the drive-satisfying object of a child's aggression). Fantasy expressions involve manipulation of an image or symbol which resembles its referent. The language modality is
characterized by its use of shared symbols or words that bear no physical resemblance to their referents. Fantasy and language are viewed as developmentally more advanced alternatives in the sense that they are more delayed, since contact with the goal object is postponed. The transition from one mode to the next occurs as a result of the individual simultaneously distancing himself from the drive-satisfying goal object and distancing himself from direct physical contact with that object. Santostefano also assumes that each of the behavioral modalities appears in the child's repertory long before it is used as an effective instrument for expressing drives.

According to Santostefano maturational changes also occur within the action, fantasy and language modes. These changes follow a similar course of increased differentiation, articulation and integration so that the child becomes better able to detour, delay, vary, regulate and control his expressions. As more mature modes of expression emerge, develop and come to dominate, earlier modes of expression are subordinated, play less of a role and become increasingly inhibited and controlled (though always potentially available to the mature individual). Thus with the emergence of fantasy as a mode of expressing aggression, action expressions of aggression become less frequent, and are controlled and inhibited to a greater extent. It is assumed that with increased capacity for delay and the availability of multiple expressive modes, the individual becomes better able to meet environmental expectations while satisfying personal needs.

Santostefano (1970) also explains deviant development of motive expression as a result of poor coordination between the environment's
expectations or restrictions and the child's capacity for delay and for constructing mean-ends alternatives. According to his theory, psychopathology develops when a child is forced, prematurely, to pass through lower modes of behavioral expressions, or is prevented, for some reason, from progressing to more advanced modes of expression. In the case of the former, the child functions using higher-level processes, but in ways which are not optimal and not flexible since they do not rest on a firm foundation. In the case of the latter, the child overtly "acts out" on his affects or drives even in situations when such behavior is inappropriate.

Drawing on the similarities between the theories just presented, one finds the common notion that overt manifestations of action and the development of mental representation, in one or another form, are related. All of the theories are based on the premise that the evolution of cognitive processes plays a major role in the acquisition of motor control. They also address the quantitative and qualitative dimensions of activity with their views that the immature individual's behavior is totally action-oriented, direct, immediate and often inappropriate to the situation. The idea that with the development of mental representation and symbolic processes, the child becomes increasingly able to control, delay, guide and modulate his motor actions is also common to these theories. In many of the theories reviewed, development was said to be organized around a series of stages - the first of which is dominated by action-oriented behavior, i.e., sensorimotor, and the following stages increasingly dominated by mental representations and symbolic
processes. Increasing internalization is believed to lead to subordina-
tion of action as the primary form of behavior, or mode of expression,
and to more controlled, socially acceptable and planful behavior. More
ideational activity, higher levels of ideational activity and greater
flexibility in the use of ideational activity, are all said to lead to
greater control of motility.

Research Studies Using Adult Populations Relating Motility in Action and
in Fantasy

With the aim of investigating personality correlates of individuals
tending to give human movement responses to static inkblots, Frank Barron
(1953) constructed a series of 26 inkblots ordered in terms of the
frequency with which they evoked movement responses. With this measure he
divided a sample of 100 high ranking military men into two groups - those
who tended to give movement responses on earlier cards in the series and
thus had lower thresholds for perceiving motility and those who tended to
give movement responses on later cards or no movement responses at all,
and thus had higher thresholds for perceiving motility. Among Barron's
findings from systematic observations, life histories and formal testing
of these men, was that those individuals who had lower movement thresholds
functioned more, but not necessarily better, in the intellectual or
intrapsychic sphere, and that movement threshold was unrelated to measured
intelligence. Applying his findings to Rorschach's original observations,
Barron claimed that his study helped confirm the relationship between the
tendency to perceive movement on the inkblots and the tendency towards
intrapsychic living.

Investigating the relationship between overt motility and motion
percepts, Singer, Meltzoff, and Korchin (1952) attempted to test Werner's
sensoritonic theory more directly in relation to the Rorschach. In their three part study they obtained responses from college-aged and adult subjects before and after a motor inhibition task which consisted of writing a phrase as slowly as possible. It was predicted that a period of motor inhibition would lead to a subsequent increase in the production of movement responses and that there would be a direct relationship between subjects' ability to inhibit motor activity on the writing task and production of human movement responses (M) on the Rorschach. A set of three closely related experiments, differing somewhat in methodology, yielded fairly consistent results which were generally in keeping with the experimental hypotheses. All three experiments yielded significant, positive correlations between the number of movement responses produced and their measure of motor inhibition, thus adding experimental support to Rorschach's original observations. Although their findings in regard to Werner's sensoritonic theory were not conclusive, they were in the direction of an increased production of motility responses following motor inhibition.

Varying their methodology to include inhibition of general motor activity and a contrasting condition of motor hyperactivity, Singer, Meltzoff and Goldman (1952) hypothesized that following a period of inhibition subjects would increase their production of movement responses and following a period of vigorous physical exercise subjects would decrease their production of movement responses. In this study following a control administration of two Rorschach cards, male university students were subjected to a motor inhibition task asking them to begin walking across the room and then "freeze in place" for a period of five minutes.
Immediately following, two more Rorschach cards were administered. Following a brief interval, a hyperactive condition consisting of five minutes of vigorous calisthenics was imposed on the subjects, and immediately after, two more Rorschach cards were administered. In terms of findings relating to motility, a significant increase in movement percepts was noted following the inhibition condition as compared with the control administration or following the hyperactive condition. It was also found that there was a significant increase in non-human movement. In contrast to predictions, a significant decrease in M responses was not found following the vigorous exercise period. Attempting to account for the unexpected findings in regard to the hyperactive condition, the authors state that the subjects' frustration with the task may have affected the results. In discussing their findings, the authors state that results from the inhibition condition lend further support to Werner's hypothesis relating motor inhibition and Rorschach human movement responses. The authors also claim that their data support Rorschach's observations that motor behavior and human movement percepts are inversely related, though this conclusion seems to be somewhat of an overgeneralization given the findings from the hyperactive condition.

In a related study, Singer and Spohn (1954) compared schizophrenic adult males who scored higher on the Rorschach Movement determinant, with another group of schizophrenic males equated for age, IQ, hospitalization, and other Rorschach scores, but who tended to score lower on the Movement determinant. They found that individuals in the high M group elicited
less spontaneous motor activity in a waiting room situation and were better able to inhibit motor activity when requested to write a short phrase "as slowly as possible," than those individuals in the low M group. In the same study, Singer and Spohn investigated the dimension of vigorousness of motility when assessing Rorschach percepts and found that those individuals with active M percepts were behaviorally more inhibited than those with static M percepts and that even within the high M group, the dimension of vigorousness could differentiate those who were overtly more active than others.

In an extension of the above study, Singer and Herman (1954) explored the relationship between overt motility, perception of M's on the Rorschach and the tendency for fantasy in a similar population of adult male schizophrenics. They found that subjects with more M's differed significantly from those with less M's in their ability to delay overt motility (these subjects took longer to write a phrase when instructed to write as slowly as possible), their manifestations of less spontaneous activity during a brief waiting period and their more frequent introduction of characters or incidents not directly represented in TAT stimuli (their measure of subject's general ability to fantasize).

Also with adults, Cooper and Caston (1970) explored the relationship between fantasy motility and motor activity, modifying what they felt were shortcomings in previous methodologies. In their study, when the measure of fantasy was taken during physical exercise, rather than afterwards, a direct, positive relationship between degree of motor activity and motility in fantasy was found. The use of the Holtzman
Inkblot Series enabled these researchers to increase the number of stimuli given to each subject in the various conditions of the study.

To explore the hypothesis that motility in fantasy increases with heightened muscle awareness, rather than inhibited activity, Greenberg and Fisher (1972) conducted a series of studies. They found that at least with women, motility in fantasy increased over a variety of conditions which called attention to muscles in the body. However, with men their hypothesis did not hold up.

The above studies investigating the overt motor activity and motility in fantasy relationship in adults seem to employ two general research strategies. The first strategy involves observing or assessing characteristic activity level or ability to inhibit activity. The second involves manipulating activity level or imposing motor restrictions. Studies using the second strategy have resulted in findings which are variable. In Singer, Meltzoff and Korchin's study (1952) for example, the expected inverse relationship was found between motor inhibition and motility in fantasy. In Singer, Meltzoff and Goldman's study (1952) however, the expected negative correlation did not reach significant levels when vigorous motor activity was imposed. Lastly, in Cooper and Caston's study a direct positive relationship was found between degree of motor activity and motility in fantasy. Perhaps one of the factors contributing to the inconsistent findings using this second strategy is the failure of researchers to take into account the different effects the same experimental motor inhibition or hyperactive condition might have on individuals with characteristically different activity levels or motor inhibition abilities.
Findings of those studies using the first research strategy are more consistent. Using activity level as an inherent tendency and motor inhibition as a stable ability, they provide support for an inverse relationship between overt motility and motility in fantasy in adults. In these studies two aspects of overt motility were investigated - level of activity and ability to inhibit motoric action, and both were found to be related to the tendency to represent motility in fantasy. Thus, it was shown that adults who are rated as less motorically active tend to express more motility in fantasy than those rated high in activity level. In one clinical study it was also shown that motorically inhibited schizophrenics were able to produce more vigorous motility responses than motorically active schizophrenics. Finally it was demonstrated that adults who are better able to inhibit their fine or gross motor actions also tend to represent more motility in fantasy than those less able to inhibit their actions.

Research Studies Using Child Populations Relating Motility in Action and in Fantasy

To provide support for his theory that available "tonic energy" will be released through body movement or alternatively through illusions of motion or spatial displacement, Werner did a series of studies using brain damaged, retarded children who were either hyperactive or "phlegmatic." He found that brain damaged hyperactive children had higher thresholds for stroboscopic and illusory motion perception than did more hypoactive brain damaged, retarded children (1945).

Also using a clinical population, Hurwitz (1954) compared the number of Rorschach M responses of eight to twelve year old boys informally
judged by parents, teachers and therapists to be hyperactive and subactive, and found subactive children had more human movement responses. He also investigated the form of Rorschach responses in general and found that hyperactive subjects gave more vague and unstructured responses than hypoactive subjects. According to the author, these results suggested that hypoactive subjects are developmentally more mature than hyperactive subjects. Hurwitz's study is also noteworthy in that it looked at responses separately by age grouping in addition to the group as a whole and found significant differences between hyper- and hypoactive subjects at each age. The use of a mixed clinical population, however, makes it unwise to generalize these findings to a normal latency aged population.

Using normal children, Riess (unpublished dissertation, NYU, 1957) investigated the behavioral correlates of human movement responses in Rorschach protocols. She divided her population consisting of sixty 6 to 7 year olds into two groups: those who had given one or more human movement responses and those who had given none. Groups were equated for age, sex, IQ and color responsiveness. During a ten minute spontaneous play period in a room with a variety of toys, children were observed and assigned a rating of one to three depending upon the vigorousness of their play. Planfulness and impulsivity of overt behavior were assessed by performance on the Porteus Maze. Her hypothesis, that children giving at least one M response would be less motorically active and more planful in their motor behavior was only partially supported by her observations. In confirmation of her hypothesis she found that
children giving at least one movement response (M) displayed greater "motor restraint" in that they were more likely to remain still, play quietly and choose low activity type toys than children giving no M responses. However, contrary to her expectations, children giving one or more M's did not perform better on the Porteus Maze than children giving no M responses. From this the author concluded they were no more planful and no less impulsive in their hand movements.

Wolfensberger, Miller, Foshee and Cromwell (1962) identified extremes of high and low active high school students with a Foshee ballistograph and compared their Rorschach experience ratios (M/C), a measure which takes into consideration the subject's tendency to perceive motility in fantasy. Their prediction that introtensive individuals, (M>C), would be less active than extratensive individuals, (C>M), was not upheld.

McCully (1961) looked at the relationship between overt activity and representations of motility in fantasy by using preadolescent boys suffering from a progressive muscular loss. While these boys did not produce more M responses than would be expected given their age, McCully concluded that these boys on the average produced more M responses than would be expected given their regressed and immature emotional level.

By accepting Rorschach's assumption that the tendency to produce movement responses when looking at inkblots is indicative of a tendency toward inner living or a reliance on imagination, research studies on behavioral correlates of children predisposed to fantasy, also become relevant to this review. In several of the studies found in the child literature, investigators have looked at motoric differences between
children with high and low predispositions to fantasy play. While fantasy or "make-believe" play is similar to internalized fantasy in that it involves the use and manipulation of mental images, it differs in that it is accompanied by overt action. Because of its reliance on action, fantasy play is said to be at a developmentally lower level than internalized fantasy (Piaget). Therefore research on one should be viewed as relevant to, but not necessarily equivalent to, research on the other.

In one such study of fantasy play, Jerome Singer (1973) used an interview approach to assign children to high and low predispositions-to-fantasy groups and then evaluated their motoric behavior during an enforced waiting period. His interview was based primarily on four simple questions, including, "What is your favorite game?", "What do you like to do best when you are all alone?", "Do you ever have pictures in your head?" and "Do you have a make-believe friend?". Each of the child's four responses was scored as to whether or not it reflected the child's engagement in symbolic play. Children who gave one or no responses indicative of fantasy play were put into a low-fantasy predisposition group and those who gave two or more responses were assigned to a high fantasy-predisposition group. Forty children between the ages of six and nine were used. The age range was selected because of frequent reports in the literature that internalization of fantasy play as thought and imagery begins in this age range. Groups did not differ significantly in terms of age and sex and general intelligence level, although intelligence scores were available only for half the sample. A measure of motor control and capacity for delay was acquired by having each child cooperate in a waiting situation asking him to remain quietly sitting or
standing in one spot without changing positions for as long as possible. The task was introduced to each child by saying that they were part of a study investigating suitable types of people for future space travel. Results of Singer's study indicated that high-fantasy children were able to remain seated or standing quietly for significantly longer time periods than low-fantasy children. Those who were able to delay longest before giving up reported afterwards that they had helped pass the time by pretending to be flying or "playing a rocket game." The author also observed that these children gave subtle physical clues of some type of fantasy play such as eye rolling and muttering, during the wait. According to the author, these findings not only substantiate a reciprocal action-fantasy relationship, but suggest that children who tend to engage in fantasy use it as a means of delaying action and deferring gratification.

Pulaski (1973) also screened and assigned children to groups of high and low predisposition to fantasy. However, she based her assignments on several criteria, including the child's threshold to perceiving movement on the Barron Inkblot Series, a structured interview pertaining to the child's fantasy play and a draw-a-picture tell-a-story task. Her population of 64 children from kindergarten through second grade was divided into two groups with each group containing an even number of girls and boys. The children were then observed individually in a play situation with both highly and minimally structured play materials. Motility was one of the several variables assessed through observation. A Motility Rating Scale was designed to evaluate the combination of activity level, speed and vigor of movement, postural and gestural freedom with a score
of one indicating dreamy, apathetic behavior and a score of five indicating "hyperactive behavior" such as jumping, yelling and throwing toys. Contrary to the author's expectations, the high fantasy children did not receive lower ratings for motility than low fantasy children. While there did not seem to be a significant difference in motility between high and low fantasy children as a group, when boys and girls were looked at separately, it was found that low fantasy boys showed greater motility than high fantasy boys and greater motility than low or high fantasy girls. While boys in general played at a higher level of motility than girls, within the high fantasy group there was little difference between the sexes with regard to motility. These findings suggest an interactive effect of sex with predisposition to fantasy and motility.

Most of the child studies reviewed were concerned with the aspect of motility usually referred to as activity level, though in at least one study this was discussed as "motor restraint". Only two studies (Riess and Singer) investigated the aspect of motility usually labeled as motor inhibition or motor control. Riess was the only investigator to look at both activity level and motor control, or what she referred to as "planfulness", in the same study. Activity level was usually assessed through observations of amount and vigor of activity in much the same way as the adult studies. Motor inhibition or control was assessed by counting the number of minutes a child could sit still or evaluating his accuracy and motor impulsiveness on an objective motor task.

Of the five studies looking at activity level (Werner, Hurwitz, Riess, Wolfensberger et al., and Pulaski) three provided findings which substantiated the reciprocal action-fantasy relationship and two did not.
Two of the three studies which did provide support were conducted on clinical populations. While any of a number of factors in methodology, including clinical vs. nonclinical populations, could be responsible for the discrepancy in findings, it is possible that differences in population age groups could account for the lack of consistency. To explore the possibility let us review the findings by age group. The youngest group studied ranged from five to seven years of age and data from this age group did not substantiate the expected inverse action-fantasy relationship (Pulaski). In the second sample the age range was from six to seven years and the mean age of approximately 6-1/2 was higher than in the first sample. In this second study (Riess), a reciprocal relationship was found. In Hurwitz's study a group of eight to twelve year olds again substantiated the expected relationship. However, when adolescents were used in Wolfensberger's study, motility in fantasy and activity level were not related. Thus when group age-means are used, it seems that only after the age of six is the reciprocal relationship, consistently found in adult studies, established in children. In adolescence however, the relationship may not hold. According to adult studies, the reciprocal relationship re-establishes itself by college-age. Since none of the studies found in the literature compared the action-fantasy relationship across age groups in a normal population, it is purely speculative at this point to say that age may have been responsible for the inconsistent findings. (It is interesting to note, however, that the age of six is considered a turning point in many developmental theories.)
As mentioned, two of the child studies reviewed (Riess, Singer) relate fantasy to the aspect of overt motility referred to in the literature as motor inhibition. The findings of these two studies are contradictory. Again there are several differences in methodology which could account for the lack of consistent findings. To begin with, Singer looked at fantasy play predisposition assessed through interview questions, and Riess looked at human movement responses on the Rorschach as her measure of fantasy. While the literature on fantasy relates these two measures they are not said to be equivalent independent variables. Furthermore, Singer's study evaluated ability to inhibit gross motor activity by asking children to sit still as long as possible, while Riess's study evaluated "planfulness" of fine motor activity with the use of the Porteus Maze. As with the studies investigating activity level, these two studies differed in the mean age of their samples. The Riess study, which did not substantiate the reciprocal fantasy-motor relationship when it came to motor inhibition, used children with a mean age of approximately six and a half years. It can be assumed that the mean age of Singer's population, with children ranging from six to nine years old, was somewhat higher, and this study indeed substantiated the reciprocal relationship. It may be speculated from the above, that prior to the age of six and a half years, the inverse action-fantasy relationship has not yet been firmly established, but that the relationship becomes established at a time shortly after that. It may also be speculated that fantasy or the ability to represent motility in mental imagery begins to exert an influence on both activity level and ability to inhibit motoric action by that age. Findings from Riess's study,
which investigated both activity level and ability to inhibit motoric action in the same age group, suggest that these two variables are distinct and may be related to, or influenced by fantasy at different ages.

The present study was conducted with the intention of investigating the inter-relatedness of the cognitive ability to represent movement in the fantasy mode and the two aspects of motor behavior, motor control ability and activity level. Normal children from two latency age groups, grades one and five, were chosen for study since developmental status was believed to be an influence on such a relationship. These age groups, in particular, were selected because past research suggests that the period between the sixth and tenth years is one of transition; a period in which significant changes are occurring in the child's ability to represent experience in the fantasy mode and in the child's ability to utilize mental representation to influence his behavior. Fantasy representations of motility were studied using a series of twenty Holtzman inkblots. Identification and evaluation of fantasied motility with respect to vigorousness and differentiation were accomplished using a motility rating scale developed by Santostefano. Children in the study were assessed for intelligence level, characteristic activity level, and ability to regulate motor tempo.

The hypotheses listed below are based on the assumption that motility undergoes certain transformations with development and observations that individuals who are developmentally less mature express more motility in overt action and are less able to regulate their motility than individuals
who are developmentally more mature. They are also based on theory that suggests motility is first expressed predominantly in the action mode and then predominantly in the fantasy and language modes. Following from the above, one would expect to find that children who are more active or less able to regulate their motor activity would express less motility in fantasy than children who are less active or more able to regulate their motor activity. Furthermore, if one assumes that with development comes increased differentiation within modes of expression, one would expect that children who are very active or less able to regulate their overt motility would give fewer differentiated motility responses in fantasy than low active children of the same age. Taking into consideration norms which indicate that total movement responses to inkblots increase with age, and that girls produce more human movement responses than boys, one might conclude that girls are more advanced than boys in their use of the fantasy modality. Therefore one would expect girls to give more differentiated motility responses than boys. The norms also indicate that the vigorousness of motility responses to the inkblots does not significantly increase or decrease with age, and that boys and girls tend to give responses employing the same level of vigorousness. For this reason, and despite the fact that one clinical study reported an inverse relationship between fantasied vigorousness and vigorousness of overt behavior, vigorousness is hypothesized to be a dimension which is not developmentally significant. It is therefore expected that the vigorousness of fantasied motility responses will not differ between high and low active children, and children with greater or lesser motor control, age groups or sexes.
Hypotheses

I. The number of motility units given to the Holtzman will be inversely correlated with the activity level of latency aged children.

II. The number of motility units given to the Holtzman will be positively correlated with the ability of children to control their overt motor behavior.

III. The degree of differentiation of motility responses will be inversely correlated with the activity level of children.

IV. The degree of differentiation of motility responses will be positively correlated with children's ability to control their overt motor behavior.

V. The level of vigorousness implied in fantasied motility units will not be significantly correlated with the activity level of children.

VI. The level of vigorousness implied in fantasied motility units will not be significantly correlated with motor control ability.
III. METHOD

Subjects

Proposals for the present research were sent to public school systems and private schools in the surrounding areas of Boston, Baltimore and Washington and to several school systems in northern New Jersey. Two private schools, one in Annapolis, Maryland and one in Fair Lawn, New Jersey, agreed to participate in the project. The children in both schools were typically from middle to upper middle class, suburban homes. The populations differed in that the children from the Annapolis school were from a slightly higher socio-economic class and the schools differed in that the Fair Lawn school was parochial, its classes were more traditional and more highly structured.

First and fifth grade teachers were interested in the project and eager to cooperate when contacted by the principals of both of the schools. Seven teachers in all participated in the study: two first grade teachers from each of the Fair Lawn and Annapolis schools; one fifth grade teacher from the Fair Lawn school; and two teachers from the Annapolis school who jointly taught the fifth grade.

Letters of informed consent explaining the nature and purpose of the study, the test procedures involved and the time required of their children were sent to parents of all first and fifth grade students in the two schools. Parents were told that at any point they could withdraw their child from participation in the research. Approximately eighty
percent of the parents agreed to let their children participate. Of those who did not give their consent, some expressed reservations because of the amount of time the testing required. In the Annapolis first grade class, however, every child was given permission to participate. The research procedure was explained to each child and without exception every child was willing and eager to participate in all parts of the procedure.

The population studied consisted of 79 children, 40 from the first grade and 39 from the fifth grade. Thirty eight of the children were boys and 41 of the children were girls. Results of the California Short Form of the Mental Maturity Scale established that only one child (fifth grade boy) in the group was below the average range of intelligence. Eliminating this child's scores from the study, there remained a total of 78 subjects in the sample: 40 in the first grade, and 38 in the fifth grade. There was a total of 38 boys and 40 girls. The final distribution of boys and girls by grade was as follows:

First Grade: 21 boys
          19 girls

Fifth Grade: 17 boys
              21 girls

As a whole the sample studied was above average in intelligence. The mean IQ score of the first grade sample was 123 (standard deviation of 14.5); that of the fifth grade was 116 (standard deviation of 9.2). The difference in means was significant at the .05 level (t=2.6). Looking at IQ by sex, we see that boys and girls were equivalent in terms of intelligence level. The mean IQ of the boys as a group was 120 (standard deviation of 12) and the mean IQ of the girls as a group was 118 (standard
deviation of 13). The mean age of the first graders was 6 years-3 months (standard deviation of 4.5 months) and that of the fifth graders was 10 years-3 months (standard deviation of 5.2 months).

According to teacher's reports, none of the children participating in the study were receiving medication such as "ritalin" which might have affected ability to regulate overt motility or other forms of treatment for hyperactivity. Therefore none of the children needed to be eliminated from the study on this account, and the sample was considered "normal" with respect to activity level.

Materials

The California Short-Form Test of Mental Maturity

The California Short-Form Test of Mental Maturity (1963 Revision) was chosen to establish the intelligence level of each child participating so that the scores of children who were below the average range in ability could be eliminated from the study. This test, which is published by a division of McGraw Hill, is a group test of basic intellectual abilities. It consists of logical reasoning, numerical reasoning, verbal concepts and memory subtests and involves approximately 35-45 minutes of actual test time, depending on grade level. An accompanying manual gives detailed instructions for administration of the test. Multiple choice answers and accompanying scoring sheets facilitate objective and easy scoring by hand. Scoring provided a total IQ for each child.

Motor Control Test

Motor control, which was viewed as the ability to modulate overt motility according to demands of the external environment, was operationally defined in this study as the factor by which a child could
reduce his normal walking tempo when requested to walk as slowly as possible by the examiner.

A motor control test combining elements of the "Walk-A-Line Slowly Test" designed by Hagen and Degerman, and the "Body Tempo Regulation Test" by Santostefano, was chosen as a measure of motor control which was age appropriate and would reflect differential abilities within and between the two age groups. The task used in this study required the child to walk a distance of 15 feet along a straight path, twelve inches wide, designated by strips of tape on the floor. In this brief test the child is directed to walk the distance in his/her normal speed, and then as slow as he/she can. Scores on this test consisted of a number representing the factor by which the child slowed down his regular walking tempo. The results of a pilot study showed that test-retest reliability was significant at the .01 level (r=.52). With the intention of enhancing reliability, actual testing for the research study required the child to repeat each walking tempo twice, so that mean regular and slow scores could be used in determining the child's motor control ability.

2"The Body Tempo Regulation Test" consists of a maze-like path rather than a straight path, and involves an assessment of the child's regular, slow and fast tempos. "The Walk-A-Line Slowly Test" requires the child to walk a straight path in his slowest tempo.
Teacher's Rating Scale of Body Activity Level

A five point rating scale of body activity level was used as a measure of characteristic activity level for the children participating in this study. Ratings of one through five were defined as follows:

Score 5: Children in the class who are most restless and in constant motion.

Score 4: Children in the class who are above average in restlessness and body motion but not among these in the top group.

Score 3: Children who are average in body activity.

Score 2: Children who are lower than average in restlessness and amount of motion.

Score 1: Children in the class who are least restless and whose bodies are usually still.

A form providing simple rating instructions for the classroom teacher, definitions of each of the ratings used, and space for writing the names of participating children was printed and distributed to teachers. Results of a pilot study showed the test-retest reliability of this rating scale to be very high, with r = 1.00.

Holtzman Inkblot Technique

Twenty cards picturing abstract designs and inkblots from the Holtzman Inkblot Technique (Series A) were chosen as stimuli which could evoke expressions of movement in the fantasy mode. The Holtzman was selected over the Rorschach Projective Technique, a series of only ten inkblots, because the former was felt to provide greater opportunity for giving motility responses, and statistically, a more characteristic assessment of a child's tendency toward fantasizing motility. The following cards were chosen because they elicited the most movement responses from a
small sample of children and adults during informal pretesting: 42, 2, 4, 7, 9, 10, 12, 14, 16, 17, 19, 21, 25, 34, 37, 39, 41, 43, 44, 45.
The cards used were both black and white, and in color. Most of the designs were inkblots that are symmetrical in pattern, but some are asymmetrical, abstract designs.

**Procedure**

Testing in each of the classes began at least three weeks into the school year so that teachers were knowledgeable about the activity levels of their students. Children were tested in the following order: the fifth grade class from Fair Lawn, the first grade class from Annapolis, the fifth grade class from Annapolis, and the first grade class from Fair Lawn. Prior to the researcher's visit to the schools, children were informed that someone would be coming to their classroom to learn more about first and fifth graders and how they differed. They were told that they would be asked to play some games and answer some "school-kinds" of questions.

The tests were administered in the following order: the Body Tempo Regulation Test, the Holtzman Inkblots and the California Short-Form Mental Maturity Scale. The first two were administered on an individual basis, and the last on a group basis, by class. As suggested in the test manual, first graders were administered the intelligence test in smaller groups, consisting of half the class. It was decided to administer the individual tests before the group tests because it was believed that interaction on a one-to-one basis would help to establish rapport and assure cooperation throughout the remainder of the study. The decision to administer the Motor Control Test first was based upon the notion that
children would be especially receptive to the game-like nature of the task. Individual testing took approximately 35 minutes per child and intelligence testing took approximately one hour per group.

When the researcher arrived to begin testing she was introduced by name to the class as a whole. The children were told that if they were given permission by their parents to help out in the project that they would be going one at a time into another room for a little while to play some games with the experimenter. It was also explained that the experimenter would be coming back another day to do some more things with the children helping out on the project. The classroom teachers then assisted by sending children one at a time to a room down the hall where the experimenter was waiting. Each child was then individually explained that the experimenter was there to do some things with him/her in order to learn more about first/fifth graders. He/she was told that today we would be playing two games. He/she was told that most children think these games are fun to do. The child was reassured that he/she would be told all about the game before he/she was asked to do it, and that if there was any part of the game he/she did not want to do, he/she did not have to do it.

Each individual session began with the experimenter asking the child his/her name, age and birthday (ages and birthdates were later confirmed by school records) and a question or two about his/her favorite classroom subject in order to establish some degree of rapport.

The Motor Control Test

The first task, the Motor Control Test, was introduced as follows:

The first game we're going to play today is the walking game.
In this game what I want you to do is walk along this path from here to there in two different ways: first in your regular speed, and then as slow as you can. I'm going to ask you to do it both of these ways two times, and I'm going to use this watch to see how long each of the times takes.

The experimenter then showed the child where to stand, took a seat at the end of the walkway and proceeded with the following instructions.

First, I want you to walk in your regular, medium speed. When I say go, walk from here to the end of the path in your regular speed. O.K., go. (Child walks). That was fine. Now let's do it once more, again in your regular speed. (Child repeats). Now I want you to walk from here to the end of the path as slow as you can. When I say go, go as slow as you can, but don't stop in the middle, keep going until the end of the path. Go. (Child walks, then is asked to repeat in slow tempo. Child repeats).

Using a stop watch, the examiner recorded the number of seconds taken for each trial. The two scores for both the normal and slow trials were averaged so that two scores were obtained for each child: a mean normal score and a mean slow score.

All of the children participating in the study found this task to be enjoyable. Both first and fifth graders expressed comments such as "it was fun," and "it was easy". Most of the children showed an interest in the stop watch and were allowed to examine it following the task.
Holtzman Inkblot Technique

Following the Motor Control Test the child was asked to sit beside the experimenter at a table. The Holtzman Inkblots were introduced as follows:

This is a game of imagination that I thought you might like to play. What I want you to do is to look at some designs that I'm going to show you, and to say what one thing each design looks like or one thing it reminds you of. There are no right or wrong answers because this is an imagination game and these pictures remind different children of different things.

Each child was then presented with the twenty cards, one at a time, in a standard order. The free association and the standard inquiry were both conducted with the card in front of the child. The first card was presented with the following instructions:

Now here is the first design. Tell me one thing it looks like or what it reminds you of. (Regardless of the child's response he was reassured that his answer was fine.)

Similar instructions were given for each card. Following the child's association the following standard inquiry was given. What made that look like a ________? Can you show me where you saw that? Can you tell me anything else about that ________? The child's response to each of the twenty cards was recorded verbatim in writing. As stated above, only one response per card was requested so that all children would have a standard number of responses which could contain movement. If a child gave more than one response per card, this was recorded but not scored for research purposes. Response latency was unobtrusively
recorded by means of a stop watch. If a child asked about the timing, he/she was told that the researcher wanted to know if first and fifth graders differed in the amount of time it took to think of something for the different cards. None of the children seemed threatened by the task or the use of the stopwatch. All seemed to be able to concentrate on the series of twenty cards and seemed to enjoy the task. At the conclusion of the Holtzman Inkblot procedure the child was thanked for his/her help and cooperation on both tasks. He/she was then told that the experimenter would be coming back on another day to ask everyone participating in the project to help again—this time by answering some school-kinds of questions. In order to relieve any anxiety they had about taking a test, older children were reassured that their performance would not affect their school grades.

The California Short-Form Test of Mental Maturity

As stated previously, this test was administered on a group basis: the fifth graders received the test in groups consisting of all participating children in the class (approximately twenty children in a group) and the first graders received the test in groups consisting of half the class (ten children in each group), as suggested in the test manual. The test was introduced to the groups as one with "school kinds of questions." The children were told that in this part of the project they would be asked to listen carefully, and answer questions about arithmetic, vocabulary words and a story they would be read. They were reminded to do their best, but not to worry about getting every question right. Test booklets, pencils and erasers were then distributed to all of the children participating in the study. Fifth graders also received answer sheets
on which to mark their answers and the appropriate instructions for marking them. The standard instructions from the test manual were read to the children as a group. Additional instructions for proceeding with the test were given to the first graders as needed, in accordance with the test manual.

**Activity Level Rating Scale**

Rating scales were distributed to each of the teachers participating in the study. Teachers were instructed to assign a score of 1, 2, 3, 4 or 5 to each child in the class participating in the study depending upon his/her characteristic activity level. Levels of activity were defined so that teachers could evenly distribute scores of one through five among the class. For example, a score of one meant the child was among those in the top fifth of the class who were "most still" and "least restless". According to the directions given, a class of twenty children would thus contain four children with scores of 5, four children with scores of 4, four children with scores of 3, four children with scores of 2, and four children with scores of 1. In classes that were not evenly divisible into five groups, the teachers were individually instructed to assign scores as evenly as possible.

Teachers were also asked to indicate on the form any child who was receiving medication or any other treatment for hyperactivity.

Completed forms were then returned to the experimenter. Only one teacher expressed having difficulty with the scale, saying that she did her best but had some trouble assigning scores to a few of the children in the group.
Scoring and Analysis of Data

Motor Control Test

The factor by which a child was able to modulate his tempo was calculated by dividing the mean number of seconds it took him to walk the designated distance in his slow tempo by the mean number of seconds it took him to walk the distance in his regular tempo. Mean motor control scores and standard deviations are reported for the total sample, for first and for fifth graders, for boys and for girls, and for sexes within each grade in Table 1. First graders received a mean motor control score of 2.9, with a standard deviation of 1.8, and fifth graders received a mean motor control score of 3.4, with a standard deviation of 2.3. A t-test was performed and showed no significant difference between first and fifth graders in motor control (t=1.123, p<.20, df=76). These results seemed to stand in contradiction to previous findings and it was therefore felt important to explore the role of IQ, a factor which has been found by Loo and Wenar (1971) to correlate with motor inhibition. An analysis of covariance indicated that when the difference between first and fifth graders' IQ was taken into account (first graders had a higher mean IQ than fifth graders; t=2.63 p<.025, df=76) fifth graders showed significantly greater motor control (F=2.10, p<.15, df=1,76).

Girls received a mean motor control score of 3.1 with a standard deviation of 1.9, and boys received a mean motor control score of 3.2 with a standard deviation of 2.2 (see Table 1). A t-test was performed and showed no significant difference between boys' and girls' motor control scores (t=.178, p<.05, df=76).
### TABLE 1

**Motor Control Test Scores:**
Mean Scores and Standard Deviations (s.d.) by Grade and Sex

<table>
<thead>
<tr>
<th></th>
<th>1st Grade mean (s.d.)</th>
<th>5th Grade mean (s.d.)</th>
<th>Total mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>3.1 (2.0)</td>
<td>3.1 (1.8)</td>
<td>3.1 (1.9)</td>
</tr>
<tr>
<td>Boys</td>
<td>2.7 (1.6)</td>
<td>3.8 (2.8)</td>
<td>3.2 (2.2)</td>
</tr>
<tr>
<td>Total</td>
<td>2.9 (1.8)</td>
<td>3.4 (2.3)</td>
<td>Total sample: 2.7 (2.0)</td>
</tr>
</tbody>
</table>
Activity Level Rating Scale

The scaled scoring resulted in a total of 16 children receiving a score of 1, 15 children receiving a score of 2, 16 children receiving a score of 3, 15 children receiving a score of 4, and 16 children receiving a score of 5. The distribution of scores by grade, by sex and by sex within grade can be found in Table 2.

The mean activity level score received by boys as a group was 3.4 and the mean activity level score received by girls as a group was 2.6. The distribution of scores by sex can be found in Table 2. A Chi-Squared test showed that the distribution of boys' scores differed significantly from that of girls' scores ($\chi^2 = 17.66, p < .005, df = 4$). Furthermore a t-test indicated that the mean activity level scores of boys and girls differed significantly ($t = 2.77, p < .01 df = 76$). Looking at scores of boys and girls by grade it was found that first grade boys received a mean activity level score of 3.4, with scores ranging from 1 to 5. The mean activity level score of first grade girls was 2.4 with scores ranging from 1 to 4. Fifth grade boys received a mean activity level score of 3.5, and fifth grade girls received a mean score of 2.7. The scores of both fifth grade boys and girls ranged from 1 to 5. Means and standard deviations are summarized for the sample as a whole, by grade, by sex and by sex within grades in Tables 3, 4, 5, and 6.

A Pearson Product Moment Correlation indicated that for the group as a whole, activity level ratings were not significantly correlated with motor control test scores ($r = -0.106, t = .929, p < .35$). These results support the conclusion of Maccoby et al. (1965) that the ability to inhibit motor impulses needs to be distinguished from general activity
TABLE 2

Distribution of Scores on Activity Level Rating Scale by Grade and Sex
(Increasing scores indicate increasing activity level)

<table>
<thead>
<tr>
<th>Score</th>
<th>Boys Frequency</th>
<th>Girls Score</th>
<th>Girls Frequency</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grade 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>7</td>
<td>5</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Grade 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>38</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td></td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
level. They also are in agreement with Wenar and Loo's findings (1971) that motor inhibition is unrelated to observational ratings and objective measures of activity level.

**Holtzman Inkblot Technique and the Rorschach Motility Scale**

Motility on the Holtzman Inkblot Technique was identified and assessed by means of the Rorschach Motility Scale, developed by Santostefano, and presently in preparation for publication. According to Santostefano, the scale was devised to "aid in the study of motility expressed in fantasy and the relation between fantasied movement and other relevant phenomena and issues." The scale provides detailed instructions for identifying fantasied motility units. A motility unit is defined as a statement of movement of any form or intensity contained within the response to the inkblot. Using this system, each response to the inkblot could contain none, one or more than one motility units. For example, the response, "a horse running, lifting his legs up high and kicking up dirt", would contain three motility units. Each motility unit was counted and the total number of motility units given on a protocol was recorded for each subject.

The present study also utilized one of the six subscales of the Rorschach Motility Scale which evaluate various aspects of motility responses. This subscale, referred to as "Levels of Motility," was used to assess the level of vigor represented by a particular motion contained in a unit. A six point scale is provided which conceptualizes movement in a continuum of vigor, from motility that is extremely vigorous (Level 1) to motility that is extremely attenuated and subdued (Level 6).
Detailed guidelines for assigning levels of vigor are provided by sets of action verbs, referred to as "pointer verbs", (action verbs whose level of vigor does not depend on the context) and "context-relevant verbs", (action verbs which represent one level of vigor in one context and a very different level of vigor in another). The following are examples of pointer and context-relevant verbs at each of the six levels. These are presented from the Rorschach Motility Scale to illustrate the type of scoring involved in assessing level of vigorousness.

Level 1 - Pointer verb: exploding  
Context-relevant: charging (bull)

Level 2 - Pointer verb: dancing  
Context-relevant: riding (motorcycle)

Level 3 - Pointer verb: grabbing  
Context-relevant: tearing (something light)

Level 4 - Pointer verb: crawling  
Context-relevant: carrying (book)

Level 5 - Pointer verb: eating  
Context-relevant: sucking (milk from a straw)

Level 6 - Pointer verb: smiling  
Context-relevant: holding (someone's hand)

After assigning a level of vigorousness to each motility unit, the mean level of vigorousness was calculated for each protocol. In the past, trained raters have shown agreement in independent scoring with this scale that ranges from 80% to 95%.

Santostefano's system makes a distinction between simple "motility units" and "multiple motility units." A response which contains one distinct form of movement is considered a simple motility unit and a response which integrates and differentiates two or more distinct forms of movement
In one image is defined as a multiple motility unit. In the present research multiple motility units were relabeled "differentiated motility responses". This change in terminology was made to reflect the nature of the response which contained differentiated movement integrated into a single image. The number of differentiated responses on a protocol was totaled. This number reflected the distribution of motility units, i.e., whether motility units were given individually or in integrated clusters, with a high number of differentiated responses indicating a tendency to give many responses containing clusters of motility units. As called for in Santostefano's scoring system, each of the motility units given in a differentiated response was scored separately for vigorousness "to capture the degree of differentiation of motility contained by the image."

Since motility units were scored by the same individual (the researcher) who earlier administered and scored the motor tasks, all Holtzman protocols were coded so that the identity, grade and sex of the child were not known at the time of scoring. Prior experience with the Rorschach Motility Scale enabled the researcher to identify and assess motility expressions with little difficulty.

The means and standard deviations for the fantasy variables explored (number of motility units, degree of differentiation and level of vigorousness) are given for the sample as a whole, by grade, by sex and by both grade and sex in Tables 3, 4, 5, and 6.

The present researcher views "differentiated motility responses" and "multiple motility responses" as reflecting differentiated expressions of motility in much the same way as $W_1$, $W_2$, $W_3$, etc. reflect a continuum of global to differentiated whole percepts in Ames, et al. (1974).
<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Age (months)</td>
<td>98.9</td>
<td>24.6</td>
</tr>
<tr>
<td>Mean IQ</td>
<td>119.6</td>
<td>12.7</td>
</tr>
<tr>
<td>Activity Level Rating</td>
<td>3.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Motor Control Score</td>
<td>3.1</td>
<td>2.0</td>
</tr>
<tr>
<td>Number of Fantasied Motility Units</td>
<td>11.2</td>
<td>6.1</td>
</tr>
<tr>
<td>Number of Differentiated Motility Responses</td>
<td>2.3</td>
<td>2.2</td>
</tr>
<tr>
<td>Differentiated Motility Responses (Normalized)</td>
<td>.168</td>
<td>.120</td>
</tr>
<tr>
<td>Level of Vigorousness</td>
<td>3.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Response Latency (seconds)</td>
<td>10.5</td>
<td>8.5</td>
</tr>
</tbody>
</table>
### TABLE 4

Statistical Description of Data:
Mean Scores and Standard Deviations (s.d.) by Grade

<table>
<thead>
<tr>
<th>Grade</th>
<th>Mean</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 1 (n=40)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (months)</td>
<td>75.6</td>
<td>4.5</td>
</tr>
<tr>
<td>IQ</td>
<td>123.2</td>
<td>14.6</td>
</tr>
<tr>
<td>Activity Level Rating</td>
<td>3.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Motor Control Score</td>
<td>2.9</td>
<td>1.8</td>
</tr>
<tr>
<td>Number of Fantasied Motility Units</td>
<td>8.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Number of Differentiated Motility Responses</td>
<td>1.6</td>
<td>1.5</td>
</tr>
<tr>
<td>Differentiated Motility Responses (Normalized)</td>
<td>0.14</td>
<td>0.13</td>
</tr>
<tr>
<td>Vigorousness Level</td>
<td>3.6</td>
<td>0.9</td>
</tr>
<tr>
<td>Response Latency (seconds)</td>
<td>7.2</td>
<td>6.3</td>
</tr>
<tr>
<td><strong>Grade 5 (n=38)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (months)</td>
<td>123.5</td>
<td>5.2</td>
</tr>
<tr>
<td>IQ</td>
<td>115.8</td>
<td>9.2</td>
</tr>
<tr>
<td>Activity Level Rating</td>
<td>3.1</td>
<td>1.5</td>
</tr>
<tr>
<td>Motor Control Score</td>
<td>3.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Number of Fantasied Motility Units</td>
<td>13.8</td>
<td>6.3</td>
</tr>
<tr>
<td>Number of Differentiated Motility Responses</td>
<td>3.1</td>
<td>2.6</td>
</tr>
<tr>
<td>Differentiated Motility Responses (Normalized)</td>
<td>0.19</td>
<td>0.11</td>
</tr>
<tr>
<td>Vigorousness Level</td>
<td>3.8</td>
<td>0.7</td>
</tr>
<tr>
<td>Response Latency (seconds)</td>
<td>14.0</td>
<td>9.1</td>
</tr>
</tbody>
</table>
## TABLE 5

**Statistical Description of Data:**
Mean Scores and Standard Deviations (s.d.) by Sex

<table>
<thead>
<tr>
<th>Sex</th>
<th></th>
<th>Mean</th>
<th>s.d.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls (n=40)</td>
<td>Age (months)</td>
<td>100.1</td>
<td>23.6</td>
</tr>
<tr>
<td></td>
<td>IQ</td>
<td>118.8</td>
<td>13.4</td>
</tr>
<tr>
<td></td>
<td>Activity Level Rating</td>
<td>2.6</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td>Motor Control Score</td>
<td>3.1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>Number of Fantasied Motility Units</td>
<td>11.7</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>Number of Differentiated Motility Responses</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Differentiated Motility Responses (Normalized)</td>
<td>0.18</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Vigorousness Level</td>
<td>3.8</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Response Latency (seconds)</td>
<td>9.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Boys (n=38)</td>
<td>Age (months)</td>
<td>97.7</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>IQ</td>
<td>120.4</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>Activity Level Rating</td>
<td>3.4</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Motor Control Score</td>
<td>3.2</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Number of Fantasied Motility Units</td>
<td>10.7</td>
<td>6.9</td>
</tr>
<tr>
<td></td>
<td>Number of Differentiated Motility Responses</td>
<td>2.3</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>Differentiated Motility Responses (Normalized)</td>
<td>0.16</td>
<td>0.13</td>
</tr>
<tr>
<td></td>
<td>Vigorousness Level</td>
<td>3.5</td>
<td>0.8</td>
</tr>
<tr>
<td></td>
<td>Response Latency (seconds)</td>
<td>12.0</td>
<td>10.2</td>
</tr>
</tbody>
</table>
TABLE 6
Statistical Description of Data:
Mean Scores and Standard Deviations (s.d.) by Grade and Sex

<table>
<thead>
<tr>
<th>Group</th>
<th>Girls Mean (s.d.)</th>
<th>Boys Mean (s.d.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Grade 1</td>
</tr>
<tr>
<td>Sample Size</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Age (months)</td>
<td>76.1 (4.9)</td>
<td>75.2 (4.3)</td>
</tr>
<tr>
<td>IQ</td>
<td>123.2 (15.5)</td>
<td>123.2 (14.1)</td>
</tr>
<tr>
<td>Activity Level Rating</td>
<td>2.4 (1.1)</td>
<td>3.4 (1.5)</td>
</tr>
<tr>
<td>Motor Control Score</td>
<td>3.1 (2.0)</td>
<td>2.7 (1.6)</td>
</tr>
<tr>
<td>Number of Fantasied Motility Units</td>
<td>9.4 (4.6)</td>
<td>8.2 (4.7)</td>
</tr>
<tr>
<td>Number of Differentiated Motility Responses</td>
<td>1.7 (1.5)</td>
<td>1.5 (1.6)</td>
</tr>
<tr>
<td>Differentiated Motility Responses (Normalized)</td>
<td>0.15 (0.12)</td>
<td>0.13 (0.13)</td>
</tr>
<tr>
<td>Vigorousness Level</td>
<td>3.8 (0.9)</td>
<td>3.5 (0.9)</td>
</tr>
<tr>
<td>Response Latency (seconds)</td>
<td>6.8 (5.4)</td>
<td>7.5 (7.2)</td>
</tr>
</tbody>
</table>
IV. RESULTS

The six formal hypotheses of this study were all in the form of correlations. Each hypothesis was tested by means of a simple Pearson Product Moment Correlation, whose significance was assessed with a $t$-statistic. The first four hypotheses were stated as correlations in a predicted direction. The significance of these were assessed with a one-tailed test, while the remainder of the correlations were assessed with two-tailed tests. In addition, several of the hypotheses were tested by a second method which involved calculating partial correlation coefficients between the two relevant variables with intelligence level partialed out. The second method was used because of previous findings that intelligence level correlates with children's inhibition ability, the number of human movement responses and the number of differentiated responses given on projective tests such as the Rorschach and Holtzman.

In addition to the testing of formal hypotheses I through VI, a number of other relationships were examined. These are referred to as exploratory hypotheses in the text of this section, and represent for the most part attempts to replicate previous findings with respect to age and sex differences. Mean differences between age groups and between the sexes for each of the three fantasy variables were assessed by $t$-tests (see Table 9). In addition, analyses of covariance were performed when the interaction effects of IQ on age and sex differences were explored.
Furthermore, because of findings that ability to control motor behavior (inhibition ability) is correlated with cognitive reflectivity (Costantini et al., 1973; Buck and Gross, 1972) the present study attempted to explore the possibility that the production of motility responses to the Holtzman is predominantly a function of the child's ability to attend and reflect on a card before responding. With this purpose in mind the number of seconds it took each child to respond to each of the twenty Holtzman cards was recorded at the time of test administration and a mean response latency was calculated for each child. The mean response latencies for the sample as a whole, by grade, by sex and by grade and sex are reported in Tables 3, 4, 5, and 6. T-tests were performed to assess differences between the mean scores of first and fifth graders and differences between boys and girls. The response latency for fifth graders was significantly greater than that for first graders ($t=3.803, p<.001, df=76$). The response latency of boys was greater than that of girls ($t=1.504, df=76$), but the difference was significant only at the 0.15 level (using a two-tailed test). A Pearson Product Moment Correlation involving the variables number of fantasied motility units and motor control was then computed partialling out response latency. Pearson Product Moment Correlations were also used to examine the relationships between response latency to the inkblots and the two variables, number of motility units and degree of differentiation. These calculations were necessary to explore the possibility that the number of motility units and degree of differentiation were dependent merely on the time spent arriving at the response, rather than on the overt variable of motor control.
Lastly, in a preliminary analysis of the dimension of differentiation, the existence of a very close correlation between number of motility responses and number of differentiated motility responses was found. An attempt was made by the investigator to explore the influence of differentiation independently of the frequency of motility responses by looking at the ratio of differentiated motility responses to motility units. This ratio is hereafter referred to as normalized differentiation. Normalized differentiation for the sample as a whole, by grade, by sex and by grade and sex is reported in Tables 3, 4, 5, and 6.

Significance throughout this study refers to a .05 significance level, using a one-tailed test. Exceptions to this were the use of two-tailed tests to determine the significance of correlations between response latency to the inkblots and the two fantasy variables, number of motility responses and degree of differentiation, and the use of two-tailed tests to explore the relationship of vigorousness of fantasied motility responses to age, sex and overt motility.

Table 7 presents the results of the formal Hypotheses I and II, Table 8 presents the results of formal Hypotheses III-VI and Table 9 presents the results of the exploratory hypotheses investigated in the study.

**Formal Hypotheses**

**HYPOTHESIS I** The number of motility units given to the Holtzman will be inversely correlated with the activity level of latency aged children.
This hypothesis was not confirmed in that a significant correlation was not found in either direction, either before or after the partialing out of intelligence.

**HYPOTHESIS II** The number of motility units given to the Holtzman will be positively correlated with the ability of children to control their overt motor behavior.

This hypothesis was confirmed both before and after intelligence was partialled out. It was also confirmed in a correlation after response latency to the inkblots was partialled out. This last calculation eliminated the possibility that the number of motility units was significantly influenced by the rate of responding, rather than by the inhibition ability of the child. Furthermore, a correlation of response latency and number of motility units showed the two variables not to be significantly related.

**Hypothesis III** The degree of differentiation of motility responses will be inversely correlated with the activity level of children.

This hypothesis was not confirmed. A significant correlation was not found between the two variables in either the predicted direction or the opposite direction. This absence of a significant correlation held true both before and after intelligence level was partialled out. It also held true using either the number of differentiated motility responses or normalized differentiation.

**HYPOTHESIS IV** The degree of differentiation of motility responses will be positively correlated with children's ability to control their overt motor behavior.

This hypothesis was confirmed both before and after intelligence was partialled out. It was also confirmed using either method of calculating
the degree of differentiation.

A correlation performed between degree of differentiation and response latency to the inkblots indicated that the two variables were not significantly related.

**HYPOTHESIS V** The level of vigorousness implied in fantasied motility units will not be significantly correlated with the activity level of children.

This hypothesis was confirmed by the data.

**HYPOTHESIS VI** The level of vigorousness implied in fantasied motility units will not be significantly correlated with motor control.

The findings of this study confirmed the above hypothesis.

**Exploratory Hypotheses Relating to Number of Motility Units:**

A. Older children will produce more numerous motility units on the Holtzman than younger children.

A one-tailed t-test confirmed that the mean number of motility units given to the Holtzman by fifth graders was significantly higher than the mean number given by first graders ($t=3.97$, $p<.001$).

An analysis of covariance was performed to investigate the role of IQ on the relationship between age and number of motility units. The results indicated that correcting for IQ did not change the significance of the relationship ($F=17.2$, $p < .05$, $df=1,76$).

B. Girls will produce more motility units on the Holtzman than boys.

When the mean number of motility units given by girls and boys was compared using a one-tailed t-test, no significant difference was found at the .05 level ($t=.766$). Thus the data did not confirm this hypothesis.
Exploratory Hypotheses Relating to the Degree of Differentiation of Fantasied Motility Responses:

A. The Holtzman motility responses of older children will be more differentiated than the responses of younger children.

As determined by a one-tailed t-test, the mean number of differentiated responses given by fifth graders was significantly greater than that of first graders (t=3.094, p<.005). An analysis of covariance was performed to investigate the role of IQ on the relationship between degree of differentiation and age. The results indicated that correcting for IQ did not change the significance of the relationship (F=10.1, p<.05, df=1,76).

B. Girls will produce more differentiated motility responses than boys on the Holtzman.

The results of a one-tailed t-test did not support this hypothesis. Using a .05 level of significance, the mean number of differentiated responses was not found to differ between boys and girls (t=.066).

Exploratory Hypotheses Relating to the Level of Vigorousness of Fantasied Motility Units:

A. Older children will not differ from younger children in the vigorousness of their motility units on the Holtzman.

This expectation, based on Ames's norms (1974), was upheld by the data. A two-tailed t-test, using a .05 level of significance, indicated that the mean level of vigorousness did not differ between first and fifth graders (t=.768).

B. Boys and girls will not differ significantly in the vigorousness implied in their motility units.

This hypothesis was supported by the data. The difference between the mean level of vigorousness of boys and girls was not significant using a two-tailed t-test and a .05 level of significance (t=1.59).
TABLE 7  Statistical Analyses of Formal Hypotheses I and II Involving the Variables Number of Fantasied Motility Units (# F. Mot. Units), Activity Level (Act. Lev.), Motor Control (Mot. Cont.)

<table>
<thead>
<tr>
<th>Hyp.</th>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Sample</th>
<th>N</th>
<th>Partialled Out</th>
<th>d.f.</th>
<th>r</th>
<th>t</th>
<th>p^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>#F. Mot. Units</td>
<td>Act. Lev.</td>
<td>Total</td>
<td>78</td>
<td></td>
<td>76</td>
<td>.042</td>
<td>.366</td>
<td>---</td>
</tr>
<tr>
<td>I</td>
<td>#F. Mot. Units</td>
<td>Act. Lev.</td>
<td>Total</td>
<td>78</td>
<td>I. Q.</td>
<td>75</td>
<td>.039</td>
<td>.341</td>
<td>---</td>
</tr>
<tr>
<td>I</td>
<td>#F. Mot. Units</td>
<td>Act. Lev.</td>
<td>1st gr.</td>
<td>40</td>
<td></td>
<td>38</td>
<td>-.026</td>
<td>-.158</td>
<td>---</td>
</tr>
<tr>
<td>I</td>
<td>#F. Mot. Units</td>
<td>Act. Lev.</td>
<td>5th gr.</td>
<td>38</td>
<td></td>
<td>36</td>
<td>.070</td>
<td>.422</td>
<td>---</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>Total</td>
<td>78</td>
<td></td>
<td>76</td>
<td>.368</td>
<td>3.401</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>Total</td>
<td>78</td>
<td>I. Q.</td>
<td>75</td>
<td>.363</td>
<td>3.425</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>Total</td>
<td>78</td>
<td>Resp. Latency</td>
<td>75</td>
<td>.374</td>
<td>3.489</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>1st gr.</td>
<td>40</td>
<td></td>
<td>38</td>
<td>.388</td>
<td>2.598</td>
<td>p&lt;.01</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>5th gr.</td>
<td>38</td>
<td></td>
<td>36</td>
<td>.317</td>
<td>2.003</td>
<td>p&lt;.025</td>
</tr>
<tr>
<td>II</td>
<td>#F. Mot. Units</td>
<td>Mot. Cont.</td>
<td>Girls</td>
<td>40</td>
<td></td>
<td>38</td>
<td>.307</td>
<td>1.992</td>
<td>p&lt;.01</td>
</tr>
</tbody>
</table>

^aSignificance level indicated when p<.05.
TABLE 8  Statistical Analyses of Formal Hypotheses III - VI Involving the Variables Differentiation of Fantasied Motility Responses (Diff. F-Mot.), Activity Level (Act. Lev.), Motor Control (Mot. Cont.) and Vigorousness of Fantasied Motility Units (Vig. F-Mot.)

<table>
<thead>
<tr>
<th>Hyp.</th>
<th>Variable 1</th>
<th>Variable 2</th>
<th>Sample</th>
<th>N</th>
<th>Partialled Out</th>
<th>d.f.</th>
<th>r</th>
<th>t</th>
<th>p^a</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td># Diff. F-Mot.</td>
<td>Mot. Cont.</td>
<td>Total</td>
<td>78</td>
<td>---</td>
<td>76</td>
<td>.260</td>
<td>2.344</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>IV</td>
<td># Diff F-Mot.</td>
<td>Mot Cont.</td>
<td>Total</td>
<td>78</td>
<td>I. Q.</td>
<td>75</td>
<td>.264</td>
<td>2.373</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>V</td>
<td>Vig. F-Mot.</td>
<td>Act. Lev.</td>
<td>Total</td>
<td>78</td>
<td>---</td>
<td>76</td>
<td>-.031</td>
<td>-.269b</td>
<td>---</td>
</tr>
<tr>
<td>VI</td>
<td>Vig. F-Mot.</td>
<td>Mot. Cont.</td>
<td>Total</td>
<td>78</td>
<td>---</td>
<td>76</td>
<td>.061</td>
<td>.530b</td>
<td>---</td>
</tr>
</tbody>
</table>

^aSignificance level indicted when p<.05.

^btwo-tailed test of significance was used
### TABLE 9 T-Test Values for Fantasied Motility Variables by Grade and by Sex

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group 1</th>
<th>Group 2</th>
<th>df</th>
<th>$X_1$</th>
<th>$X_2$</th>
<th>$S_1$</th>
<th>$S_2$</th>
<th>$\sigma$</th>
<th>$t$</th>
<th>$p^a$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motility Units</td>
<td>First</td>
<td>Fifth</td>
<td>76</td>
<td>8.75</td>
<td>13.79</td>
<td>4.67</td>
<td>6.32</td>
<td>5.61</td>
<td>3.97</td>
<td>p&lt;.001</td>
</tr>
<tr>
<td>Motility Units</td>
<td>Boys</td>
<td>Girls</td>
<td>76</td>
<td>11.73</td>
<td>10.66</td>
<td>5.14</td>
<td>6.92</td>
<td>6.15</td>
<td>.766</td>
<td>---</td>
</tr>
<tr>
<td># Diff. F-Mot.</td>
<td>First</td>
<td>Fifth</td>
<td>76</td>
<td>1.60</td>
<td>3.11</td>
<td>1.55</td>
<td>2.59</td>
<td>2.15</td>
<td>3.09</td>
<td>---</td>
</tr>
<tr>
<td># Diff. F-Mot.</td>
<td>Boys</td>
<td>Girls</td>
<td>76</td>
<td>2.35</td>
<td>2.32</td>
<td>1.76</td>
<td>2.67</td>
<td>2.28</td>
<td>.066</td>
<td>p&lt;.005</td>
</tr>
<tr>
<td>Norm. Diff. F-Mot.</td>
<td>First</td>
<td>Fifth</td>
<td>76</td>
<td>.14</td>
<td>.19</td>
<td>.13</td>
<td>.11</td>
<td>.122</td>
<td>1.81</td>
<td>p&lt;.05</td>
</tr>
<tr>
<td>Vigorousness</td>
<td>First</td>
<td>Fifth</td>
<td>76</td>
<td>3.63</td>
<td>3.78</td>
<td>0.913</td>
<td>0.746</td>
<td>.847</td>
<td>.768</td>
<td>---</td>
</tr>
<tr>
<td>Vigorousness</td>
<td>Boys</td>
<td>Girls</td>
<td>76</td>
<td>3.85</td>
<td>3.55</td>
<td>0.801</td>
<td>0.847</td>
<td>.835</td>
<td>1.59</td>
<td>---</td>
</tr>
</tbody>
</table>

$^a$Significance level indicated when $p<.05$. 
V. DISCUSSION

In the following Discussion Section, quantitative and qualitative dimensions of motility in fantasy will be discussed. Preliminary findings with respect to age and sex differences within each of these dimensions will be presented prior to a discussion of the formal hypotheses involving the overt motility variables of activity level and motor control.

A Quantitative Analysis of Motility in the Fantasy Mode: the Number of Motility Units.

Preliminary Findings:

As reported in the Results Section, fifth graders gave considerably more motility units on the Holtzman than first graders. The significance was not altered when IQ was taken into account. These findings are consistent with previously established norms (Ames, et al., 1974). If one were to extend Santostefano's model to the data, one might say that older children tended to express more motility in the fantasy mode than younger children, and that their tendency to give more motility units reflected a greater availability of fantasy as a modality for expressing motility.

Previous studies have found girls to give more human movement (M) responses than boys (Ledwith, 1959). Since this Rorschach determinant is said to reflect a general tendency toward fantasy, it was informally hypothesized at the start of this paper that girls would be more advanced
in their use of fantasy to express motility. However, this was not the case. In the present study the total number of fantasied motility units (human, animal and inanimate) did not differ significantly between boys and girls in the sample as a whole, and within each of the first and fifth grade samples. As will be discussed later, boys and girls motility responses also did not significantly differ along the dimensions of differentiation or vigorousness. The first finding might be interpreted as meaning that the fantasy modality is equally available for the expression of motility to boys and girls at a given age in the developmental period under investigation. The norms which indicate that girls give more human movement responses than boys but not significantly more motility responses in general, might suggest that there is something about the combined human and movement qualities of the response, rather than just the motility quality of the response, in which they are more mature or advanced.

One might also speculate that girls may be more advanced in their general development of the fantasy mode (higher number of M responses than boys) but not in their use of fantasy to express motility (no significant difference in overall number of motility units and no significant differences in degree of differentiation of responses or level of vigorousness of motility units). An explanation for this might come from one of the several assumptions underlying Santostefano's model of organizational modes. It is understood in Santostefano's model that organizational modes are present before they actually become available for expression of motives, drives and affect. According to this assumption, fantasy would be available to children before it
would function as an alternative for action expressions of motives, such as aggression. If one were to extend this model to the expression of motility, it might be reasonable to interpret the findings of previous research as indicating that fantasy becomes available to girls earlier in their development than to boys and is perhaps more highly developed in some dimensions, but that this study suggests that by the age of 6 fantasy is already functioning in motility expression to the same extent for both sexes.

**Hypothesis I**

Contrary to expectations, the results of this study relating to Hypothesis I indicate an insignificant correlation between the characteristic activity level of normal children and the number of fantasied motility units given by them to the Holtzman. The partialling out of intelligence did not alter the findings, thus adding confirmation to previous studies which failed to find a significant relationship between activity level and intelligence (Loo and Wenar, 1971).

The findings relating to Hypothesis I stand in contradiction to the sensori-tonic theory proposed by Werner which implied the tendency to perceive movement is related in an inverse fashion to the amount of overt movement actually exhibited. Werner's construct of a fixed amount of energy which must be released through one of two alternate channels was also not supported by these findings. Similarly, these results do not support Rorschach's observations in so far as he found an inverse relationship between the tendency to give kinesthetic responses to inkblot stimuli and the degree of general motility overtly manifested
by subjects. Rorschach, like many after him, seemed to confound general activity level with ability to inhibit physical activity. Findings from this study and others, (Maccoby et al., 1965, Loo and Wenar, 1971) have shown that activity level and inhibition ability are variables which are not necessarily related. In the discussion of motor control, to follow, it will be seen that Rorschach's observations regarding inhibition were confirmed by the present research.

Furthermore, the findings relating to Hypothesis I do not support the applicability of Santostefano's theory of organizational modes to the expression of motility in so far as his theory says that higher forms of expression come to dominate or subordinate more direct forms of expression. As applied to the expression of motility, this theory would suggest that as fantasy expressions of motility became readily available, i.e. movement units on the Holtzman, overt expressions of motility, i.e. activity level, would decrease. This was not the case.

The lack of a significant correlation between activity level and number of fantasied motility units was found at both first and fifth grade levels, suggesting that such a relationship does not exist in normal children during the latency period, even if such a relationship exists in adulthood or in clinical populations, as found in previous studies. It was speculated at the beginning of this research that discrepant findings in the literature may have been due to population age differences among children, but the data does not support such an argument.

The finding that at a given age in latency a child's activity level is not significantly influenced by his cognitive ability to
represent movement in imagery, poses questions with regard to the
fixedness of activity level as a constitutional, individual temperamental
trait and the influence of neurological, environmental and emotional
factors on the quantitative output of motor activity. While the
methodology of this study does not test the fairly established notion
that activity level decreases with age, it may be hypothesized that if
activity level does decrease it is due to factors other than the tendency
to express action via the fantasy mode.

Hypothesis II

In confirmation of Hypothesis II, a significant positive correlation
was found between ability to regulate overt motility and the number of
fantasied motility units given on the Holtzman. Since previous research
has shown intelligence to be related to motor inhibition ability, the
influence of intelligence was partialled out. Even after the partialing
out of IQ the correlation was significant. Furthermore, the partialing
out of response latency did not alter the significance of the results.
Additional Pearson Product Moment Correlations confirmed that for the
group as a whole the number of motility units given to the projective
test was not related to the time the child spent arriving at a response.
In fact, if one looks at the correlation by grade, just the opposite
of what would be expected was found in the first grade: children with
shorter response latencies gave more motility units. This might suggest
that the first graders who had greater facility with the fantasy modality
responded sooner and with more motility units.

The results of Hypothesis II lend support to several developmental
theories and lend validity to certain of Rorschach's notions. To begin
with, the confirmation of this hypothesis supports the psychoanalytic position that internalization of actions on a symbolic level leads to increasing capability to delay, guide and inhibit overt behavior. Freud spoke mainly with regard to the use of fantasy as a means of coping with drives and internal tensions. To cite an early example, internal representation of the mother's breast enables the infant to wait for his feeding without being overwhelmed with tension. If one were to consider motility as a drive in itself as Mitelman does, the results could easily be interpreted in light of Freud's thinking: the internal representation of movement enabled the delay of overt motility by reducing internal tension. Freud's theory would also suggest that the ease with which a child was able to 'conjure up' internal representations of motility influenced his ability to inhibit overt motility. While Freud spoke mainly with regard to the use of fantasy as a means of coping with drives and internal tensions, the ego psychologists stressed the adaptive role of fantasy in meeting demands stemming from the external environment. In support of this position, the results indicated that the children who tended to represent movement in fantasy were best able to meet the demands of the motor control test.

The superior performance on the motor control test of children giving more fantasied motility units also lends support to aspects of Piaget's stage theory. In particular, Piaget states that with increased use of imagery the child becomes increasingly able to coordinate, plan and guide his actions at will. Looking at this correlation by grade (see Table 7), one sees that it is significant at both the first and fifth grade levels. Thus, within the first grade, children who
were better able to regulate their overt motor behavior tended to give more motility units on the Holtzman. Within the fifth grade, the same held true. The fact that first graders were able to represent movement in mental imagery at least to some extent, can be interpreted as an indication that they had entered the stage of concrete operations. The stage of concrete operations would imply some degree of motor control and this was evident in the motor control scores of the first graders. First graders, although less able to regulate their overt motor behavior than fifth graders certainly were able to adapt to the demands of the motor task. As reported in the Procedure section, a t-test showed that the first graders' mean regulation ability was lower than the fifth graders' but only at the 20% level of significance (t=1.123, p < .20, df=76). The observation that fifth graders did somewhat better than first graders in regulating motor behavior and represented movement in imagery more frequently, might be interpreted in Piaget's cognitive theory as a difference in development within a particular stage rather than a difference between stages.

In addition, the results relating to this hypothesis support the application of certain aspects of Santostefano's organizational mode theory to the expression of motility. In particular, Santostefano's theory proposed that when more advanced and indirect modes of expression are readily available, developmentally lower and more direct modes of expression, i.e. action, are more readily controlled. The significant correlation between number of motility units given to the Holtzman and motor control ability clearly supports this notion. As mentioned, the correlation coefficients of the first grade sample and the fifth grade
sample with regard to the above two variables are both significant at the .05 level. These results suggest the applicability of this aspect of Santostefano's theory to the expression of motility across the age period 6 years through 10 years. The results of a comparison of correlation coefficients between first and fifth graders on this relationship supports the notion that an equally strong relationship exists throughout the period of childhood under investigation. A statistical comparison of the two correlation coefficients indicates that they are not significantly different at the .05 level (Z=.347).

On the surface the results relating to Hypotheses I and II present contradictions to the conclusions of Riess (1957), the researcher who related movement on the Rorschach to dimensions of children's overt motility similar to the ones investigated in the present study. To review, she found a significant inverse relationship between "motor restraint" (defined as activity level) and movement on the Rorschach, but an insignificant relationship between motor planfulness (motor control) and movement on the Rorschach. The two studies are not equivalent, however, either in focus or methodology, and the differences are readily apparent. Perhaps most importantly, Riess chose to focus only on human movement responses. By counting only human movement, it can be assumed that much of the motility in her young children's responses was lost. It is generally acknowledged that most of the motility expressed in this age group to inkblot tests is in the form of animal and other non-human forms of movement. Given that M most probably represents abilities in addition to the ability to fantasize motility, findings based solely on M responses would be relevant to, but not
necessarily generalizable to the present study given its goals.

Among other differences in methodology, Riess chose to use the Rorschach, a short series of ten inkblots. As a research instrument the Rorschach may have provided too few stimuli for investigating human movement, or even total movement, in such a young age group. The present investigator's use of 20 Holtzman inkblots was felt to provide greater opportunity for giving motility responses, and statistically, a more characteristic assessment of a child's tendency toward fantasizing motility. Thus, the combined use of the Holtzman and the consideration of all motility units was believed to provide a more accurate assessment of the tendency to express motility in fantasy in a group of young children. Perhaps a further analysis of types of motility, i.e. human, vs animal, vs inanimate, vs imaginary characters, would be useful in shedding more light on the relationship of fantasied motility to overt activity level (Subscale 2 of Santostefano's Motility Rating Scale attempts to explore these different categories).

Lastly, the task assessing "motor planfulness" may have measured a different capability than the motor control task used in this study. The Porteus Maze is a paper and pencil task involving small hand muscle coordination while the adaptation of the "Body Tempo Regulation Test," or "Walk-A-Line Slowly" Test, involved gross motor control. It was felt that for young children the latter task was both more appropriate for their physical development and a more valid measurement of general motor control. Gesell (1946) comments that at age 6, the child is still awkward in performing fine motor tasks such as writing and drawing.
The only other study reviewed which investigated the relationship between motor inhibition and a dimension of fantasy predisposition (fantasy play) was that of Singer (1973). He used a measure of motor inhibition which differed from the present investigator's, but which also involved inhibition of gross motor behavior. As in the present study, a significant positive correlation was found. The results of Singer's study are interesting in conjunction with the findings of the present study. Together these findings suggest that both developmentally early forms of fantasy (fantasy play) and more mature forms of fantasy (internalized fantasy) are related to the ability to inhibit overt motility.

A Qualitative Analysis of Motility in the Fantasy Mode: Differentiation and Vigorousness.

Preliminary Findings: Differentiation

To explore the qualitative dimension of differentiation, children's motility responses were scored as either undifferentiated or differentiated depending upon whether there was one movement articulated in a motility response, i.e., "walking," or more than one movement articulated and integrated in a motility response, i.e., "walking with his arms swinging." As discussed earlier, the degree of differentiation attributed to each child was assessed in two ways; the number of differentiated responses and the ratio of differentiated motility responses to the total number of motility units. With both methods, older children (fifth graders) gave significantly more differentiated motility responses than younger children (first graders). This was true despite the fact that first graders had a higher mean intelligence level.
One might argue that the difference between the articulation of motility responses of first and fifth graders is attributable to a difference of vocabulary levels rather than differences in the use of the fantasy mode. However, it was informally observed from the Holtzman protocols that most of the vocabulary words used in the motility responses of fifth graders could also be found on the protocols of the first graders. Most, if not all of the words used by the fifth graders, were words one would expect to be in the vocabulary of a first grader. Extending Santostefano's model of organizational modes to the data, it can be said that fifth graders are developmentally more advanced than first graders in the qualitative manner in which they use the fantasy mode to express motility.

It was originally expected that girls would be developmentally more advanced than boys in their expression of motility in the fantasy mode, both in their tendency to give motility units and in the degree to which their responses were differentiated. As we stated previously, girls and boys did not differ significantly in the number of motility units given to the Holtzman. Also contrary to expectations boys and girls did not differ significantly either in the number of differentiated motility responses given to the Holtzman, or the degree of normalized differentiation, as shown in Table 9. Considering these findings together, it appears that girls and boys proceed at similar rates in their use and development of the fantasy mode to express motility.

Hypothesis III

Again, contrary to expectations, the quantitative output of motor behavior did not seem to be a predictor of the manner in which motility
was expressed in fantasy. Correlations using both number of differentiated motility responses and degree of normalized differentiation failed to confirm a significant relationship between activity level and motility differentiation in either the predicted or opposite direction. The same correlations by grade and by sex were also insignificant at the .05 level. The partialing out of IQ did not bring about a significant change.

As the reader may recall, organismic theories such as Werner's and Santostefano's suggest that development follows a transition from lack of differentiation to articulation and integration within organizational modes. In the present study differentiation of movement responses was intended to reflect development of motility expressions within the fantasy mode. This being the case, the insignificant correlation suggests that at a given age, activity level is not influenced by the degree to which the fantasy mode has developed. Looking at these conclusions in conjunction with those from Hypothesis I, it can be said that neither the development of a fantasy mode nor development within the fantasy mode, is predictive of the quantitative output of motor activity at a given age. The qualification, "at a given age" is necessary to remind us that the results can only suggest the validity of the above statement between ages because of the methodological limitations of this study, i.e. the use of teacher's ratings to assess activity level. In other words, one cannot conclude from the data that a decrease in activity level with age is not related to the development of the fantasy mode. Ideally, what is needed to confirm
such a statement between ages would be a longitudinal study, or alternatively, a cross-sectional study which employs absolute rather than relative measures of motor output.

Hypothesis IV

It was hypothesized at the onset of this study that the degree of differentiation of motility responses would be positively correlated with children's ability to control their overt motor behavior. As reported in the Results section this hypothesis was confirmed both before and after IQ was partialed out. It was also confirmed using either of the two definitions of degree of differentiation, the number of differentiated motility responses and normalized differentiation. In addition, an insignificant correlation between degree of differentiation and response latency eliminated the possibility that the degree of differentiation was due merely to time spent arriving at a response.

The confirmation of Hypothesis IV lends support to developmental models which propose that greater control of and capacity for delay in lower and more direct modes of expression are achieved as development occurs within higher and more indirect modes of expression. To review, development within modes is said to reflect a transition from lack of differentiation to greater integration and articulation. The data showed that children who were better able to control or delay their overt motor activity tended to give more responses on the Holtzman which reflected detailed articulation of more than one movement integrated into a single image. Just how the ability to represent differentiated movement in mental imagery could influence the control of overt movement
can only be speculated. Perhaps this ability allows the child to superimpose images of two kinds of movement; the first, a standard of movement such as a regular walking tempo or an ongoing movement, and the second, a specified variation from the first movement.

**Preliminary Findings: Vigorousness**

The level of vigor implied in motility units was the second qualitative aspect of fantasied motility which was investigated. In the Procedure Section, the assignment of levels of vigorousness according to Santostefano's motility rating scale was described. To review briefly, a score of 1 through 6 was assigned to each motility unit given on the Holtzman, with level 1 being most vigorous and level 6 least vigorous. A mean level of vigorousness score was arrived at for each child. In confirmation of previous findings (Ames et al., 1974) and the expectations of this researcher the mean vigorousness level of combined motility units (human, animal and inanimate) was not significantly related to the grade of the child. This lends support to this researcher's concept of vigorousness as being a quality of fantasied motility which is not developmental in nature.

Also in confirmation of previous findings there was an insignificant difference at the 5 percent level between boys and girls in terms of the level of vigor implied in their motility units. There was a tendency however for boys to give more vigorous responses than girls ($t=1.59$, $p<.15$). It is likely given the nature of the teacher's rating scale of activity level used in this study, that boys were more vigorous in their overt behavior, as well as more active, than girls.
Together these findings suggest that vigorousness may be a culturally or physiologically determined aspect of behavior.

**Hypotheses V and VI**

As predicted in Hypothesis V, vigorousness of motility units did not correlate significantly with activity level. Had there been a significant correlation or strong tendency for highly active children to produce less vigorous motility units, one might have argued in support of Werner's sensori-tonic or alternate energy channels theory. However, the relationship was extremely weak ($r = .03$) and in the opposite direction from what Werner would have predicted. Hypothesis VI was also confirmed in that level of vigorousness was not significantly related to motor control ability. The relationships between vigorousness of fantasied motility units and the four variables investigated (age, sex, activity level and motor control) all support the notion that vigorousness is a dimension of fantasy which is not developmentally significant.

In summary, it appears, from the findings of this study, that motility is multifaceted and that its expression in the overt behavior of children and in their fantasy reflects this nature. Activity level and motor control were found to be independent dimensions of overt motility and it was shown that their relationships to fantasied expressions of motility differed. Ability to control overt motility was demonstrated to be related to two of the fantasy variables investigated; the number of fantasied motility units given to the Holtzman and the degree to which motility responses were differentiated. On the other
hand, activity level was not correlated with either of these. Neither motor control ability nor activity level was related to the level of vigorousness implied in motility units. The above relationships were consistent for both boys and girls, and for first and fifth grade groups. Although only two age groups were studied it may well be that the above relationships also hold valid for the intervening latency years.

While the present research suggests a relationship between aspects of overt and fantasy expressions of motility, further research is necessary to establish a dependent or cause and effect relationship between the ability to represent motility in the fantasy mode and motor control ability. If such a relationship is substantiated, it may be possible to increase motor control by enhancing the fantasy ability of children through some sort of cognitive training program. In previous research the fantasy play of children has been increased through systematic training involving the modeling of imaginative behaviors (Freyberg, 1963).

Furthermore, the findings of this study have theoretical implications in that they suggest the applicability of particular aspects of Santostefano's developmental model of organizational modes to the development of motility expression. In doing so the research findings also support the psychoanalytic, cognitive and organismic theories upon which Santostefano's model is based. In particular, the notion that certain aspects of motility undergo clearly defined changes with maturation is supported. Both the availability of higher (fantasy)
modes of expression and development (differentiation) within these modes relate to the control of lower (action) modes.

Additional research is also needed to investigate the relationship between overt and fantasied expressions of motility in carefully defined clinical populations of "hyperactive" children. The present study cautions against pooling into one research sample children who are merely very active or vigorous in their motor output with children who are motorically impulsive or unable to inhibit, delay or guide their overt motility. Applying the results of the present study one would expect to find that the latter group tends to represent less motility and less differentiated motility in the fantasy modality than normal children. No such relationship would be expected in the former group of children.
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