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THE MATERNAL MEDIATION OF ATTENTION OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

BY

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ABSTRACT

THE MATERNAL MEDIATION OF ATTENTION OF CHILDREN WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER

BY

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Being able to "pay attention" is recognized to be an ability of the individual. However, some recent work in cognitive development has highlighted the importance of the child's social environment in facilitating the development of individual cognitive abilities. This study examined the attention mediation of mothers of children with attention deficit with hyperactivity disorder (ADHD) and of mothers of normal children. Thirty-four mothers and their sons were placed in a task-setting that placed unusual demands upon the son's ability to control his attention, once with mother present and once with mother absent.

When their mother was present all children were significantly better at maintaining their attention on task. In addition, it was found that regardless of the setting, children with ADHD were significantly less successful at staying on-task and did not accomplish as much as the non-ADHD children. Furthermore, while the ADHD children were less successful across all settings, they were especially limited in their attention control when their mothers were not present.

Few differences were found between the mother-child speech and behavior of the ADHD and non-ADHD groups. The only significant group difference found was the mothers of the independent first, ADHD group scaffolded significantly less often than the other groups.

Fairly strong negative correlations were found on maternal directiveness and child time-on-task and amount of work accomplished when mother was present and when mother was absent. However, a significant positive correlation was found between maternal scaffolding and child time-on-task when mother was present, and scaffolding and the amount of work child accomplished when mother was absent.

Qualitative analyses revealed some important features of the task activity: the meaninglessness of the task for the child, the conflicting goals of mother and child, the authority structure of their relationship, and the mother's affective tone. Attention mediation was found to occur through a variety of forms, including behaviors like pointing, tapping the child, and physically redirecting his gaze; many types of speech; and the use of certain strategies.

Dedicated to my wife, Rebekah.

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INTRODUCTION

Throughout the lifespan the ability to maintain one's attention on something is essential for conducting any purposeful activity. Whether reading a book, fixing a car, speaking with another person, or washing the dishes, one's attention, at least initially, must be directed to the "task-at-hand." And for demanding tasks, one's attention must be directed at the important features of the task, and distractions must be ignored in order for the task to be successfully accomplished.

Broadly speaking, attention encompasses a range of perceptual and cognitive processes from the reception of perceptual inputs like black marks on a page to the conscious decision to reflect on an abstract idea like attention, perhaps in the face of other more attractive objects of reflection. Every moment humans are exposed to an immense array of perceptual and cognitive stimuli. The collection of processes we call attention permits us to analyze a subset of this array through a deeper level of awareness (Glass & Holyoak, 1986), what we commonly call "paying attention to" or "focusing our attention" on something.

Restricting ourselves to cognitive processes, the ability to attend involves a number of important aspects. First, there is the dimension of arousal, a cognitive state

that varies from drowsiness to frantic excitement (Parasuraman, 1985). Secondly, there is alertness, the ability to detect gross changes in the environment (e.g. hearing the telephone ring while watching television) (Glass & Holyoak, 1986). Thirdly, selective attention is the ability of an individual to deliberately single out a certain stimulus or class of stimuli from among a field of other stimuli and, if necessary, to shut out the distracting stimuli (what Cherry, 1953, labeled "the cocktail party effect,") (Neisser, 1976). Fourthly, vigilance is the ability to sustain one's attention at a high level of alertness (Parasuraman, 1985). And lastly, persistence is the temporal dimension of the maintenance of attention over time (Flavell, 1985).

In addition, some researchers have also begun examining the metacognition of attention: how one's arousal, alertness, selectivity, vigilance, and persistence are managed or controlled. Carver & Scheier (1981) have suggested that the process of attention is activated and maintained by higher order thought patterns and so is dependent on the processes of memory and metacognition. They believe that we have a hierarchy of behavioral standards that provide the goal-context within which we act. At the bottom of the hierarchy lie the cognitions that order simple behaviors that are necessary to bring an overall goal to fruition, for example, the muscle tensions required to pick up a pencil. At the top of the hierarchy

are certain scripts and beliefs that work as superordinate goal-schemas that order lower levels on the hierarchy. For example, a "good student" script and the belief that one owes his teacher respect serve as superordinate cognitive goal-structures that encourage attention control and the realization of behaviors that lead to assignment completion. Carver & Scheier theorize that one's plans and goals act as hierarchically ordered organizers that serve to guide our attention.

Kuhl (1985) has attempted to describe many of the motivational and metacognitive sub-processes that make action possible. Kuhl has focused on the process of action control which he defines as the maintenance and enactment of intentions in the face of competing action alternatives. He points out that it is not enough to initiate a course of action in order to achieve some goal. One must also keep oneself on task during the activity until the goal has been achieved. This requires such metacognitive self-regulation strategies as active attentional selectivity, encoding control, emotion control, motivation control, environment control, and parsimony of information-processing. These strategies permit the individual to maintain an activated intention throughout an activity and resist alternative activities. Without such self-regulation we would be unable to stay engaged in any activities that were not thoroughly enjoyable, especially when other more interesting activities

were available.

The theorizing of Carver & Scheier (1981) and Kuhl (1985) points to the meta-attentional processes that may influence such aspects of attention as vigilance, selectivity, and perseverance. A fuller understanding of attention, then, must include both a consideration of the attentional processes themselves as well as the meta-attentional motivation and self-regulation processes that guide and direct attention.

The Development of Attention

Most attention researchers have been primarily concerned with adult attention (Cherry, 1953; Broadbent, 1958; Kahneman, 1973; Lachman, Lachman, & Butterfield, 1979). Much less is known about the development of attention, including how the perceptual, cognitive, and metacognitive processes necessary for attention develop throughout childhood.

Developmental researchers have noted that people are born with little capacity to regulate their own attention (Gibson, 1969; Hagen & Hale, 1973). However, the attentional abilities of infants do possess a discernable structure. The attention of infants is drawn to perceptual stimuli that may be either novel or familiar, depending on the individual's present need for stimulation or comfort (Pick, Frankel, & Hess, 1978). As children grow older their ability to attend to objects, persons, and utterances for

longer periods of time increases (Flavell, 1985).

Some of the most important research on children's attention has examined the increasing ability of the growing child to selectively attend to objects of interest and ignore objects outside that scope (Hagen & Hale, 1973). It also appears that children fairly suddenly develop the ability to ignore irrelevant information around age 10 to 12. Flavell (1985) saw this ability as manifesting greater control over one's attention, and he underscored its importance in the maturation of attention because it enables the child to use her limited attentional resources more effectively.

Flavell (1985) also noted that the attention of children develops in terms of its adaptability. As children mature they become increasingly better at adapting their attention to the exigencies of particular contexts (Lehman, 1972; Hagen & Hale, 1973). Older children are able to more quickly focus on relevant features in the environment. When told what the relevant feature was, older children were more consistently able to direct their attention to that feature (Hagen & Hale, 1973). Furthermore, older children appear to be more strategic with their attention. When studying objects they exhibit greater number of eye movements, more movements along the contour, and greater attention to the object's distinctive features (Zinchenko, van Chzhi-Tsen, & Tarkonov cited in Gibson, 1969). Vurpillot (1968) found

that children under 6 tended to base observational judgements on limited information, whereas children over six tended to adopt systematic scanning strategies. (Vurpillot, 1968).

Thus, developmental researchers on attention have found that children come to maintain their attention on objects for longer periods of time, they become increasingly able to ignore irrelevant information, they use their attention more adaptively and flexibly, and they become more planful and strategic with their attention. However, where do these changes come from?

The Social Dimension of Self-Regulation and Attention

Clearly the development of attention is contingent upon corresponding neurological development and has certain neurological constraints. On the basis of infant observation, it appears that attention requires the neurological capacity to be aroused by stimuli and to habituate to it (Posner, 1975). Later, as children grow, the neurological system must be capable of regulating arousal levels and patterns of habituation in order to remain on task for long periods and in order to resist distractions. Consequently, although the precise neurological processes involved in attention are not clear, we know enough to conclude that the development of the cognitive process of attention can proceed no faster than the maturation of the corresponding structures in the brain

and nervous system (Glass & Holyoak, 1986).

However, there are also reasons to believe that the development of attention may be shaped through the interaction of the individual with his or her social environment. Vygotsky (1978) theorized that all the higher cognitive functions, for example thinking, concept formation, planning, and remembering, are first experienced interpersonally, in social interaction with others. For example, in order to learn how to solve a problem, for example, finding something that has been lost, a young child is exposed to many social experiences in which such problem solving occurs. For example, others in her environment demonstrate problem solving as they look for their misplaced keys. And when the child herself loses something, others may help her by providing strategies, such as, where were you when you last had it? Eventually, the child internalizes the "structures" provided by these interpersonal experiences and learns how to solve such problems on her own. Over time, all the higher cognitive processes experienced with another gradually become internalized and the child comes to think, form concepts, plan, and remember on his or her own.

In at least one paper Vygotsky (1979) explicitly dealt with attention. He suggested that it is rooted in genetically controlled neurological mechanisms beginning with such reflexes as the feeding response, and it continues

to be shaped by the child's early experiences. Vygotsky called this the period of natural or primitive attentional development, and he stated that this development continues throughout life, though with decreasing influence as the child grows older. However, Vygotsky (1979) also hypothesized that shortly after birth another dimension of attention development begins: the "cultural development of attention." He defined this dimension as "the evolution and change in the means for directing and carrying out attentional processes, the mastery of these processes, and their subordination to human control" (p.193). Vygotsky noted that throughout childhood development, the child's attention is often guided and controlled by others. He believed that this mediation of attention by others makes the emergence of self-control of attention possible.

Vygotsky (1978) also distinguished between two developmental levels in children: 1) the 'actual developmental level,' the level of performance of which the child is capable on his or her own; and 2) the more advanced level of performance that the child is capable with the assistance of an adult or more capable peer. Vygotsky termed the distance between the child's actual developmental level and the level of potential development the 'zone of proximal development.' By identifying the 'zone' Vygotsky underscored the importance of the social dimension in the development of cognitive structures and also permitted us to

recognize cognitive structures that were only in the process of being formed. Given Vygotsky's definition, the process of attention should also exist within the zone of proximal development as well, constituting the developmental level within which the child can maintain attention with another but not on his or her own.

Also, influenced by Vygotsky, Wood and his coworkers (Wood & Middleton, 1975; Wood, Bruner, & Ross, 1976) have used the term 'scaffolding' to refer to the support that adults or more capable peers provide that facilitates task mastery within the zone. Wood, Bruner, & Ross (1976) suggest that scaffolding in joint problem-solving activities involves such things as recruiting the child, simplifying the task to make it manageable, motivating and directing activity, isolating those aspects of the present state of the task that differ from the ideal goal state, and controlling frustration. In addition, the term scaffolding implies the gradual withdrawal of the support provided by the more skillful Other. According to these researchers, a scaffolding adult is one who facilitates task engagement and accomplishment, but does so by providing 'just enough' support to promote successful task performance, withdrawing the support whenever possible in order to promote independent task engagement. With regard to attention we might hypothesize that within the zone of proximal development an adult can 'scaffold' attention by providing

just enough support to enable the child to maintain attention, but not so much as to stifle the internalization of self-regulatory attentional structures.

Both of these notions, the zone of proximal development and scaffolding, presume the notion of intersubjectivity. Rogoff (1990) defines intersubjectivity as a "shared understanding based on a common focus of attention and some shared presuppositions that form the ground for communication" (p.71). The Vygotskian approach to cognitive development avoids a strict individualism that regards the child and mother as entirely separate entities. By utilizing the concept of intersubjectivity, this approach emphasizes the shared intentions and meanings that make further communication possible and that provide the ground for independent cognitive activity.

Parent-Child Interactions and Cognitive Development

If Vygotsky's theory is correct, it would add an important piece to the puzzle of how attention develops. It suggests that were we to study the guidance and control of the child's attention by the important Others in the child's social world, we would better understand how the ability to control one's own attention develops. Unfortunately, little research has been done exploring the relation of attentional development and the child's social environment. However, some studies have attempted to trace the relationship between various components of parent-child interactions and

certain cognitive skills that bear on attention.

To begin with, a number of studies have found a relationship between parental interactions and various achievement measures. For example, Freeberg & Payne (1967) found a significant relation between parental willingness to devote time to their children (primarily in playing and talking) and achievement in the preschool child. Also, Radin (1971) found higher achievement is correlated with mothers asking more information of their children in interactions. How much the mother reads to the child has also been found to be positively related to achievement (Laosa, 1982). Obviously the causal direction cannot be established with such studies. However, these results are necessary, if not sufficient, to establish causality and do not rule out the hypothesis that the child's social world helps to shape some of the processes that lead to higher achievement. With regard to attention, it is impossible to tease out its influence in the above outcomes. However, it may be assumed that such outcomes are influenced by the child's attention, along with many other achievement-related cognitive processes. Parents who spend joint activity time with their children, who talk with them, ask them questions, and read to them tend to have children who are able to perform well on achievement measures, performance which requires the ability to attend effectively to the achievement tasks.

A second area of related research concerns parenting style. Parenting style includes the affective tone of the parent-child relationship, the degree of structure provided by the parent through rules and supervision, the nature of the punishment used, and the extent to which the child's independence is fostered (Maccoby & Martin, 1983). Various researchers have discovered a relationship between parenting styles and school achievement and self-control. Anderson & Evans (1976) report that the children in their study who experienced more autonomy in decision making and were given rational discipline in the home had higher school achievement. Baumrind (1973) found that children who were given little or no supervision, or children who experienced a comparatively great deal of parental rigidity and structure had less internal control than did children of "authoritative" parents. Also the children of authoritative parents had comparable or higher levels of achievement in most areas than did the two other groups of children.

In particular, parental control seems to be an important variable in academic performance and self-control. As Baumrind (1973) has suggested, children need an optimal amount of parental structure or control. Thus far the evidence suggests that this control should be primarily indirect unless situational demands require direct guidance, this control should be informative whenever possible, and the child should be given gradually increasing

responsibility within the context of this firm, but sensitive parental control (Maccoby & Martin, 1983).

One of the most important variables that distinguish parenting style is warmth, the tendency of a parent to be responsive to the child's needs, enthusiastic about the child's accomplishments, and sensitive to the child's affect (Maccoby, 1980). Writing about mother-infant interactions, Stern (1985) suggested that healthy mothers and infants experience periods of 'affect attunement' in which they jointly participate in the same emotion. He cites as an example the mutual joy evident when a child finally places a piece in a jigsaw puzzle. The child jumps with joy and the mother smiles and nearly shouts: "YES, thatta girl." The examples that Stern points to are events in which the child's positive affect is received and embraced by the mother. Stern maintains that such moments as these provide the "intersubjective" context within which the child comes to experience and develop her emotions. Furthermore, such positive interpersonal experiences make possible the healthy development of one's own intrapersonal emotional life.

Stern's use of the term "intersubjective" differs from its use by post-Vygotskian researchers (though the uses are related). Rogoff (1990), for example, emphasizes the cognitive and linguistic dimensions of intersubjectivity. Stern, influenced by object relations theory (e.g. Mahler, Pine, & Bergman, 1975) and empathy and moral development

research (e.g. Hoffman, 1977), has emphasized the affective dimension of intersubjectivity. Both use the term to avoid an individualistic view of human nature and to underscore the shared quality of human communication. Together these emphases suggest that communication occurs through shared meaning as well as shared affect. Given the importance of warmth to parenting style, it would seem wise to attempt to understand how affectivity is experienced intersubjectively, how affect and cognition are both mediated through social interactions, and how shared affect impacts shared cognition as well as vice versa.

In summary, it must be acknowledged that the parenting style literature thus far has not been concerned directly with attention. However, the literature points to a relationship between parental control and warmth and the development of cognitive and behavioral self-control in the child. Although attention control is only one aspect of cognitive and behavioral self-control, it appears likely that parenting style provides an important dimension of what Vygotsky (1979) called 'the cultural development of attention.'

Parental Mediation of Attention

More directly related to attention mediation are several studies of parent-child interactions that have observed a variety of parental behaviors which serve to mediate the developing child's attention. A small number of

studies have examined some of the effects of what has been termed "joint attentional focus" between mothers and infants. Joint attentional focus occurs when the attention of both members of a dyad are directed to the same object in the course of communication (Bruner, cited in Tomasello & Todd, 1983). Bornstein & Ruddy (1984) found that mothers who more frequently encouraged their four-month-olds to focus their attention on aspects of the environment (e.g. through pointing or handing a toy to the baby) had children who at twelve months had higher Bayley scale scores and larger speaking vocabularies.

In a similar vein, two studies (Tomasello & Todd, 1983; Tomasello & Farrar, 1986) report that those mother-infant dyads who engaged in more sustained bouts of joint attentional focus had children with larger vocabularies six months later. Furthermore, Tomasello & Farrar found that infants learned more when object labeling was done within periods of joint attentional focus than when the mother re-directed the child's attention to objects of importance to the mother.

These studies suggest that the verbal learning and overall development of infants is enhanced as a result of joint attentional focus in dyads. Furthermore, the increased vocabulary suggests that joint attentional focus may have aided the young child's ability to selectively attend to objects in the environment and associate them with

their names. Clearly more research is needed regarding the impact of joint attentional focus on older children's cognitive development, but such studies underscore the importance of parental attention mediation.

In a descriptive study of older children and their mothers working on tasks together, Hickman (1978) found that pointing gestures were often used to direct attention. Sometimes the mothers pointed to a general area and appeared to want the child to figure out the next step. However, when the mother wished to convey more information she would point at a particular piece of the task materials, sometimes using demonstratives such as "this" or "that." Although easily overlooked, pointing gestures are a frequently used behavioral mode of attention mediation.

However, conversation is by its very nature attention-directing. In a task setting, Hickman (1978) observed that mothers occasionally simply directed or requested their children to perform certain desired behaviors. In this way, the mothers provided the maximum degree of verbal attention control possible. Little is left to the child; all necessary information is provided in the statement and through the mother's speech the child's attention is directed to important aspects of the task environment or to the realization of a sub-goal.

Hickman (1978) also observed that the mothers frequently asked questions that allowed the child to come up with

the appropriate response independently and so contribute to the task-solving process him or herself. Questions also direct attention. However, they place more responsibility on the child in the interaction than do commands and, in so doing, provide the child with more control.

DeLoache (1984) also examined mother-child interactions, using mother-child joint picture book reading as her focus of study. She, too, observed that mothers used questions to direct their child's attention. Yet, she also found that mothers adjusted their questions according to the child's age. With a child of 12 months, mothers were the only active participants and tended to label objects in the pictures and point to them. This type of activity directed the child's attention and through this focus added to the child's semantic and visual long-term memory structures.

DeLoache (1984) noticed that when the child was between 12 and 15 months, the mother began asking questions and answering them herself. This type of activity also directed the child's attention, and helped to create curiosity. However, with an older child the mother tended to seek the answers to her questions from the child, rather than providing all the information. This activity allowed the child to access her own long-term memory, provided opportunities for memory searching, and strengthened the links between memory and attention. In addition, this practice appeared to increase the child's interest in the

books. Also, with the older child, the mother tended to ask for information that was not supplied in the picture but might be implied, for example when looking at a bee on a flower a mother might ask, "What do bees make?"

Furthermore, according to DeLoache (1984) the mothers appeared to be able to gauge their questions so that they were able to hold their child's attention for as long as possible. If the child was unable to answer a question, the mother simplified the question or gave additional clues. The mothers usually seemed to structure the interaction so that the child would succeed. According to DeLoache (1984), this practice appeared to be an attempt to maximize the child's contributions to the interaction and so promoted independent cognitive activity.

Questions are an indirect form of attention control which permit the child to contribute both to the interaction and to problem solution. There may be important differences between directing the child's attention to the answer (by providing it) and directing it the problem.

Another important aspect of parental attention mediation that has already been hinted at concerns the parent's role as facilitator. How the parent construes the goals of the interaction will shape that interaction. For example, a parent may view a task setting as simply having the goal of task completion or as an opportunity to stimulate the child's intellectual growth.

McLane & Wertsch (1985) contrasted the differences between child-child dyads and mother-child dyads in a problem-solving setting in which a mother or child was given the task of teaching another child to copy a model puzzle with a replica puzzle. They found that the mother-child dyads looked at the model far more, that the tutored child in the mother-child dyads picked up and placed the pieces him or herself significantly more often than the tutored child in the child-child dyads, and that the mothers were significantly less directive (and more suggestive) than the child tutors.

The authors hypothesized that the mothers construed the context as one in which the child was "on the stage," so to speak, and the mothers viewed themselves as simply facilitators. The mothers gave more indirect suggestions because they were more concerned with educating the child than manifesting their own knowledge. Overall, the mothers were more skillful at and more desirous of directing the younger child's attention using methods that encouraged independent problem-solving activity. Such activity requires that the child make use of her own cognitive and metacognitive resources in order to solve the problems, and reinforces and promotes previous learning, feelings of competence, and creativity.

Such studies as those above provide evidence that attention mediation is an important component of the

interactions of children and their parents. Although the amount of time parents spend with their children talking, working on puzzle tasks, or reading varies from family to family, it is appropriate to conclude that under ideal conditions parents do direct the attention of their children, and do so in ways that are sensitive to the child's age and that seek to promote the development of self-regulatory skills. Thus, we may safely conclude that parents appear to scaffold their children's attention and to be sensitive to the attentional dimension of the zone of proximal development. We turn next to consider elementary school-aged children who encounter difficulty in regulating their own attention.

Attentional Disabilities

Limitations in controlling one's attention make any task more difficult. However, the classroom environment makes particularly great demands on a child's attentional resources, requiring a high degree of attention self-regulation. Unfortunately, upon first entering school, many elementary-aged children experience great difficulty attending to the instructional agenda and their learning suffers. Given the complexity of the process of attention, their problems could stem from a variety of sources. Such children may have difficulty screening out irrelevant information in the environment, they may not see any satisfying purpose in task completion, they may be limited

in their ability to sense what are the most important aspects of the problem space, or they may experience less control over their cognitive processes than do their peers. Whatever the source, their learning is impeded.

Children with the most severe attentional problems often end up being diagnosed as having Attention-Deficit Hyperactivity Disorder (ADHD), a condition affecting an estimated 3% of school-age children (American Psychiatric Association, 1987). Such children are characterized as having an excessive activity level, short attention span, great distractibility, restlessness, difficulties with self-control, and socially inappropriate behavior, all of which are not caused by any gross brain or motor impairment (Barkley, 1990). In a review of the cognitive deficits of hyperactive children Douglas (1983) isolates two 'core' attentional problems that impair task performance: 1) an inability to maintain attention for long periods of time, and 2) an inability to ignore distractions. Not surprisingly, these attentional disabilities have been found to radically interfere with their social and educational functioning (Barkley, 1989a; Charles & Schain, 1981; Rutter & Garmezy, 1983).

In spite of the prevalence of ADHD, little is understood about its etiology. Research in this area has found some evidence for differences regarding "soft" neurologic signs (e.g. clumsiness, delayed language develop-

ment, or impaired sensory integration; Ross & Ross, 1982; Shaywitz & Shaywitz, 1988; Barkley, 1989a), and more troubled developmental histories of hyperactive than normal children (Ross & Ross, 1982; Barkley, 1990). Other related research has found evidence that points to the possibility of a hereditary dimension to attention deficit disorder (Ross & Ross, 1982; Rutter & Garmezy, 1983; Barkley, 1989a). In addition, Shaywitz & Shaywitz report experiments done with rats demonstrating that a lack of brain dopamine in rat pups leads to unusually high activity levels in young rats, an activity level that can be reduced with the use of stimulant medication.

Such evidence points to the probability that in most instances ADHD is rooted in some biologically-based abnormality. However, it remains the case that no single cause has been found to be clearly linked to the development of ADHD. Similarly, the genetic background and life histories of children with ADHD have no common characteristics unifying all cases. And many children can be found who also have been exposed to things that have been suggested to lead to ADHD without developing the disorder. As a result, current theory regarding the etiology of ADHD is multi-factorial and assumes that the development of ADHD is not the result of some single cause but rather a confluence of factors leading to a disorder in a common pathway in the nervous system (Ross & Ross, 1982; Barkley, 1989a; Shaywitz

& Shaywitz, 1988).

Treatment from a Medical Model

The evidence discussed above has led most researchers and interested parties to view ADHD as a medical problem. And this approach has only been confirmed by the success of certain drugs (e.g. Ritalin, Cylert, and Dexedrine) in reducing some of the worst symptoms of ADHD, in as many as two-thirds of children with ADHD (Barkley, 1977; Robin & Bosco, 1981; Ross & Ross, 1982; Barkley, 1989a). Still, it is not known why such drugs have beneficial effects. Barkley theorizes that such drugs may lower the threshold for reinforcement, permitting a greater sensitivity to the reinforcements that exist in the environment. Whatever the reason for its effectiveness, drug therapy is viewed as the primary treatment of choice by many physicians and families and is used on between 1% and 2.6% of the school-age population (Barkley, 1989a; Shaywitz & Shaywitz, 1988).

Nevertheless, drug therapy has been criticized. Concerns have been voiced over the resulting side effects, including increases in blood pressure and pulse rate, and in some cases growth suppression (Ross & Ross, 1982). Also, some have conjectured that prescribed drug use might lead to drug abuse later in life (though evidence supporting this concern is equivocal; Ross & Ross, 1982). In addition, Rie (1975) pointed to the problem of reduced affect that results from the use of medication for ADHD. It has been argued

that this side-effect is due to overmedication. However, overmedication has been documented as a pervasive problem in the treatment of ADHD (Ross & Ross, 1982). Consequently, the effects of such overmedication warrant our attention and concern, especially since such reduced affect may have deleterious effects on the emotional development of ADHD children (Rie, 1975).

But what about the long-term effects of medication? In one study (Hechtman, Weiss, & Perlman, 1984), the authors compared two groups of young adults who had been diagnosed with ADHD as children (one of which had used medication). They found that the treated group viewed their childhood more positively, exhibited better social skills, had fewer problems with aggression, and required less psychiatric treatment than the untreated group. Unfortunately, other studies have not found these effects. While medication treatment is widely acknowledged as improving attention, and reducing impulsivity and overactivity during treatment (Shaywitz & Shaywitz, 1988; Barkley, 1990), other long-term follow-up studies have found no significant differences between medicated and non-medicated children with ADHD regarding behavior and academic achievement (Blouin, Bornstein, & Trites, 1978; Milich & Loney, 1979; Charles & Schain, 1981, Barkley, 1989a; Rutter & Garmezy, 1983).

Lastly, one wonders about the effects on parents, teachers, and children with ADHD, of viewing a disorder like

ADHD as strictly a medical problem. It is possible that this could result in assuming that the cause of the child's problems lie only within the child, attributions for the problem that are internal, uncontrollable, and stable; while the solution of the attentional problems is attributed to lie outside the child and the child's social system, and in medication. Given such attributional assumptions there is little for the concerned parties to do except keep the child medicated and "wait it out." But what if parents, teachers, and the child him or herself can make a difference above and beyond the effect of the medication, particularly, if, as Vygotsky's theory suggests, the child and others within the child's environment do have a significant role to play in facilitating attentional development. If so, a strict medical approach may promote a passive attributional style in ADHD children, as well as discourage the active involvement of parents and teachers that is necessary to foster attention control and the development of other self-regulatory skills.

Possible support for this hypothesis is found in one study that compared children raised in institutions with controls and similar children raised in foster homes. Tizard & Hodges (1978) found a far higher incidence of inattention and overactivity among institutionally-reared children. This suggests that some aspect of the social environment of homes versus institutions may be involved in

the internalization of cognitive and behavioral self-control structures. Given what is known about such institutions, the environmental difference may lie in the lower number of social interactions (Tizard & Hodges, 1978).

Specific research on ADHD children has found that the quality of their social environment may have an impact on secondary symptoms of ADHD, including aggression and low self-esteem (Conners & Wells, 1986). Campbell, Breaux, Ewing, & Szumowski (1986) report that among parent-referred problem preschoolers, maternal negativity and control and family disruption at age 3 was predictive of higher hyperactivity when the child is 6. Similarly Cohen & Minde (1983) report that there was more negative interaction among families of hyperactive preschoolers than families of nonhyperactives. All this suggests that the family environments of hyperactive children are somewhat more negative than normal, a finding that is not surprising given the difficulties that hyperactivity creates in the home. Nevertheless, this increased negativity presumably has some impact on the child as well.

Other researchers have specifically examined the interactions of mothers and their ADHD children and have found significant differences between the quality of their interactions and the interactions of mothers and non-ADHD children. In a longitudinal study of mother-child interactions that began when the children were 6 months,

Jacobvitz & Sroufe (1987) found that maternal intrusiveness at 6 months (the extent to which the mother disrupts the baby's ongoing activity rather than adapting to the child) and maternal overstimulation at 42 months (physically stimulating the child at times that seemed uncalled for by the context) both predicted hyperactivity at 6 years of age. Perhaps more notable, the authors found that of 38 child measures, including neonatal behavioral measures, and temperament ratings at infancy, 3, 6, and 30 months, only one measure distinguished future hyperactive children from normals (using the Neonatal Behavioral Assessment Scale by Brazelton, normals were found to have greater motor maturity at 7/10 days than future hyperactive children).

In another study of older children, Campbell (1973) found that mothers of hyperactive boys provided more direct help, encouragement, and impulse control suggestions during difficult tasks than did the mothers of non-hyperactive boys. Studies by Barkley and his co-workers have found that the mothers of ADHD children are more likely than mothers of normal children to act in a negative way, to issue commands, to ignore or respond negatively to their child's instigations of interaction, to initiate fewer interactions, and to respond with greater control over off-task behavior. These maternal behaviors were noticed even when their children were being compliant (Cunningham & Barkley, 1979; Befera & Barkley, 1985; Barkley, Karlsson, & Pollard, 1985;

Barkley, 1990). In the same studies they noted that the hyperactive children were more likely than normal children to be negative, independent, off-task, and less compliant to their mother's requests.

In addition, there is some evidence that the mothers of ADHD children behave differently than mothers of normal mothers even with their normal children. Ross & Ross (1982) report that in a study of the interactions between mothers of ADHD children and their non-ADHD children, mothers of ADHD children tended to be more negative and distant with their non-ADHD children than did mothers of non-ADHD children. They interpret this finding as a spread of negative affect in the social environment of the ADHD child.

As suggested by these researchers, most of these results are likely due to the bidirectional effects of the dyadic interactions (Bell & Harper, 1977). Children who are hyperactive doubtlessly require more parental control than normal children. In Barkley (1989b) and Barkley, Karlsson, Pollard, & Murphy (1985) the researchers report that mothers blind to the treatment were less directive when their ADHD children were on prescribed stimulants than when they were on a placebo, suggesting that the controlling maternal behaviors that have been observed are primarily a response to difficult child behaviors. In light of these types of findings, Barkley (1985,1990) has concluded that it is inappropriate to regard the negative and controlling

parental behaviors that have been observed as leading to the hyperactivity in the first place.

However, the intriguing findings reported in Jacobvitz & Sroufe (1987) suggest that, at least in some cases, a child's early social environment may be more influential in the development of ADHD than factors intrinsic to the child. Furthermore, the evidence cited above concerning the spillover of controlling maternal behaviors into periods when the child is compliant suggests, at the very least, that mothers of ADHD children may learn to interact with them in a more directive manner than is at times necessary. Some mothers appear to become less responsive to changes in their child's positive behavior, and consequently less able to take advantage of the child's compliance. It may be, as Rutter & Garmezy (1983) speculate, that a reciprocal, mutually reinforcing process is sometimes set into motion through the confluence of hyperactive child behaviors and parent responses that leads to further habitual maladaptive interaction patterns.

However, as outlined above, studies of parenting styles (Maccoby & Martin, 1983) have demonstrated that parents best promote self-regulation in their children by being responsive to the child's need for structure while also using the least directive and most inductive styles of interaction possible. Consequently, it may be the case that as a result of their experiences with their child, some

parents of ADHD children may be unable to respond ideally to their child when they are behaving appropriately. Such rigidity, over time, may result in missed opportunities to remediate the child's ability to regulate his or her attention as compared to a more responsive environment.

Furthermore, while we do well to assume bidirectionality of effects in the interactions of mothers and their ADHD children, the results of studies of such interactions do not rule out the possibility that at least a subsample of parents exacerbate their child's attention problems as a result of providing too little structure or being overly punitive or directive. In such cases, it is not that the parents have been trained to respond in a certain way through the course of interactions with the child, but rather that the pattern constitutes their customary parenting style. Again, on the basis of parent-child interaction research it may be hypothesized that such interactive styles would be especially counterproductive in dealing with children who are in unusual need of parenting practices that promote self-regulation. Thus, additional research is needed to explore the impact of various parenting interaction styles on the development and remediation of ADHD.

Methodological Considerations

Assuming the value of studying mother-child interactions in order to understand the development of

attention and attention disorders, we turn next to examine some limitations in previous studies on the interactions of ADHD children and their mothers. The vast majority of these studies (e.g. Barkley & Cunningham, 1979; Mash & Johnston, 1982; Befera & Barkley, 1985; Barkley, Karlsson, & Pollard, 1985; Campbell, 1973) have restricted their investigations primarily to the types of behavioral variables distinguished, for example, by Mash, Terdal, & Anderson (1973). Their coding scheme included the following maternal behavioral variables: directiveness, initiating interactions, questions, praise, negative messages, and no response; and child behavioral variables: compliance, initiating interaction, play, competition, negative comments/noncompliance, and no response. Furthermore, the scheme uses a time-sampling method that requires the coder to make one observation per dyadic partner every 15 seconds and record the first interactional behavior that occurs during that period.

Studies using such a coding framework have provided important information regarding the dyadic interactions of mothers and their ADHD children. The special contribution of the Mash, et al (1973) coding matrix consists of its capacity to deal with the contingency of dyadic interactions and not simply with isolated individual behaviors. However, frameworks like this have some limitations, primarily because the complexity of human discourse is difficult to

capture with the narrow range of interaction behaviors isolated by the Mash, et al coding system (a concern acknowledged by Barkley, 1985). Human speech is not simply a behavior in the same way that eating is a behavior. Uniquely, speech is a meaning-communicating activity that assumes a shared symbol system. In order to understand a speech event, one must be able to interpret the significance of the utterance in all its complexity, including knowing something of the intentions, values, and understanding of the communicating parties, their power-relationship; the prior history of their interactions, both long-term and immediate; and the purpose of the speech including its performative quality and its strategic nature. All of these qualities point to the necessity of understanding the context of a particular speech event in order to understand the event itself. Using a time-sampling method with a recording system limited to a narrow range of prescribed behaviors, though easy to analyze, minimizes the researcher's ability to accurately understand the speech of one's subjects.

Secondly, previous studies have neglected to examine the precise nature of attentional mediation that occurs between mother and child. In the past, researchers have neglected to consider the attentional purpose of maternal behaviors and their meaning as attention mediating messages. The attentional purpose of the mother in the interactions is

usually quite different when the child is off-task from when he is on-task. Such differences in the child's attention would seem to require different responses from the mother. The scaffolding of attention simply cannot be captured with previously used methods of study. Research on the interactions of mothers and their ADHD children ought to examine such dimensions in order to better understand the attentional relevance of the interactions.

Thirdly, these studies have not examined the effectiveness of maternal attention mediation for children's independent attention control. None of the studies of the interactions of mothers and their ADHD child to date have compared the ability of ADHD children to regulate their attention alone with their ability to do so with the assistance of the mother, to examine whether their attention is co-regulated within the zone of proximal development.' Furthermore, we do not know to what extent mothers of ADHD children as well as mothers of normal children are successful at keeping their child on task when they are together and, if so, how they are successful?

Consequently, to understand the maternal mediation of attention better, a study possessing the following characteristics would seem desirable. First, a coding scheme should be used that will allow some comparison to be made to previous research. Secondly, the coding scheme should have some way of operationalizing the attentionally

relevant aspects of the dyadic interactions, including the existence of an attentional dimension of the zone of proximal development; scaffolding; and attentional purpose. Thirdly, there should be a way to measure the relationship between interaction speech and behavior and attention outcomes, for example time-on-task. Fourthly, such a coding frame should be combined with a qualitative analysis of the dyadic discourse of attention mediation in order to understand those important features of attention mediation that, either at present do not yield to quantitative analysis or simply are best grasped through qualitative analysis. Ideally, the utilization of qualitative and quantitative observation components will provide more clarity and depth than either method alone.

It is hoped that such a multimethod approach (Brewer & Hunter, 1989) to the study of attention mediation might lead to some answers to the following research questions and the testing of the following hypotheses:

1. Is attention co-regulated within the zone of proximal development? That is, are children better able to maintain their attention on task, selectively attend to important features in the environment, and be vigilant with the assistance of another person than by themselves.

Hypothesis 1: With age held constant children are able to maintain their attention on task longer and are able to accomplish more with the assistance of their mothers than

when the same children are working on their own.

2. Assuming that ADHD children are less able to regulate their attention when working by themselves than normal children, are these differences mitigated by the presence of mothers? In other words, are ADHD children able to regulate their attention in ways that approximate the norm in the zone of attentional proximal development? Hypothesis 2: The ability of children with ADHD to regulate their attention approximates that of normal children when their mothers are present.

3. Are there differences between the interactions of mothers and their ADHD children, and mothers and their non-ADHD children? Hypothesis 3A: Mothers of ADHD children speak more often. Hypothesis 3B: Mothers of ADHD children are more directive than mothers of non-ADHD children. Hypothesis 3C: Mothers of ADHD children use a lower percentage of questions in their speech. Hypothesis 3D: ADHD children complain more than non-ADHD children. Hypothesis 3E: Mothers of ADHD children scaffold as much as mothers of non-ADHD children.

4. What sorts of things do mothers do to help their children stay on-task while they are together? Hypothesis 4A: With attention and age held constant, mothers

who are more directive will have children who are on-task for longer periods of time and who accomplish more when they are together than mothers who are less directive.

Hypothesis 4B: With attention and age held constant, mothers who ask more questions will have children who are on-task for longer periods of time and who accomplish more when they are together than mothers who ask fewer questions.

Hypothesis 4C: With attention and age held constant, mothers who engage in scaffolding activity more frequently will have children who are on-task for longer periods of time when they are together than mothers who engage in less scaffolding activity.

5. Are certain patterns of maternal attention-mediation associated with a higher or lower degree of attentional self-regulation? For example, if a mother is highly directive during interactions, is her child less able to regulate his attention when on his own?

Hypothesis 5A: With attention and age held constant, mothers who are more directive will have children who are on-task for longer periods of time and who accomplish more when their mothers are absent than mothers who are less directive.

Hypothesis 5B: With age and attention held constant, mothers who ask more questions will have children who are on-task for longer periods of time and who accomplish more when

their mothers are absent than mothers who ask fewer questions.

Hypothesis 5C: With age and attention held constant, mothers who more frequently scaffold will have children who are better able to regulate their attention on their own than children of mothers who scaffold less frequently.

6. In general, how do mothers mediate their children's attention?

To answer these questions and to test these hypotheses the following study was conducted.

CHAPTER II

METHOD

Because of the nature of problems that were being investigated the present study is composed of two parts: 1) a quantitative section, involving the measurement and analysis of child and mother-child verbal and behavioral activity in an experimental setting (presented in chapter three), and 2) a qualitative section utilizing the text of the mother-child interactions in the experimental conditions, and personal interviews (presented in chapter four).

Subjects

Seventeen ADHD male children and their mothers participated in the study. The children who participated were undergoing treatment for ADHD at one of two medical clinics in the Lansing area: the Collaborative Developmental Clinic, a part of the Clinical Center at Michigan State University, under the care of Marsha Rappley, M.D.; and Blue Care Network, Health Central, Lansing, under the care of Louis Resnick, M.D. The Clinical Center sent letters (see Appendix A) to the families of all males, aged 6 through 10, who were undergoing treatment for ADHD, inviting them to participate in the study, twenty in all. The Blue Care Network sent the same letters to 107 families at the two clinics inviting them to participate in the study. However, through miscommunication, letters were sent to the families

of boys and girls receiving treatment for ADHD. Thirty-three families indicated they would like more information. Those who responded positively were given more information about the study and were asked screening questions about themselves and their child. If their responses indicated that they were appropriate for the study (e.g. if the child in question was male, if he was still undergoing treatment, and if he had no other serious problems), they were again invited to participate.

During the phone call the parents of children who were being treated for ADHD with drug therapy were also told that the study required that ADHD medication would have to be withheld long enough to ensure the drug was no longer influencing behavior (a period of time which varies depending on the drug). (This permitted observations of the children and their mothers when the child's behavior was not chemically modified.) It was made clear to the parent that if they felt it was inappropriate to withhold their child's medication they did not have to participate. Also, only children who had no other serious physical or emotional problems (e.g. mental impairment or conduct disorder) were included in the sample.

The mothers of these children were asked to complete the Child Behavior Checklist (Achenbach & Edelbrock, 1983) and sixteen of the children who participated were rated as being at or above the 98th percentile on the hyperactivity

scale. One child (dyad 13) was rated at the 94th percentile. The group mean was 11.73. In addition, information on educational attainment was obtained. Mother's education was measured on a 5-point scale: 1=Did not graduate from high school, 2=high school graduate, 3=some college, 4=college graduate, and 5=graduate school. The ADHD group had a mean of 3.33. Mother's mean age was 31.93 for this group.

The work of two of these dyads in the experimental conditions could not be used in the quantitative portion of the study. One child began crying and was unable to continue working on the task. Another child turned off the television (which was being used as a distractor in the experimental conditions; see below). However, the interactions of these dyads and interviews with them were used in the qualitative portion of the study.

The distribution on age of the ADHD children who participated in the quantitative portion of the study can be found in Table 2.1. The mean age of this group was 104 months. In addition, thirteen of the children were white and two were Hispanic.

Table 2.1

Number of Children in Study by Age and Group

Age	ADHD	Non-ADHD
5	1	1
6	2	2
7	1	3
8	5	5
9	3	3
10	4	2

Eighteen male children who had not been diagnosed as having ADHD and their mothers also participated. To obtain this group letters (see Appendix B) were sent to 500 families who had male children in the kindergarten through third grades in the Lansing school district. Letters were sent to 75 families of kindergarten children, 75 families of 3rd grade children, 175 families of 1st grade children and 175 families of 2nd grade children. To obtain a sample with a range of SES, children were randomly selected for the initial mailing from a range of schools that could be distinguished by the percentage of children whose families received Aid for Dependent Children (AFDC; a good indicator of family economic status). Schools in the Lansing School District were rank ordered by percentage of families receiving AFDC and groups of male students were randomly selected from schools with high, middle, and low percentage. A researcher from the Research and Evaluation Department of the Lansing School District used a computer

and the databank of all Lansing School District pupils to randomly select subjects according to the stratification criteria outlined above.

Names and home addresses of those selected were printed and placed on envelopes by School District personnel so that the researcher had no knowledge of those families who were invited to participate. Letters inviting the families to participate were enclosed, along with a postcard that all families were encouraged to return whether they desired to participate or not. If they were interested, they were asked to write their phone number on the card and told that someone would be contacting them. Seventy-six postcards were returned.

Thirty-nine indicated that they would like more information. These families were called and provided additional information about the study. Then, some background information was obtained regarding the family and child, including the age and grade of the child. In addition, the parent was asked to respond to the question: How well is your child able to pay attention (very well, pretty well, not real well, or poorly)? If the parent responded 'not real well' or 'poorly' the family was not considered for the quantitative portion of the study. However one mother who responded 'poorly' was invited to participate with her child (dyad D-1) for a trial run of the task materials and video/audio equipment. It was later

decided to include their interactions in the qualitative portion of the study and a videotape of their performance in the experimental conditions was used to train coders.

After calling prospective subject-families and ascertaining that their child was not hyperactive, the attempt was made to match the child on age and grade with an ADHD child whose family already agreed to be in the study. If a match could be made, an appointment was set up with the non-ADHD child and his mother.

Also, one mother who was an acquaintance of the author participated in the study with her son (dyad P-1). Their videotaped performance during the experimental conditions was also used to train coders, but they were not included in the quantitative portion of the study.

All of the sixteen mothers of the control group who participated in the experimental portion of the study were also asked to complete the Child Behavior Checklist (Achenbach & Edelbrock, 1983) on the participating child. Fifteen of the children were well within the normal range of the hyperactivity scale of that instrument. After the study was completed it was discovered that one child scored above the 98th percentile on that scale. Consequently, this person was not included in the normal group and was excluded from the final analysis of the data derived from the experimental portion of the study. The group mean for the normal group (without the child just mentioned) was 2.8. There was a

significant difference between the two groups on this measure (presented in the next chapter).

In addition, for mother's educational attainment the non-ADHD group had a mean of 3.4, virtually the same as the ADHD group. Mother's age for this group was 35.33. The difference between the two groups on this variable approached significance. However, it does not seem likely that a difference in mother's age of this magnitude (31 to 35) would confound the results.

The age of the non-ADHD children at the time of their participation can be found in Table 2.1. The mean age for this group was 100.2 months. There was not a significant difference between the two groups on age. Of these fifteen, 13 were white, 1 was African-American and 1 was Hispanic. The children of dyads D-1 and P-1 were both 7 years old and white.

The final sample of dyads that was used in the quantitative portion of the study consisted of 15 ADHD children and 15 non-ADHD children. A total of 12 pairs of dyads that were matched on child's age were obtained. However, because the groups of 15 dyads in each group were essentially equivalent in child's age it was decided that the larger sample would provide the most power. Consequently, the larger sample was used in the data analysis. (Because P-1 and D-1 were obtained under the non-standard conditions explained above they were only used in the

qualitative analysis.)

Design

This study is composed of a 2 (attention group) x 2 (task-setting) split plot design. Factor one consists of a between-subject variable: ADHD or non-ADHD son, while factor two is a within-subjects variable and refers to the task-setting: dyadic (son and mother) or independent (son alone).

Measures

The children's ability to attend was assessed by the researcher and the child's mother. In addition, the children's verbal ability and family background information were assessed on all the children in the study. These measures are discussed below.

Matching Familiar Figures Test (MFF-T)

The attentional ability of each child was measured through an administration of the MFF-T (Kagan, Rosman, Day, Albert, & Phillips, 1964). This test is a measure of children's impulsive versus reflective cognitive style. The particular version used in the present study was designed for 5-12 year old children and requires the child to find an exact copy of the stimulus item among six comparison items over 12 trials. Completion of the test provides two separate scores: the total number of errors across the 12 trials, and the average time it took the child to make his first choice across the 12 trials. More errors and less time taken to pick the copy distinguishes impulsivity; the

converse distinguishes reflectivity. Raw scores can be converted to percentile scores based on age norms. Messer (1976) reports test-retest reliabilities for response time have ranged from .58 to .96 and for errors have ranged from .34 to .80.

The MFF-T has been used as a measure of impulse control and ability to selectively attend to perceptual details, and both inability to regulate impulses and pick out important perceptual details are symptoms of ADHD. In fact, the MFF-T has been used with some success to distinguish between hyperactive and normal or nonhyperactive children (Campbell, 1973; Campbell, Douglas, & Morgenstern, 1971; Shaywitz & Shaywitz, 1988). However, recent research has not validated the discrimative function of the test (Barkley, 1990). Furthermore, it must be acknowledged that it is not entirely clear what processes the MFF-T is measuring and why a relationship has sometimes been found between MFF-T performance and ADHD. Many processes are activated during MFF-T performance including arousal, motivational, perceptual, behavioral, memory, and metacognitive processes. Nevertheless, the MFF-T was used to provide a cognitive measure of ADHD that it was hoped would help to confirm physician diagnosis of ADHD.

Child Behavior Checklist (CBC)

All the mothers who participated in the study completed the CBC created by Achenbach & Edelbrock (1983). This

instrument is designed to assess the behavior problems of children aged 4 to 16. A list of 112 behavior problems is provided and the parent is to rate the extent to which an item describes his or her child (0 = Not true; 1 = Somewhat true; 2 = Very true). In addition, nine scales have been identified on the CBC through factor analysis, including a hyperactivity scale. The hyperactivity scale consists of the following 11 items: Acts too young for his/her age; Can't concentrate, can't pay attention for long; Can't sit still, restless, or hyperactive; Confused or seems to be in a fog; day-dreams or gets lost in his/her thoughts; Destroys his/her own things; Impulsive or acts without thinking; Poor school work; Poorly coordinated or clumsy; Prefers playing with younger children; and Speech problem. The answers are then added and a total score is obtained between 0 and 22.

Over the whole test the test-retest reliability (intraclass correlation) is .952. The test-retest reliability (Pearson correlation) for the hyperactivity scale was .92. The group means for the ADHD and non-ADHD group were significantly different at 11.73 and 2.8 respectively ($p < .001$). The mothers of the two groups of children clearly saw them as behaving differently.

Peabody Picture Vocabulary Test-Revised (PPVT-R)

This instrument assesses a child's word knowledge and was used to measure verbal ability. The median splithalf reliability across all child age groups for the test form

used in the present study is .80. As seen in Table 2.2, the mean standard vocabulary score for the ADHD group was 103.87 and for the non-ADHD group was 104.31. This was not a significant difference.

Parent Background Questionnaire

Lastly, the mother was also asked to provide general family data such as the birth order of the child, number of children in the home, mother's age and educational background, and the occupational background of both parents on a questionnaire designed by the investigator. The occupational background of the parents was used to compute social status based on the occupation factor of the Hollingshead social status scale. Occupational social status for both groups was exactly 5.77.

Procedure

The study was conducted at the Learning Clinic of Michigan State University, a set of rooms which are furnished with one-way mirrors that permit discrete video and audio recording. All mother-child interactions were recorded using a video camera and a tape recorder from behind the one-way mirror. The room contained a large table and two chairs for working on the task, and a smaller table, located next to the child's chair, on which sat a one-piece monitor/VCR unit. A number of toys were also placed in a corner of the large table.

When a mother and child arrived, the child was seated

in a room and asked to copy a few paragraphs from a book while in the next room the investigator explained the procedure to the mother. At this time the consent form was completed (see Appendix C) and any questions were answered.

Next, the investigator assessed the child's verbal ability with the Peabody-Picture Vocabulary Test, while the mother worked on the CBC and Parent Questionnaire.

Then the mother and child were brought into the task room and given a moderately challenging problem-solving task using various pieces from a "Brio" block set. The mother and child were seated at the large table, and the investigator brought to them a small box with a pre-selected number of Brio pieces and asked them to construct an animal with the pieces. They were permitted to work on this project for 20 minutes or until they were satisfied they had successfully accomplished the goal.

After finishing the Brio task, the child was invited to return to the other room and was administered the Matching Familiar Figures Test. The mother continued working on the CBC and Parent Questionnaire.

Next, the child participated in dyadic and independent tasks. Order of the tasks was counterbalanced across children. Both tasks involved identical task materials but in the dyadic task the child worked with mother, whereas in the independent task the child worked alone. For the dyadic task the mother was instructed to help her son study the

page of random letters in order to find and circle the stimulus letters. She was told that her son should do the work but that she should 1) help him to pay attention to the task, and 2) help him to do a good job and find all the right letters. She was also asked not to make reference to the investigator in her dialogue to her son but encourage him to do the work because she wanted him to do it. In addition, during this activity the videoplayer located next to the child was playing a popular children's cartoon. Headphones were plugged into the player and the volume was turned up just loud enough for some sounds to be heard by those in the room. This activity lasted 20 minutes.

For the <u>independent</u> task the mother was instructed to explain the identical task to the child, but as soon as she was finished with the instructions she was to leave the room and sit just outside the door of the cubicle in order to work on the Child Behavior Checklist and so that they could not see each other. She was told not to pay attention to any of his activities and that if he asked for help to tell him that she couldn't help because she had to work on a questionnaire. Again, the videoplayer was on, playing another episode of the same children's cartoon. This activity also lasted 20 minutes.

Finally, on a few occasions when the experimental tasks were completed, a mother was invited to ask her son to describe how he enjoyed the task. This interview was also

audiotaped and the experimenter viewed the interaction behind the one-way mirror.

Task

The goal of the task used in the dyadic and independent conditions was to circle certain letters that were distributed randomly in lines of letters of the alphabet. The task materials included a pencil, a sheet of paper containing 46 lines of random letters (see Appendix D), and another page containing the 7 large 'target' letters (see Appendix E).

Coding

The primary data source for the quantitative portion of the study consisted of video tapes of the dyadic interactions during task performance. Two coding systems were devised. Trained observers coded the behaviors and discourse of the mother and child. Coding system A focused on types and quality of maternal and child speech acts and behaviors. Coding System B focused on scaffolding.

Coding System A: Maternal and Child Speech and Behavior and Directiveness

Prior to the actual coding, the observers using this system attended three training meetings between which they coded training tapes and compared their ratings with the ratings of the investigator. All the observers achieved at least 80% agreement with the investigator on each of the variables. The independent and dyadic activities of 32

dyads were coded once. In addition, 10 of the dyads (over 25% of the total sample) were coded by two coders to obtain a measure of the reliability of the coding system.

The observers coded a total of eight out of twenty minutes (or 40% of the total time spent on each activity). They were instructed to code four minutes of activity beginning at four minutes into the condition and ending at eight minutes, and four more minutes of activity beginning at fourteen minutes into the condition and ending at eighteen minutes. Only 40% was coded because of the complex nature of the variables and the decision to use a time-intensive, event-based coding system rather than a time-sampling coding system (Bakeman & Gottman, 1986).

System A coders were trained to identify and code a range of speech and behavior acts. The first step was to distinguish an event. An event was defined as any speech unit that could be interpreted as standing on its own. This included all sentences as well as exclamations like "Oops," or "Oh,no." However, it did not include hesitation particles utterances like "Uhhh." In addition, certain behaviors were also identified as discrete events, including such things as mother pointing, touching child, and the child going on- or off-task. (The rules followed by the coders for event identification can be found in Appendix F). The overall percent agreement on event identification was .88.

The event was then coded on a number of variables. On the basis of previous research in mother-child interactions in general and mother-ADHD child interactions in particular, as well as hypotheses of the researcher, the following variables were selected for coding. (A list of the variables used in Coding System A can be found in Appendix G).

Actor

First, the coder identified who was speaking or behaving.

Speech Acts

All maternal and child speech acts were categorized in terms of types of speech: commands, statements, questions, answers to questions, and 'other speech.' Also, a maternal speech act could be classified as an off-task speech act, and a child speech act as a complaint. The overall percent agreement for maternal speech was .87 and for child speech was .86.

Behavioral Acts

Maternal behavioral acts were categorized as assisting child, physically/acoustically orienting child, doing task herself, or off-task behavior (see Appendix H for more detail). The overall percent agreement for this variable was .86. Child's behavior was simply classified as on-task or off-task. Percent agreement was .99.

Attentional Purpose

In addition, each of the mother's acts were assessed for the attentional purpose that could be assumed to underlie the act. Coding this variable required that the coder judge the purposes of the mother in reference to the task goals of keeping the child on-task and helping the child to do a good job. These categories included enlistment, maintenance, focus, encouragement, refocus, and off-task. (See Appendix I for a fuller description). Overall percent agreement for this variable was .87.

Directiveness

The maternal speech acts were also coded as being directive or not. All commands would be directive. However, questions and statements that had implied directive force were also coded as directive. Such statements as "You missed a 'g'," are not imperatives in form. However, their pragmatic function is essentially that of an imperative. Such utterances are labeled embedded directives by Ervin-Tripp (1977). Percent agreement for this variable was .92.

Coding System B: Scaffolding

In addition, another group of coders were trained to assess maternal scaffolding. This variable was used in a previous study that focused on maternal scaffolding in a teaching situation with preschool children (Neal, 1990). The basic way of assessing scaffolding in that study was adjusted in the present study to fit the peculiarities of

the attention task. Coding system B used a time-sampling method where coders assessed whether or not the mother was scaffolding every 15 seconds during the twenty minute activity. This assessment required a two-step process. First, the coder had to classify the child's behavior as on-task, off-task, or frustrated. Secondly, the coder judged whether or not the mother's response to the child's activity exemplified scaffolding. Scaffolding occurred when the mother used the child's behavior to adjust her own level of support, intervening to assist the child when necessary and withdrawing when the child was successful. For example, scaffolding responses to on-task behavior included praise, non-commanding verbalizations, strategic withdrawal, focusing attention on errors, and simplifying the task. Non-scaffolding responses to on-task behavior included off-task statements, harsh statements, detached state, teasing, strong commands, and negative correction of errors. (A complete list of the categories and decision rules is found in Appendix J). At the end of each dyadic activity it was possible to obtain a percentage of mother's activities designated as appropriate support (scaffolding).

Twenty-five percent of the dyads from the present study were coded by two coders. The percent agreement for this variable was .84.

Measures of Child Attention

Child time-on-task was measured for each activity by

recording the length of time that the child was on-task (ascertained by gaze at task and task-relevant actions) and summing up all such episodes over the duration of the activity. Then a percentage of time-on-task was obtained. This variable was used as a measure of child's ability to stay on task in the face of a distractor and return to the task when distracted. In addition, the quality of the work for each of the tasks was assessed by recording the number of letters accurately circled. This variable is a measure of the actual work accomplished and indicates the child's ability to regulate his attention and effort while on-task. Two of the older children completed the page just before the twenty minutes were up. Time-on-task was computed on them only until they completed the page so they were not penalized for finishing early.

This constitutes an outline of the study. Chapter three presents the quantitative results, and chapter four presents the qualitative results.

CHAPTER 3

RESULTS OF THE QUANTITATIVE ANALYSIS

To insure that the ADHD and non-ADHD groups were essentially the same, except with regard to ADHD, analyses were run on a number of variables including age and grade of the child, child's vocabulary ability, family social status, mother's education, and hyperactivity according to mother rating of child behavior.

Table 3.1

Demographic Variables by Group Membership

	ADHD		Non-ADHD		t-value
Variable	M	SD	M	SD	
Child's age (mos.)	104.0	19.28	100.2	14.37	-.61
Child's grade	2.67	1.54	2.60	1.12	-.14
Social status	5.77	1.51	5.77	1.75	.00
Mother's education	3.33	.72	3.40	.99	.21
Mother's age (yrs.)	31.93	2.81	35.33	5.70	2.01
Hyperactivity (CBC)	11.73	2.99	2.80	2.40	-9.03***
Vocabulary (PPVT-R)	103.87	14.64	104.31	12.13	.09

*** $p < .001$

The groups were found to be very similar on these demographic variables, although the difference in maternal age was nearly significant ($p = .052$). However, it does not seem likely that a difference in mother's age of this

magnitude (31 to 35) would confound the results of the study. However, the groups did differ significantly on hyperactivity according to mother's rating.

As stated in chapter two, each child completed the MFF-T. These results were analyzed to see if the groups differed significantly in impulsiveness.

Table 3.2

Matching Familiar Figures Test Results by Group

Variable	n	M	SD	t-value	p-value
Reaction time (secs.)					
ADHD	15	8.07	5.46	1.53	.137
Non-ADHD	15	11.47	6.65		
Number of Errors					
ADHD	15	16.87	8.30	-1.37	.180
Non-ADHD	15	12.80	7.89		

As can be seen in Table 3.2, the differences between the two groups did not achieve significance, though they were in the expected directions. Small sample size may help to explain the lack of significance. Furthermore, the test's lower than desirable reliability may have contributed to this problem (Messer, 1976; Barkley, 1990). Since this study was conducted, Barkley (1990) has stopped using the MFF-T in his work because he claims it is an unreliable measure of impulsivity in ADHD children. The present study seems to provide support for the conclusion that the instrument lacks the ability to discriminate ADHD children

from normals.

Hypotheses 1 and 2

Hypothesis 1: When controlling for age, children are able to maintain their attention on task longer and are able to accomplish more with the assistance of their mothers than when the same children are working on their own.

Hypothesis 2: The ability of children with ADHD to regulate their attention approximates that of normal children when their mothers are present.

To test hypotheses 1 and 2, time-on-task and number of correct letters were separately analyzed within a split-plot 2 (presence of mother) X 2 (group) X 2 (order of task) design. The within-subjects variable "presence of mother" was categorized as mother present or mother absent; the between-subjects variable "group" was categorized as ADHD or non-ADHD; and the other between-subjects variable "order of task" was categorized dyad first or independent first. An ANCOVA was performed with child's age as a covariate and the two within-subjects outcome measures used as dependent variables. Age was used as a covariate to control for age effects on attention control since children's ability to control their attention increases with age (Shaywitz & Shaywitz, 1990).

Dependent Measure: Number of letters circled

The distribution of the variable "number of correct letters circled when mother is absent," was first inspected

to determine whether there were any unusual features of the distribution. It was discovered that two of the cases from the ADHD group appeared to be outliers from the rest of the group (child 9 circled 322 letters, child 27 circled 387; the rest of the group circled a mean of 34 letters with no one circling more than 60). It appears that these older children (a ten- and nine-year-old) were unusually competent to work when mother was absent and appear to be very different from the rest of the group. Therefore, these outliers were excluded from subsequent tests of hypotheses 1 and 2.

The ANCOVA revealed that when number of correct letters circled were analyzed without the two unusual cases, two significant main effects were found: presence of mother, $F(1,24) = 14.6$, $p = .001$ (Table 3.3); and group membership, $F(1,24) = 5.66$, $p = .026$. However, there were also two significant two-way interactions: group by mother's presence $F(1,24) = 5.51$, $p = .028$; and order of task by presence $F(1,24) = 4.37$, $p = .047$. The main effect for mother's presence supports hypothesis 1 that when mother is present the child accomplished more work. In addition, the interaction effect for group by presence of mother, presented in Table 3.4 and Figure 3.1, provides support for hypothesis 2, that the children from both groups will look more similar when mother is present than when she is absent.

Table 3.3

Letters circled: Mother's Presence/Without two outlying cases

	M	SD	n
Mother present	145.57	100.60	28
Mother absent	88.89	97.76	28

Table 3.4

Letters circled: Group X Mother's Presence/
Without two outlying cases

	ADHD			Non-ADHD		
	M	SD	n	M	SD	n
Mother present	125.00	88.56	13	163.40	109.82	15
Mother absent	32.92	25.78	13	137.40	111.51	15

Table 3.5

Letters Circled: Mother's Presence X Order of Condition/
Without two outlying cases

	Time 1			Time 2		
	M	SD	n	M	SD	n
Mother 1st	132.21	84.22	14 (D)	106.29	119.64	14 (I)
Indep. 1st	71.60	69.90	14 (I)	158.93	116.36	14 (D)

The order of task by presence interaction (Table 3.5; D = Dyad, I = Independent) reveals that the number of letters circled with and without mother depends to some extent on whether one was first with mother or by oneself.

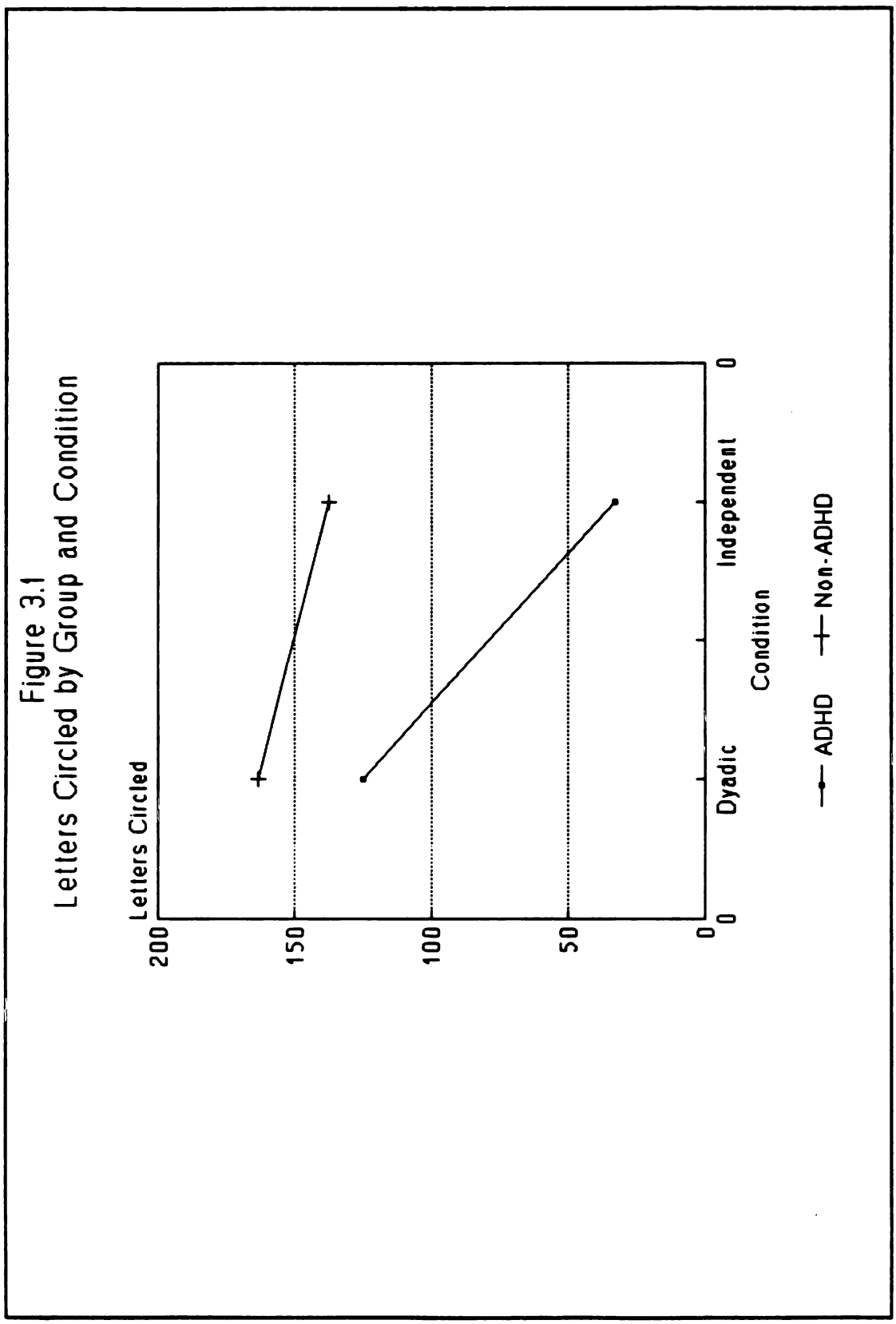
Figure 3.1
Letters Circled by Group and Condition
Letters Circled
200
150
100
50
0
0
Dyadic
Independent
0
Condition
ADHD
Non-ADHD

The children usually worked better with mother present, but there was greater improvement in performance if maternal help followed an opportunity to work alone.

The results presented in these three tables suggest that having mother present significantly improved the number of letters that were circled. In addition, ADHD children circled significantly fewer letters overall than did non-ADHD children (78.97 letters overall compared to 150.40, respectively). Furthermore, the group X mother's presence interaction shows that while both groups accomplished less when mother was absent, the ADHD children circled significantly fewer letters when mother was absent than did the non-ADHD group.

Dependent Measure: Time-on-task

The same type of analysis as above was performed on child's time-on-task. Again, two significant main effects were found for presence of mother, $F(1,24) = 44.56$, $p < .001$; and group membership, $F(1,23) = 9.24$, $p = .006$. The relevant descriptive statistics are found in Tables 3.6 and 3.7.

Table 3.6

Percentage of Time on Task: Mother's Presence/ Without two outlying cases

	M	SD	n
Mother present	.712	.194	28
Mother absent	.407	.259	28

Table 3.7

Percentage of Time on Task: Group Membership/

Without two outlying cases

	ADHD			Non-ADHD		
	M	SD	n	M	SD	n
Group mean	.462	.198	13	.644	.215	15

These results show that children work on-task longer when mother is present, providing additional support for hypothesis 1. Again, there was a significant group difference. However, support was not found for hypothesis 2 because the group X mother's presence interaction effect did not achieve significance (though the group means did point in the direction of confirmation).

In comparing these two sets of analyses on letters circled and time-on-task, there appears to be some overlap. In both sets of analyses, having mother present led to more letters circled and more time-on-task. In addition, the ADHD group circled significantly fewer letters overall and spent significantly less time-on-task overall. Such overlap is not surprising either through common sense or given the correlation between letters circled and time-on-task (.72 with mother present and .83 with mother absent, both $p < .001$). Nevertheless, as suggested in chapter 2 the two variables seem to be measuring different aspects of the children's performance. Simply because a child is on-task

does not mean he is working on the task as hard as another on-task child might be working. In fact, perhaps the ADHD children are somewhat more similar to non-ADHD children on independent time-on-task than they would be on independent number of letters circled because they accomplish less while they are on-task.

Because of this possibility, it was decided to test the "efficiency" of the subjects by dividing the number of letters circled by their time-on-task resulting in a new variable: letters circled per minute. When this analysis was performed, the results were substantially the same as those reported above, for example, the ADHD children were significantly less efficient than non-ADHD children overall (7.35 letters per minute vs. 11.35 respectively): $F(1,22) = 5.21$, $p = .03$. This difference may help to explain the inconsistent findings regarding hypothesis 2. ADHD children accomplish less while they are on-task.

However, there was one difference between the present findings and the findings reported above: there was no significant difference in efficiency across both groups for mother's presence (9.655 letters per minute with mother present vs. 9.336 for mother absent). It appears that whether mother was present or absent, when the children were working their efficiency overall was about the same.

In summary, the previous analyses provide definite support for hypothesis 1, that children are better able to

maintain their attention on task longer and therefore accomplish more overall when their mothers are present than when they are absent. However, there was no difference in their efficiency while they were on-task. Partial support was also found for hypothesis 2. A group X presence interaction was found for the number of letters circled suggesting that ADHD children do approximate normal children when their mothers are present. However, this interaction was not found for time-on-task. The difference may be due to the different aspects of the child's performance that are being measured. A child may be on-task but not really working hard. Consequently, time-on-task may be a less precise measure of attention. This might result in non-significant interaction effect found for time-on-task between mother's presence and group membership.

Hypotheses 3A to 3E

Differences Between the Interactions of the ADHD vs. Non-ADHD Groups

In order to test the set of hypotheses 3A to 3E, 2 (group membership) X 2 (Order of presentation) ANCOVA's were run with age as the covariate and with a number of maternal and child speech and performance variables used as dependent measures. The rest of the analyses explore relationships between mother and child. Consequently, it was decided to include the two cases that were excluded in the previous analyses because the superlative performance of those two

ADHD children may be related to maternal behavior and speech.

Hypothesis 3A: Mothers of ADHD children speak more often.

Hypothesis 3B: Mothers of ADHD children are more directive than mothers of non-ADHD children.

A breakdown of the descriptive statistics and results on hypotheses 3A and 3B is found in Tables 3.8.

Table 3.8

Group Differences During Interaction

Variable	ADHD (N=15) M	ADHD (N=15) SD	Non-ADHD (N=15) M	Non-ADHD (N=15) SD	Group Main Effect F
Hypothesis 3A					
Total Utterances	78.09	25.63	65.16	46.76	1.61
Hypothesis 3B					
Total Commands	22.23	16.62	16.46	14.20	2.56
% of Total Utterances that were Directive Utterances	0.552	0.168	0.498	0.150	1.02
Total Refocusing Utterances	35.37	28.16	20.94	18.74	3.81
Assisting Behaviors	4.78	4.16	6.52	5.82	Not valid
Redirecting Behaviors	2.49	2.78	2.25	2.80	Not valid

Hypothesis 3A

Hypothesis 3A was not confirmed. Mothers of ADHD did not speak significantly more than non-ADHD mothers.

Hypothesis 3B

Hypothesis 3B was also not confirmed. Only in total number of refocusing utterances was any difference for group membership found that approached significance ($p = .062$; interaction effect: $p = .071$). Thus, no significant differences in means were found on maternal speech variables. In addition to these means tests, maternal assisting and redirecting behavior were compared for the two groups with the Kruskal-Wallis test and no significant differences were found for the two groups.

Hypothesis 3C: Mothers of ADHD children use a lower percentage of questions in their speech.

Hypothesis 3D: ADHD children complain more than non-ADHD children.

Hypothesis 3E: Mothers of ADHD children scaffold less than mothers of non-ADHD children.

The results of the analyses of hypotheses 3C through 3E are presented in Table 3.9.

Table 3.9

Group Differences During Interaction/Cont'd

Variable	ADHD M	ADHD SD	Non-ADHD M	Non-ADHD SD	Group Main Effect F	Interaction F
Hypothesis 3C % of Speech that is Questions	.149	.090	.141	.078	0.03	0.00
Hypothesis 3D Child Complaints	6.82	8.66	2.37	3.40	Not valid	
Mother First	11.50	13.70	0.86	1.22		
Indep. First	2.14	3.62	3.88	5.59		
Hypothesis 3E Percent Scaffolding	0.731	0.155	0.830	0.103	4.58*	5.54*
Mother First	0.846	0.097	0.839	0.131		
Indep. First	0.614	0.213	0.821	0.075		

* $p < .05$

Hypothesis 3C

As seen in Table 3.9, there was no significant difference in the percentage of total maternal utterances that were questions. Consequently, hypothesis 3C was not confirmed. There do not appear to be differences between the ADHD and non-ADHD groups regarding question use.

Hypothesis 3D

When number of child complaints is examined one group looks very different from the others. However, because its distribution is so skewed its variance is vastly different from that of the other groups. Therefore, the group means could not be tested using ANCOVA. Consequently, the data were analyzed with the Kruskal-Wallis nonparametric test and no significant differences were found. However, this is due, at least in part, to the fact that the Kruskal-Wallis test is only a 'one-way' test and can only compare the ADHD and non-ADHD groups. Nevertheless, at least descriptively, it appears that a number of children in the ADHD, mother first group complained a good deal more than children in the other groups. Therefore, while hypothesis 3D cannot be positively confirmed, the evidence suggests that it is not disconfirmed by the present study and points in the direction of confirmation.

Hypothesis 3E

Hypothesis 3E was not confirmed. There were group differences for scaffolding. With scaffolding as the

dependent variable, main effects were found for group membership, $F[1,24] = 5.8$, $p = .024$; and order of presentation, $F[1,24] = 4.58$, $p = .043$; as well as an interaction effect for the two factors, $F[1,24] = 5.54$, p .027. It appears that the ADHD, independent first mothers scaffolded significantly less than the other groups of mothers. It is difficult to know what the cause of this difference is. Perhaps it was due to a tendency for this group to withdraw too much, or to intrude into the task more than was appropriate in order to produce immediate task performance, since this group of children may have been growing weary of the experiment by this time (though admittedly they did not complain as much as the ADHD, mother first group). Perhaps the mothers in this group fell back on repetitious strategies and utterances rather than constructively engage the child in the task. Though they did not scaffold as much, their children did stay on task as much as the normal children did (see Table 3.10). Most likely, this result was due to the child's weariness and the consequent maternal lack of appropriate responsiveness to her child.

Table 3.10 presents the means from a number of important variables to help provide a simple overview of the above findings.

Table 3.10

Overall Group Differences

	ADHD		Non-ADHD	
	Dyad 1st	Indep. 1st	Dyad 1st	Indep. 1st
Total Utterances	78		65.5	
Total Commands	22.5		16.5	
Refocusing Utterances	35.5		21	
Child Complaints	13	2	1	4
Scaffolding	.85	.61	.84	.82*

* Significant group membership main effect and group X order of task interaction effect

In summary, overall there were fewer differences between the two groups than were expected. The only significant differences between the groups was in scaffolding. The mothers in the independent first, ADHD group did significantly less scaffolding than the other groups, perhaps due to the weariness of their children and their response to this weariness. On a descriptive level, the children in the dyad first, ADHD group complained more often. However, no significant differences were found for number of maternal utterances, maternal commands, percent of total maternal utterances that were directive, maternal helping behaviors, and child complaints.

Hypotheses 4A, 4B, and 4C
Relationships Between Mother's Speech and Immediate Child Activity

In order to see if there was a relationship between mother's speech and the child's activity with mother, Pearson product-moment correlations were computed. First, correlations were computed for the ADHD and non-ADHD groups separately and tested with the Fisher r-Z test. Then, if the differences were not significant, correlations were computed using data from both groups. In this section, the tables will present combined data, unless the group correlations were significantly different.

Hypothesis 4A: When controlling for attention and age mothers who are more directive will have children who are on-task for longer periods of time and who accomplish more when they are together than mothers who are less directive.

Originally, third order correlational analyses were run between maternal directive variables and child outcome variables, partialing out the effects of attention (using the CBC score) and age from the analysis. However, it was discovered that there was no appreciable difference between correlations with and without the effects of age and attention partialed out. Consequently, zero-order Pearson product-moment correlational analyses were run which are presented in Table 3.11.

Table 3.11

Correlations/Combined Groups

Maternal Directive Speech/Child in Dyad Outcomes

	With Mother Condition			
	Letters Circled	N	Time-On-Task	N
Maternal Commands	-.644***	30	-.694***	30
Total Directive Utterances	-.611***	30	-.584**	30

** p < .01
*** p < .001

Hypothesis 4A was disconfirmed. Rather than a positive relationship there was a fairly strong, negative relationship between number of maternal commands and directive utterances and how much the child accomplishes and stays on-task. The more frequently mother directs, the less the child does; and/or the less child does, the more frequently mother directs. This information goes directly counter to hypothesis 4A. Nevertheless, in retrospect, these results seem interpretable. Rather than assume that mother's interest and control evidenced in her speech would lead to more task-relevant behavior, it appears that mother's speech may be more of a response to child's task-irrelevant behavior. Children who are working hard require comparatively little spoken direction. On the other side of the spectrum, it is also likely that at least in some cases a certain threshold is reached in which a mother's directives have come to be disregarded and so have become ineffectual. It is also possible that these correla-

tions may reveal the opposite causal direction: those children work less whose mothers were more directive, whereas those children work more whose mothers are less directive.

In addition, a scatterplot of the relationship between mother commands and directive utterances and the two child outcome measures revealed that the negative relationship was slightly curvelinear. To test this observation, the data were put into a polynomial regression equation with maternal commands squared used as the second predictor variable. As can be seen below, when maternal commands and its square were entered into the same equation, maternal commands and its square were both significant predictors of the two child outcomes. However, when total directive utterances was used as a predictor, its square was only significant in helping to predict time-on-task. As a result of this analysis, it can be concluded that the relationships between maternal commands and the two child outcome variables and total directive utterances and time-on-task are actually somewhat curvelinear. Put another way, this means that children with far below average performance were associated with very high number of maternal commands. Then, as the child's performance increased, maternal commands very quickly decreased through the middle of the bivariate distribution, at which point increasing child performance was associated with a very gradual decrease in maternal commands. At this

end of the distribution, high child performance was associated with a very low number of maternal commands. The improvement in the model as a result of adding the squared predictor is presented in Table 3.12.

Table 3.12

Test of Curvelinear Model/Directive Speech and Child Outcomes

Combined Groups

Variables	Squared Predictor P-value	Original R-squared	New R-squared
Maternal Commands			
with Letters Circled	.008	.418	.552
with Time-On-Task	.0006	.481	.651
Total Directive Utterances			
with Letters Circled	.22	--	--
with Time-On-Task	.049	.341	.413

Next, Table 3.13 displays differences in the correlations between the ADHD and non-ADHD groups that emerged through the course of the analysis (N = 15 for each group).

Table 3.13

Correlations/by Group

Percent of Utterances that are Commands: Dyadic Outcomes

	Dyad Condition					
	Letters Circled			Time-On-Task		
	ADHD	Non-ADHD	z	ADHD	Non-ADHD	z
% of Total Utterances that are Commands	-.693**	.148	2.47*	-.591*	-.301	0.90
% of Focusing Utterances that are Commands	-.475	.536*	2.73**	-.670**	.483	3.28**
% of Refocusing Utterances that are Commands	-.500	-.247	0.73	-.422	-.281	0.39

* p < .05
** p < .01

When examining the correlations between percent of speech that was commands and the percent of focusing speech that was commands with letters circled, as well as percent of focusing speech that was commands with time-on-task, negative correlations were obtained for the ADHD group, whereas positive correlations were found for the non-ADHD group. This suggests that for the ADHD group, fewer commands proportionally were associated with more work accomplished; more commands proportionally were associated with less work accomplished. However, for the non-ADHD group, more commands proportionally were related to more work done, and fewer commands proportionally were related to less work done. The normal children responded better to speech with a high proportion of commands than ADHD children. The use of commands with ADHD children on the other hand, appeared to be less effective. It is also possible that the mother's use of commands differed for the two groups. Perhaps the mothers of ADHD children who used a high proportion of commands in their speech used them less effectively by tending to undercut their authority or by aggressiveness, than the same type of mothers of non-ADHD children. There were no differences between groups regarding percent of refocusing speech using commands.

In conclusion, this set of analyses suggests that hypothesis 4A may have very limited support. While overall there was a negative correlation between maternal

directiveness and child outcomes with mother present, a higher proportion of commands during focusing periods was associated with higher performance for dyads in the non-ADHD group.

Hypothesis 4B: With attention and age held constant, mothers who ask more questions will have children who are on-task for longer periods of time and who accomplish more when they are together than mothers who ask fewer questions.

This hypothesis was also originally tested using third order partial correlations between maternal question variables and child outcome variables, with the effects of age and attention partialed out, and again no consistent differences could be detected between third order partial correlations and zero order correlations. Consequently, Pearson product moment correlations were run. The first analysis is presented in Table 3.14.

Table 3.14

Correlations: Combined Groups

Maternal Questions and Child Dyadic Outcomes

	Dyadic Condition			
	Letters Circled	N	-Time-On-Task	N
% of Total Utterances that are Questions	.071	30	.219	30
% of Focusing Utterances that are Questions	-.118	30	.092	30
% of Refocusing Utterances that are Questions	-.394*	30	-.284	30

* $p < .05$

While the relationship does not appear to be as strong as that between commands and child outcomes, a moderate negative relationship was found between percent of refocusing utterances that are questions and number of letters circled with mother present. However, in examining the percent of speech in general using questions, a negative linear pattern was not found. Consequently, one cannot conclude that question use in general is negatively correlated with work accomplished. However, when the child is off-task, a higher percentage of questions is associated with fewer number of letters circled. Perhaps this is due to the disruptive nature of questions. Questions require listening and a response. As a result, they do not immediately direct the child to work. Perhaps when the child was off-task, they tended to be used with especially mild force. Regardless, hypothesis 4B was certainly not

confirmed. Question use is not positively related to improved immediate performance. On the contrary, percent of refocusing utterances that were questions was negatively related to number of letters circled.

Hypothesis 4C: With attention and age held constant, mothers who engage in scaffolding activity more frequently will have children who are on-task for longer periods of time when they are together than mothers who engage in less scaffolding activity.

The same sequence of correlational analyses were run on scaffolding and child outcomes as were run to test hypotheses 4B. The final set of analyses is presented in Table 3.15.

Table 3.15

Correlations: Combined Groups

Scaffolding and Child Dyadic Outcomes

	Dyadic Condition			
	Letters Circled	N	Time-On-Task	N
Scaffolding	.251	29	.416*	29

* $p < .05$

Scaffolding was positively related to time-on-task. While the correlation between scaffolding and letters circled did not reach significance, the correlation was in the same direction as the other correlation. This supports

hypothesis 4C that mothers who scaffold more often have children who stay on-task more, although it is only a moderate relationship. Nevertheless, one interpretation is that scaffolding enables the child to stay on-task, though doubtlessly other factors (including the child's personality and age) play a role in a child's performance. Alternatively, the finding is consistent with the interpretation that children who work hard are easier to scaffold.

Hypotheses 5A, 5B, and 5C

Relationships Between Mother's Speech and Child's Independent Activity

The last set of analyses concerns the relationships between maternal speech and child's performance and time-on-task with mother absent as found in hypotheses 5A to 5C.

Hypothesis 5A: When controlling for attention and age, mothers who are more directive will have children who are on-task for longer periods of time and who accomplish more when their mothers are absent than mothers who are less directive.

Just as in the hypotheses 4A to 4C, the relationship between the variables of interest were examined using Pearson product-moment correlations, after first testing third-order correlations and not finding appreciable differences between them and zero-order correlations.

Again, the product-moment correlations were computed for the ADHD and non-ADHD groups separately and tested with the Fisher r-Z test, and if the differences were not significant, correlations were computed using data from both groups.

The first set of correlations to be discussed focuses on the relation between maternal directiveness and the child outcomes in the independent task found in table 3.16.

Table 3.16

Correlations: Combined Groups

Maternal Directive Speech and Child Independent Outcomes

	Independent Condition			
	Letters Circled	N	Time-On-Task	N
Maternal Commands	-.593***	30	-.597***	30
Total Directive Utterances	-.591***	30	-.509**	30

** p < .01
*** p < .001

Similar to the pattern noted in the test of hypothesis 4A, a negative relationship was discovered between number of maternal directives and the child's independent performance. Consequently, hypothesis 5A was also disconfirmed. The more commands mothers used, the poorer their children's performance was. Again, two hindsight interpretations can be made. Children who are self-regulated need less maternal control when mother is present. Alternatively, high use of commands may result in

low self-regulation, and low use of commands may result in high self-regulation.

In addition, a curvelinear relationship was also suspected for maternal commands and the child outcome variables. When entered into a polynomial regression equation with letters circled as the dependent variable the squared predictor variable was significant as can be seen in Table 3.17.

Table 3.17

Test of Curvelinear Model

Directive Speech and Child Independent Outcomes

Variables	Squared Predictor P-value	Original R-squared	New R-squared
Maternal Commands			
with Letters Circled	.003	.352	.553
with Time-On-Task	.12	--	--
Total Directive Utterances			
with Letters Circled	.03	.350	.455
with Time-On-Task	.52	--	--

Evidently, there appears to be a negative linear relationship between the two directive variables and time-on-task but a negative, slightly curvelinear relationship between the same predictors and letters circled. Nevertheless, again we see a general moderate to strong negative relationship between maternal directiveness and child's work by himself. These results may indicate that high use of commands in general have not been interna-

lized, have not promoted self-regulatory skills, and so have not helped the child to stay focused on the task and resist distractions when mother is not around.

Next, differences in correlations between ADHD and non-ADHD groups on commands and child independent outcomes are presented in Table 3.18.

Here we see one significant difference between groups when comparing proportional command use. However, the overall trend points to the possibility that there may have been a group difference in correlations but small sample size led to a type II error.

These above sets of results lead to the conclusion that hypothesis 5A was not confirmed. Low maternal use of directive speech did not was not related to low output, and high use to high output. This is probably due to underestimating the fact that much of support that children require to stay on task in earlier years has been internalized by the time they reach the age the Ss were in the present study.

Table 3.18

Correlations: Separate Groups

Maternal Commands and Child Independent Outcomes

	Independent Condition					
	Letters Circled			Time-On-Task		
	ADHD	Non-ADHD	z	ADHD	Non-ADHD	z
% of Total Utterances that are Commands	-.594*	.000	1.68	-.448	-.221	0.64
% of Focusing Utterances that are Commands	-.235	.642**	2.59**	-.107	.521*	1.67
% of Refocusing Utterances that are Commands	-.674**	-.074	1.82	-.547*	-.298	0.74

* p < .05
** p < .01

Hypothesis 5B: With age and attention held constant, mothers who ask more questions will have children who are on-task for longer periods of time and who accomplish more when their mothers are absent than mothers who ask fewer questions.

Similar to hypothesis 5A, third-order correlations were replaced with Pearson product-moment correlational analyses between question use from the dyadic condition and the child's time-on-task and number of letters correctly circled during the independent task as outcome measures. These results are presented in Table 3.19.

Table 3.19

Correlations: Combined Groups

Maternal Questions and Child Independent Outcomes

	Independent Condition			
	Letters Circled	N	Time-On-Task	N
Maternal Questions	-.344	30	-.165	30
% of Total Utterances that are Questions	.087	30	.064	30
% of Focusing Utterances that are Questions	-.220	30	-.172	30
% of Refocusing Utterances that are Questions	-.320	30	-.298	30

No statistically significant pattern was detected in the data. However, it appears that the relationship may be mildly negative. At the very least, hypothesis 5B is not confirmed and we can conclude there is no evidence in the present study that question use is positively related to

child's performance when mother is not present. Consequently, there is no evidence in the present study for the view that greater question use facilitates the development of self-control and self-regulation.

Hypothesis 5C: With age and attention held constant, mothers who more frequently scaffold will have children who are better able to regulate their attention on their own than children of mothers who scaffold less frequently.

As with the above hypotheses, Pearson correlational analyses were run on scaffolding and the child's time-on-task and number of letters correctly circled in the independent task. This data is presented in Table 3.20.

Table 3.20

Correlations: Combined Groups

Scaffolding and Child Independent Outcomes

	Independent Condition			
	Letters Circled	N	Time-On-Task	N
Scaffolding	.398*	29	.293	29

* p < .05

A moderate relationship was found between percent of time mother was scaffolding and number of letters circled when alone. The correlation with time-on-task was also positive, but was not significant. These results suggest that a high percentage of time scaffolding co-occurs with

high child independent task-activity. This may be because scaffolding promotes the development of self-control and self-regulatory skills. At the same time, it may be the case that children who work well are easier to scaffold.

Summary

Lastly, Table 3.21 is presented to provide an overview of some of the more important results.

Table 3.21

Overall Group Mean Differences

	ADHD		Non-ADHD	
	Mother 1st	Indep. 1st	Mother 1st	Indep. 1st
Total Utterances	95	61	66	65
Total Commands	26	19	17	16
Child Complaints	13	2	1	4
Letters Dyadic	111(1st)	141(2nd)	153(1st)	172(2nd)
Letters Indep.	23(2nd)	45(1st)	190(2nd)	92(1st)
Time-O-T Dyadic	.60(1st)	.72(2nd)	.78(1st)	.75(2nd)
Time-O-T Indep.	.17(2nd)	.39(1st)	.58(2nd)	.48(1st)
Scaffolding	.85	.61	.84	.82

In general, the two non-ADHD groups performed similarly, except in terms of the letters they circled when by themselves. It appears that the non-ADHD, independent first group did relatively poorly when by themselves, but substantially improved when with mother. In contrast, the non-ADHD, mother first group, continued to improve even when working by themselves, after having worked with mother. The

two ADHD groups tended to perform less well than the non-ADHD groups, a difference that was especially notable when mother was not present. Particularly limited performance was demonstrated by the mother first, ADHD group, when they were by themselves. After working with mother, they had an unusual amount of difficulty when they then worked by themselves.

Mother's and child's speech and behavior for both groups was about the same, although ADHD children in the mother first group, seemed to complain more than those in the other groups. The ADHD, independent first group performed somewhat comparably to the non-ADHD, independent first group. However, the mothers were significantly worse scaffolders than the mothers of all other groups. Perhaps they grew weary with children who were tired. Still they provided enough support to help their children achieve comparably the same as their comparison group. Perhaps, this analysis reveals that the ADHD children could not regulate their attention without their parent's help, particularly after already having worked on the task. Those mothers who worked with their ADHD children after they had already worked on the task by themselves spent less time scaffolding, perhaps indicating that they too were strained in response to the strain of their children.

In addition, a fairly strong negative correlation was found between maternal directiveness and child outcomes,

both with mother and without mother present. However, there was a group difference in this set of analyses. ADHD child performance was negatively correlated with percent of focusing utterances that were commands and letters circled, whereas the same variables were positively correlated for non-ADHD children. There was also a moderate negative correlation between number of maternal questions and number of letters circled with mother present, but no significant relationships were found for question use and child performance without mother present. Lastly, scaffolding was positively related to time-on-task with mother present and positively related to letters circled when mother was not present.

CHAPTER 4

A QUALITATIVE ANALYSIS OF ATTENTION MEDIATION

The previous chapter presented the results of the study in a form that helped to reveal some of the statistical relationships between some forms of speech and some child attentional behavior and activity. The present chapter extends this quantitative analysis and examines the context and nature of the interactions in detail. Specifically, the present analysis considers the forms of maternal discourse used to mediate the child's attention, and the quality of the interaction. Thus, the aim of this chapter is to provide a descriptive analysis of the interactions in order to help understand better the quantitative results as well as to clarify the nature of attention mediation in general.

The present analysis was based on qualitative analyses of mother-child interactions in a previous study (Johnson, 1989), and examination of the present interactions in person, on videotape, and on audiotape. Through these sources a number of questions arose, for example, How does speech and behavior mediate the attention of another?, What helps to maintain joint activities when one party does not enjoy the activity? How is power distributed in such contexts? and How does maternal affect help to shape mother-child interactions?

Transcriptions were made of the interactions of thirteen dyads from the audio and/or videotapes of the

conditions. Those thirteen dyads were chosen on the basis of dyadic outcomes, including maternal scaffolding, commands, and child performance derived from the quantitative analysis. The dyads chosen seemed to typify successful or unsuccessful attention mediation.

Next, the transcriptions of each dyad were read, often while observing the corresponding videotape. Notes were taken of interesting or novel occurrences, and codes were developed of discourse that seemed to exemplify common patterns of attention mediation that were shared by many dyads, as well as unique patterns found in isolated cases. In addition, attention mediation discourse that seemed either especially constructive or negative was distinguished at this stage. Finally, instances of the codes were collated and woven into the following text.

The Immediate Context of the Attention Mediation

The Preexisting Relationship of the Dyad

First, it is necessary to underscore the obvious point that the participants had a lengthy series of interactions before they were observed in the experimental setting. For anywhere from five to ten years, they experienced together love, rejection, authority, submission, kindness, wrath, pride, and disappointment, as well as repeated co-participation in numerous projects initiated by either the mother or the son. Consequently, their interpretation and experience of the experimental situation would have been

expected to vary greatly between dyads.

The Mother's Ownership of the Project

At the same time, there was one important commonality. Each of the mothers decided to participate in my research study voluntarily. When they came to the Learning Clinic to participate in the study, these mothers did virtually whatever they were asked to, and with very few exceptions, they seemed to try hard to follow all the instructions and fill out any questionnaires they were given. They did not argue with me or appear resistent to the task. The main exception to this trend was mother 13 who brought in a magazine during the dyadic condition and read, off and on, while her son worked on the task. However, in general, the mothers were very cooperative and gave evidence that they sincerely desired to participate fully in the research project.

Enlisting the Son

However, the project required the participation of two individuals, mother and son. Consequently, an important part of the mother's task was to enlist her child in the project. From what I gathered unsystematically, some mothers asked their son if he would like to participate in a study, while others simply brought their son in without telling him anything about the study. However, once they arrived both their mother and I acted in ways that made it clear that we desired that they perform the tasks that had

been set up for them. The behavior of the mothers suggests that they recognized their task was to procure their son's participation. It appears therefore that they had intentions for their sons that they participate in the study as well. Basically, the whole study focused on the extent to which the children accepted this set of other-intentions for them. By the end of the study, it became clear that the children varied greatly in the extent to which those other-intentions were owned, whether with mother present or absent.

The Meaninglessness of the Task

The experimental conditions were set up to test the extent to which the children would accept their mother's intentions for them, since the task itself had little intrinsic interest to them. At best, the task could be perceived temporarily as a game. Perhaps especially for young children, matching letters and circling the matches could be mildly enjoyable for a while. A few of the older boys seemed motivated to finish the whole page (which they did). However, the task was designed so that it would not be enjoyable. It was very basic, involving the search for letters, not words, so that most of the boys lost interest in the task quickly; and the task was very long (one page with 1485 characters for 20 minutes). Many of the children complained off and on throughout the dyadic condition. The following is a selection of some of their comments:

Child 4: This is not getting fun.

Child 7: I'm tired.... I'm too tired, Mom....I just can't help watching it.... I don't wanna do this.... This is too hard for me. (This child broke down crying and the experiment was halted.)

Child 3: I want (to) fall asleep... It's stupid. (Mother answers: You can do it.) I can't. (M: Yes you can.) The letters are too small for me.

Child 1: Mom, I'm all done now (After working for just a couple of minutes).

Child 20: It's hard. God.

The boys struggled with this task. It was not enjoyable. When asked afterwards what was so difficult about the task, child 20 was typical.

Mother: What didn't you like about, you tell me what you didn't like about circling the letters in the paper.
Child: Took too long.
M: It took too long?
C: Yeah.
M: Too long for what?
C: I just, I didn't, it took too long.
M: Well, you had the TV going and you had a box of cars there and a box of dinosaurs. Okay. Why did it take too long? Why do you think it took too long?
C: It was boring.
M: It was boring? What do you mean, it was boring? Did you want to do something else instead?
C: Yeah.
M: Like what?
C: I don't know. Play outside.

There just was not much about the task that had meaning for most of the children beyond the fact that their mothers wanted them to do it. The task was not relevant to them. The task was pure work but with the added burden of having no connection to their life.

For example, there was little connection between the

task and their prior experience. A few mothers attempted to create a point of contact with their son's past by pointing out the similarity between the present activity and other word or letter games they played in other books, for example, mother 20.

M: Remember, we've done the word games.
C: Oh.
M: The word puzzles. This is something like the word puzzles. Only this one's a little different. You don't have to look for words, you hafta look for letters."

However, pointing to such continuity did not generally excite long-term commitment to the activity.

Similarly, the task had little relevance to their future life, after participation; though, here again, a number of mothers attempted to create some such continuity by promising to give the child an ice cream or a trip to McDonalds if they would work hard at the task. However, the nature of the task was such that it was fundamentally abstracted from the child's life experiences and his own interests and desires. Consequently, the task was not perceived as relevant to his life.

The Meaningfulness of the Distractor

To complicate matters, within the experimental condition was a television showing a cartoon story of some characters with which every child in the study seemed to be very familiar (Teenage Mutant Ninja Turtles). Consequently, the child was exposed to a story that was perceived as relevant. For most of the participating children this

cartoon story proved to be far more interesting than the required task. A few boys played some with the toy cars and aliens. However, most of them demonstrated great interest in the videotape, watching it for long periods of time during the independent condition and being repeatedly distracted by the television during the dyadic condition.

Compliance with Mother

Given the interest in the turtle story, why was it that any of the boys continued to work on the task at all? Most of the children made it clear that they wished they could watch the television. However, all the mothers made it equally clear that their child had to work steadily on the task. The dyadic setting created a scenario in which the goals of mother and son were in direct conflict: the son's desires to enjoy a cartoon story and the mother's desires that he work on an uninteresting task. The setting created a novel opportunity for co-defining the task-at-hand and negotiating the ensuing course of events.

With mother present, most children seemed unwilling to directly and openly defy her desires for them and completely abandon the boring task. However, some of the interactions seemed to revolve around attempts of the child to negotiate some compromise that would permit at least a partial realization of his desires to watch television. Sometimes the negotiations were very subtle. Child 6 obviously looked at the television for a few seconds and the mother said

nothing. After returning to work for a few seconds he looked back again. This time his mother touched his arm and he returned to the task. He seemed to be testing the boundaries of his mother's intentions for him and seeing how much his own interests could be realized. Many mothers responded to such testing with various attention-getting gestures, including when necessary, turning their son's face back to the paper. Most often, the mothers would respond to such testing with redirective speech. Such speech and gestures were usually successful in bringing the child back. However, they reveal the existence of a power relationship in which the mother mildly (in most cases) coerced her son to work on a project in which he was not interested; either directly, through physically orienting the child herself, or indirectly, through symbolic means (speech or gesture).

In a few cases, the child was successful in negotiating a partial realization of his desires to avoid the unpleasant task. For example, a few children asked if they could at least put the headphones on while they worked. For a short while child 3 was permitted to watch television and work only during commercials. Most successful was child 20 who arranged a deal with his mother in which he would complete one line of letters and then be allowed to play or watch television for a few minutes. Such concessions on the part of the mother formally permitted a plurality of goals during

one period of time. In addition, such concessions suggest that, to some extent, some power-sharing had occurred allowing the child to shape the immediate agenda more than was the case in most of the dyads. Significant variation in the co-construction of the goals of the dyadic task period was evident.

Compliance without mother

When the children were alone, they spent much more time watching television. However, most of the children spent at least some time working by themselves. At least some of this compliance may have been related to fear. Though their mother was not seated in a place where she could monitor them, some of the boys would jump back to the task if their mother made some noise outside the room by, for example, moving her chair, or if someone else walked down the hall. However, most of the boys appeared to be irregularly 'summoned' back to the task by some internal cue. While watching the television, it looked as if someone suddenly tapped them on the shoulder, leading them to return to the task and work again for a while. Such occasions demonstrate the beginnings of the development of a self-regulatory monitoring function within the child.

Some boys showed great distress on their faces when they suddenly remembered their circling job, sometimes muttering complaints to themselves (or to their mother outside the room) about the arduousness of the task. But

other boys showed no displeasure and simply turned from the television to the task without any external prompting. Such occasions suggest that some children had developed some self-control structures, that is, the capacity for receiving and maintaining the rules that their mothers had previously set down. One can surmise that the more upset they were at such times, the greater the internal conflict between their own goals (e.g. to watch television) and the project and its rules laid down by their mother.

Nevertheless, the vast majority of children, both ADHD and non-ADHD, worked during the independent session at least a little while, and some worked over 50% of the time. This suggests that most of the children to some extent continued to define their activity time alone within the intentions and goal-context provided by their mothers.

Thus far, a discussion of the immediate context of the attention mediation has been presented in order to better understand the meaning of the situation to the participants and to place the attention mediation that was observed in its place within the larger context of the experiment. We turn now to examine the particular forms of attention mediation that were used by the mothers.

The Means of Attention Mediation

As suggested in chapter 1, all communicative acts are attempts to focus the attention of another. Whenever we speak or make a gesture, we are attempting to direct

someone's attention to an object that we believe is worth their while to look at or think about. Consequently, all of the actions that were observed could be analyzed in terms of their attention mediating quality. Nevertheless, certain types and forms of speech are especially well-suited for mediating the attention of another in distinct ways.

To understand accurately the particular forms of speech and behavior that the mother used for attention mediation, they must be discussed with regard to the different attentional phases of the dyadic task. Each dyadic activity was made up of certain phases that could be distinguished by their place in the sequence of the events, the child's behavior, and his particular needs of the moment. The mother's task was to scaffold the child's attention by staying with the child, by drawing his attention to the relevant aspects of the task environment in order to help the child do the best possible job, and by keeping the child on task. From a Vygotskian standpoint, such responsibilities enhance the child's independent attentional abilities, permitting him to attend more successfully than he could by himself. Depending on the context, the mothers in the present study displayed forms of attention mediation that had a variety of attentional purposes, including enlistment, focusing, maintenance, refocusing, and encouragement.

Attentional Enlistment

The first phase is termed enlistment and occurs when the child enters the room and sits down with his mother. Her task is to get the child to work on her project. This requires orienting the child to the task-at-hand, and possibly dissuading the child from watching the television. Depending on the child, this phase may be virtually indiscernible or it may last for a minute or more until the mother finally obtains some form of compliance from the child. Some children were immediately interested in the television and had to be persuaded to turn away and listen to the instructions regarding the task-at-hand. For example, dyad 4 engaged in the following interaction:

Child: It's turtles.
Mother: (Laughs) Yes. (Child is looking at television, mother pauses for a moment.) Johnny. (The name 'John' is substituted throughout this chapter for actual names.)
C: Yeah? (Still watching)
M: You have to find.... Sit down.
C: How come that's on?
M: That, the man turned it on.
C: You mean it's still morning?
M: No.
C: How's it on in the afternoon. There's a tape in.
M: There's probably a tape. Okay.
C: I can't hear it very well.
M: No. You're not supposed to. You're supposed to do this. (He continues watching, she waits, then laughs.) OK. Johnny. (He turns back to her.) You gotta go along here and find all the G's, all the S's ....

However, other children entered the room and seemed oblivious to all else except their mother's person and communication and immediately focused on the task.

Attentional Focus

One of the mother's primary responsibilities entailed focusing her child's attention on the rules or on relevant features of the task environment. Usually, the first speech after the child had been enlisted consisted of a presentation of the task rules. This involved stating the rules and pointing out the components of the task (target letters, and so forth). This attentional purpose was evident when the child was working appropriately on the task, but the mother believed there was a need for the child's attention to be directed once again towards one of the rules or to an important feature in the environment; either because a rule was being neglected or broken, or because the child made a mistake and missed a letter or circled a wrong letter. Such scaffolding activity is at the heart of other-regulation and should help the child do the best possible job. Essentially, the mother performs attentional functions that supplement the child's limited attentional abilities. This purpose can be expressed in a variety of ways.

Focusing behavior

Pointing.

One of the most basic types of attention focusing is pointing. The purpose of pointing is to direct someone's gaze at some point in the immediate visual field. For example, if the child had missed a letter, quite often the

mother would point to the target letter or to the letter that was missed. Such a gesture, even in the absence of any words, informs the child that something has occurred which does not meet her criteria for successful work on the task. Usually, however, the mothers would use pointing along with speech in order to provide all the relevant information needed for correcting the error quickly.

Arranging task materials.

It was also common for the mothers to position the half sheet with the target letters on it in such a way that some of the rows of letters on the response page were covered up: either rows that were completed or the rows directly underneath the row that was being inspected. According to their explanations to their sons, they seemed to be attempting to eliminate distractions and to increase their child's vigilance on the one row that was being examined.

Demonstration.

In addition, a few mothers demonstrated how to find the correct letters and circle them. Though used infrequently during this study, modeling is a powerful technique that directs the child's attention to the desired behavior/skill and relevant parts of the task environment through the practice of the 'expert.'

Focusing speech

A wide variety of speech was used to focus children's attention, including certain verb forms such as 'Look,'

"Watch,' and 'Listen;' demonstrative pronouns like 'This' and 'That;' adverbs of location such as 'There,' and 'Here;' and adjectives that isolate important features like 'the first row.' However, more important and interesting than these word forms were the sentence forms that directing utterances could take: interrogatives, indicatives, and imperatives.

Interrogatives

Perhaps the most interesting form was the use of questions to direct the child's attention. An example is provided by the mother of dyad 27 who corrected her son after he had apparently circled the wrong letter:

Mother: Um-hum. Is that one of them? (one of the stimulus letters)
Child: Naw.

This mother did not tell her child that he did something wrong, per se (e.g. 'That's not one of them.') Rather, she put the responsibility for identifying the error on her son. She simply provided an indirect cue that let him know something was wrong. Interrogatives act as a personal invitation to the hearer to take responsibility in the situation and direct his own attention to solve the problem.

In addition, interrogatives can be used by individuals who seem disposed to avoid an authority role with their child but still recognize a need to focus attention. For example the mother of dyad 7 produced the following utterances:

Mother: Want to put this paper under the row? ... (to) make it easier?

In this case, it was as if the mother was asking the child for permission to provide this assistance. The mother of this dyad asked many questions throughout their time together and took great pains to avoid using stronger utterances like imperatives.

Interrogatives can also be used to pique curiosity, and to summon the child to the task. For example, the mother of dyad 9 stated the following:

Mother: Okay. Good. You caught yourself. Good job. You know what? That's not erased well enough.

In this example the mother used the question "You know what?" to get the child's attention. This illustrates an important characteristic of interrogatives: they are sentences that are the most truly interactional of all utterances. They summon the addressee and invite him to focus his attention on the other and respond.

Interrogatives can also be used with the aim of generally orienting the child's attention but allowing the child latitude to direct his attention specifically where he wants. For example, the mother could say, "What letter would you like to start circling first?" However, such invitations were rarely given in the present task. This is probably due to the highly structured task requirements and the fact that the mothers may have been reticent to allow their child too much latitude, given the power of the nearby

distractor.

Indicatives.

Indicative utterances are also used to direct attention. Since they indicate a state of affairs, they are more straightforward in directing attention to something than interrogatives. When used to focus attention, indicatives promote less independent activity since they invite the addressee to focus his attention to something already isolated by the speaker. For example, the mother of dyad 9 corrected her son in the following manner:

Mother: You missed one. Oop. You missed two in that row.

Here the mother identified the error for the child. Indicatives utterances directly single out something to pay attention to, but without any overt coercion. A statement simply describes what is. Nevertheless, as Ervin-Tripp (1977) has suggested, both interrogatives and indicatives are sometimes used to indirectly induce the person to do something. Clearly, all the utterances in the focusing category have some implied imperatival force.

Imperatives.

Utterances that have the clearest and usually strongest coercive force are called imperatives. Imperatives focus the child's attention on the desired activity as well as provide some direct coercion. In addition, they are the least interactional in character. They do not invite a wide range of possible responses; they demand compliance to a

specific task. Consequently, imperatives convey two messages: a message of authority, along with the meaning of the utterance itself. The use of imperatives in focusing attention is exemplified by the mother of dyad 9:

Mother: So, first of all, start at this row and look for all the g's. Okay. And come back and look for all the s's. I haven't really looked at it so I don't know if there'll be more than one or if there's just one. Now you're looking for what?
Child: T.
M: Okay. Find the t's.

Imperatives come in different forms and vary in their directive strength or power. The strongest imperatives are second person singular imperatives that include the second person singular pronoun or the addressee's name. An excerpt from dyad 3 provides an example:

Mother: Johnny. Put the headphones down and listen. Johnny, do your page. Hey, young man. Do your work.... Johnny. (slight pause) Put the headphones down and do your page.

More commonly, imperatives are given without the child's name or the word "you," as we saw in the quote above from dyad 9. One of the mildest imperatival forms is the first person plural form beginning with "Let's." For example, the mother of dyad 19 used that form with her son:

Mother: Let's go for the t's. Let's look for the t's.

This form subtly emphasizes the communal nature of the project while still ordering certain behavior.

Toxic imperatives.

When effective, imperatives obtain the desired goal from the child most quickly. However, at the same time, it

was clear in the study that in a few cases, the mother's virtually exclusive use of commands (harshly spoken) seemed to correspond with the child's passive, non-reactive, and non-verbal performance. The child of D1 was given no opportunity to initiate any activity and he did not seek out many such opportunities on his own. Whenever he did initiate a comment, as in the following excerpt, he was quickly and forcefully directed back to the task.

Mother: Now you gotta take your time and circle just the d's, not 3 or 4. Kay. Find your n's.
Child: Do I do all of them now?
M: NO! DO THIS ONE LINE! FIND YOUR N'S! Right there's an n.

While effective, if used too often and with negative affect, commands may become toxic, overwhelming the child and leading to passive, perfunctory performance.

Powerless imperatives.

As was stated in chapter 3, a strong negative relationship was observed between the number of commands and the amount of time-on-task, for example. This relationship was observed on the videotapes. The mothers of children who were off-task a great deal used a high number of commands, just as they used a lot of speech in general in order to get their children back on task. Children who were quiet and worked hard required less speech and fewer commands. However, in watching the videotapes, it was clear that some of the mothers who used many commands were nevertheless reticent to speak their commands with clear tones of

authority. The children of such mothers seemed to be able to negotiate more with their mothers and in some cases to manipulate their mothers into allowing them special privileges. It may be that the mothers of children who stayed on-task for longer periods of time had already trained them so that when they said something, they meant it.

Attentional Maintenance

When the child was on-task, the mothers typically sat facing towards the child, looking at the task materials. All the mothers made various comments during these periods indicating that they were still 'with' the child, that the activity was still a joint activity. This included responses to the child's remarks such as "um-hum," "yeah," and "okay," as well as self-initiated remarks like "um-hum" and "okay." In addition, some mothers made the effort to hold the paper with the target letters on it, and some mothers periodically praised their child. These utterances and behaviors appear to help maintain the child's attention and activity by encouraging the child and reaffirming the joint quality of the task.

Attentional Encouragement

When the children complained about the work either verbally or non-verbally (with disapproving facial expressions), the mothers sometimes shifted the focus to the child and his affect or perceptions, or to the difficulty of

the task, in order to avert a breakdown in their joint project. Such maternal responses were termed attentional encouragement. Sometimes mothers strongly disagreed or argued with their child, as seen in dyad 5:

Child: Do I hafta do all the way to the bottom?
Mother: Will you stop worrying about how much you hafta do and just worry about this row right now? (angry)

Some mothers disagreed with their children, but in a milder fashion, like dyad 7:

Child: This is too hard for me.
Mother: I don't think it's too hard, but it's not very exciting, is it? Not very interesting.

At other times, this mother responded to his complaints by saying "I know. That would be hard," and "I understand." (Nevertheless, these empathic-like comments did not seem to help her son stay on-task.)

A common and effective strategy was simply to respond briefly to the remarks but to fairly quickly move back to the task with a gentle, but no-nonsense manner. This was illustrated by the mother of dyad 19.

Child: When is twenty minutes gonna be up?
Mother: Not too much longer, I don't think. I forgot to check the clock when you left. But let's do this line. It starts with an i.

One would think that responding to the child's complaints would be beneficial. However, the most effective mothers overall only sporadically acknowledged the child's difficulties and returned to the task rather quickly. Presumably, one could err by treating the child's distress

too seriously and so implicitly communicating the validity of the child's experiences, or by completely ignoring the child's struggles and so communicating a lack of warmth. Perhaps there is a golden mean of attentional encouragement.

Attentional Refocus

Lastly, on many occasions the children were unable to maintain their attention and they stopped working. Usually, at such times the mothers attempted to get their sons to return their attention to the task. Since the child had abandoned their assigned task, the mother's new, immediate activity became persuading the child to rejoin the original task.

Refocusing behaviors.

Mothers used a variety of behaviors to bring their child back on task. The mildest forms of refocusing behavior included such things as tapping the table, touching the child's arm, and tapping the child. Sometimes, if a child was especially resistant, a mother might take his hands away from the off-task object of attention (the video player or toys), and/or physically turn his head back towards the circling task. On three occasions, a mother slapped or spanked her son when he was off-task.

Refocusing speech.

Findings similar to focusing speech were obtained for refocusing speech. However, the quality of the interaction differed. When refocusing attention, the mothers used more

commands and spoke with greater overall imperatival force than when their children simply needed some within task direction. Consider for example, dyad 5:

Mother: Johnny, put the headphones down and listen. Johnny, do your page. (slight pause) Hey, young man. Do your work. (slight pause) Johnny. (slight pause, mother becoming angry) Put the headphones down and do your page. (slight pause) You going to be a good boy? Johnny!

Strategy Use During Refocusing.

A wide variety of strategies were used by the different mothers throughout their interactions with their sons. These are discussed in some detail because of the importance of these different strategies. When the child went off-task, he was presumably attempting to alter the joint project in a direction more in accordance with his desires. The mother may interpret such an initiative as a healthy expression of independence or as a blatant rebellion against her wishes. How she then handles the situation is also very important. Such situations provide opportunities to communicate the mother's attitude towards the child, her valuing of his independence/dependence, and her understanding of their relationship and its power structure. Much is communicated to the child during such episodes. Therefore, the strategies used by mothers to encourage a return to the assigned task (as well as the messages within these strategies) are critical components of attention mediation.

Strong Authority Strategies.

During refocusing periods, the most coercive strategies might be termed strong authority strategies. These strategies involved power-assertion, including a degree of negative affect, and sometimes loud delivery, threats, and/or physical punishment. Three acts of physical aggression were observed. Once, while her son stopped circling and was staring at the worksheet, the mother of dyad 5 stood him up and spanked his bottom. The other two acts might not be considered as punishment in the strict sense, but they were physically aggressive. At one point the mother of D1 seemed to be frustrated with her child's performance.

> Mother: G's the one, number. Do, go, you circle all the letters instead of just sittin' there. CIRCLE IT! (At this point, she grabbed the pencil out of his hand and it went flying out of her hand and on to the floor. Then she bent over to pick it up.) I'm gonna knock you! (Upon straightening up, she lightly slapped his shoulder.) Sit up there and pay attention to business. I can tell you right now, you're gonna fail this test, because you're not payin' attention.

Later on, in a similar episode she grabbed his chin, pulled his face towards hers, looked in his eyes, and yelled 'Wake up!' Throughout the dyadic session, the mother of dyad D1 relied on strong authority strategies, alternating between periods of speech that were joyless and lacked warmth, and periods of verbal aggressiveness.

The mother of dyad 5 also used strong authority strategies more frequently than was common. She assumed an

aggressive posture with her son, at least during a portion of the dyadic session. However, after the mother of dyad 5 spanked her son and he cried, she temporarily became more sympathetic and encouraging, speaking in a softer and gentler voice. But when her son became resistent, she again became verbally aggressive.

Child: Do I hafta do all the way to the bottom?
Mother: (angry) Will you stop worrying about how much you hafta do and just worry about this row right now?

The mother of dyad 13 was somewhat more reserved than D1 or 5, though she also relied on verbally aggressive strategies. However, she tended to speak more quietly and with mock politeness.

Mother: Okay, do the next line.
Child: Do I hafta do this? Do I? (She looked at him coldly but gave no answer.)
M: Go on to the next line please (irritated)
B: I itch.
M: The next line please. (more irritated.) Start. Quit looking at yourself and do that please! (louder and more irritated)

These strategies were usually eventually successful at getting the child to work (though the quality of the work was not high for these three dyads). The children of dyads D1 and 5 tended to respond by passively doing as they were asked. However, the responses of the dyad 13 child alternated between quietly returning to the task and complaining. Either way, these strategies seemed to create a tense and hostile atmosphere, at least temporarily.

Mild Authority Strategies.

Much more common was a mild authority strategy (MAS). Though similar to a strong authority strategy in that it was based on an unequal power relation between mother and child, a MAS is qualitatively quite different, involving much less power-assertion and overt coercion. The simple, non-affect-laden command as seen in the following statements of the mothers of dyad 7 and 3 are examples of mild authority strategies.

Mother (7): Okay. Go down the row and see if you find any g's.

Mother (3): Look at mommy. I want you to do this paper.

Slightly more coercive but still without hostility was the MAS expressed by the mother of dyad 10.

Mother: You can't watch it till you're done with this. Come on. Do this.

One commonly used MAS involved calling the child's name as was done by the mother of dyad 23.

Mother: Johnny. Johnny. Come here. Look. Look for these letters on the second line.

While not immediately effective in the present case, calling the child's name often did result in the child turning back to the task, at least temporarily. Calling someone's name is a very personal, direct address. In addition, quite often when a mother called her son's name it seemed to function as a summons, conveying the meaning 'Look here.' To deliberately ignore such a form of address is a

significant act of defiance.

A MAS can also be used with a good deal of warmth as found in the following interaction of dyad 9.

Mother: (She is smiling) You're watching TV. Come on. I see you watchin' it in the mirror. (Both are laughing and smiling.) That's cheating.
Child: (He returns to the task.) I know. It is.
M: You what? You can't resist? (She smiles.)

The mother was able to assert her authority and bring him back to the task gently and with humor. Who could resist such 'coercion?' Such an approach seems to exemplify the authoritative parenting style found by Baumrind (Grusec & Lytton, 1988).

On a few occasions, questions would be used as a MAS. For example, the mother of dyad 3 used a question to respond to her son when he was attempting to touch the VCR.

Child: I can touch the tape.
Mother: But what are we supposed to be doing right now? You're supposed to be circling the letters on this paper. And I want you to circle the letters on this paper. Okay?

However, most of the time commands, rather than questions, were used as MAS to redirect the child's attention. This was probably because of the unique characteristics of an off-task episode. When the child was off-task, he was attempting to redefine the joint activity. However, in line with the established goals of the study, it was necessary that she reestablish her authority role by reorienting her son back to the task and underscoring the original goals of the task activity.

Problem-solving strategies.

On some occasions, a mother would respond to off-task behavior and frustration, by breaking down the task into smaller, more manageable pieces, as was done by the mother of dyad 3.

Mother: You circle the paper, the letters, and you'll be done quicker and then you may watch that.
Child: I can't. I just want to do one line.
M: We do it one line at a time and then it isn't so big a task, and we can get it done.

This cognitive strategy is particularly helpful when the child appears to be overwhelmed by the difficulty or perceived length of the task.

A related strategy consisted of an offer of help as used by the mother of dyad 7.

Mother: Here. Follow my pencil down the row. What letter do you want to look for, 'G' first? Come here. Watch my pencil.
Child: This is why I didn't wanna do this.
Mother: Okay. Here. I'll help you and we'll go faster.

Actually, his mother had already been facilitating the child's work. However, presumably due to his continued complaints, she recognized that he needed greater assistance to the point that she took over more responsibility for the task than she had done before. This may have communicated at least two things: first, that she recognized he was struggling and she wanted to help; secondly, that she was willing to compromise on the task demands to make it easier.

Motivational Strategies.

Some of the strategies that were used were direct

attempts at increasing the child's motivation to work on their project. Perhaps the most common was to point out to the child the built-in reward of the task: that he would be allowed to watch the television when the task was over. This information was used to encourage the child to stay focused on the task for now so that later he could watch.

Mother (7): You know, when we're all done, then you'll get to sit and watch it and just enjoy it.

A more drastic motivational strategy was to offer or promise the child something desirable after he was done with the task. For example, the mother of dyad 5 offered her son an ice cream after the task, and the mother of 7 asked her son if he wanted to go to Wonder World afterwards. The mother opted for a powerful extrinsic motivator, appealing to the child's self-interest in something outside the task itself.

Some mothers attempted to motivate their child by making the task itself more pleasurable. The mother of dyad 3 asked her son if he would like to work on the task while sitting on her lap. However he declined. This mother was actually quite resourceful. She later attempted to turn the task into a game.

Mother: Let's think of people's names that begin with those letters. What begins with the letter K? And then let's circle it. What begins with K?
Child: Nothing.
M: Keith? Alright. Let's go down. There's a K. Ken?

Nevertheless, he did not respond positively to this attempt either.

This mother also attempted to raise her son's expectations of his own performance.

Child: I want to quit. This is too hard for me.
Mother: No it's not. You're smart.
C: ^Yes it is.
M: You can do this. If this was a math page, you'd have it done.
C: Already.
M: Well, let's think of these as numbers rather than letters.
C: I can't. How can I?
M: You know algebra has letters in it as well as numbers? And sometimes the letter is what's in that. (He looks off-task again.) Let's think of it this way.

She was temporarily successful in bringing him back to face-to-face interaction for a little while, however, this strategy was not ultimately successful either.

Lastly, the mother of dyad 3 also used moral reasoning with her child, in order to help him accept this task in spite of its unpleasantness.

Mother: Sometimes we have to do tasks we don't like, don't we? Do you think when Mommy's studying it's all things she likes to do? I don't think so. Johnny, put the headphones down and listen....

Obviously, this strategy was also unsuccessful. Though the mother in dyad 3 was one of the most creative in her use of motivational strategies, her son was one of the most resistant to the task of all the children in the study. In this case, simply being creative and providing a number of different strategies did not necessarily lead to task compliance. Resourcefulness is probably helpful but was not sufficient by itself in the present case.

A very different set of motivational strategies were

used by the mother of D1. This mother attempted to shame her son into task performance.

Child: It's hard.
Mother: It's not. Are you stupid? SIT THERE! S. IS THAT AN S OR NOT? DO IT. Go ahead. Act stupid. Find out if you don't end up put somewhere on this. That's what these tests is for. Find out how much smart you are. So keep on acting stupid.

And a little later, in preparation for the independent session she said the following:

Mother: Just do your letters. Do your work, do not watch TV, or do not play with toys. You just do your letters. I"M GONNA LEAVE YOU HERE. THAT'S EXACTLY WHAT I'M GONNA DO BECAUSE T-- IS DOWN IN THE PARKING LOT RIGHT NOW, WAITING FOR YOU. NOW GET GOING. DO YOUR WORK.

This mother used extreme threats and belittling language to motivate her child into action. Although, the son did comply fairly well while the mother was present, he did not work when she was absent.

Temporary Suspension of Task Activities.

At times, some mothers decided that the best strategy for that moment was to briefly 'follow' the child in some off-task statement or action rather than immediately halt the off-task behavior. Positively interpreted, such maternal behavior may demonstrate the flexibility of the mother, may give the child some room to act independently, and may communicate to the child that he was not being rigidly controlled. However, in some cases, it may indulge the child and provide the child with more control of the agenda than might be desirable in terms of task completion.

The effect of this strategy and the message conveyed are probably dependent upon how frequently such suspensions are permitted and how long they last.

Once when her son was stretching for about 10 seconds (an unusually long time of task inactivity) the mother of dyad 19 handled the situation in the following manner:

(Child pauses.)
Mother: Great, great. Okay. Let's do the next one. (Child starts stretching.) These are a little different aren't they.
Child: Uh-huh.
M: (She looks at him stretching and shaking his writing hand.) You're wearing out your fingers?
C: Ah. Ha, ha, ha=
M:=Your muscles are gettin' worn out. (He keeps shaking his hand, then he laughs.) Okay. Ready? (Then he goes back to work.)

The mother here exhibits a degree of patience and composure. Rather than jumping on her son, she recognized his need for a break and gave him the freedom to relax. However, he did not initiate returning to the task himself, so after a reasonable amount of time had passed, she indicated, without harshness, that he needed to return to the task.

Sometimes, a mother would use this type of strategy to respond to off-task behavior when accompanied by a complaint in order to pause a moment or two to encourage the child or provide some sympathy given the task difficulty. This is evidenced in the following interactions of dyad 7:

Child: I don't want to do this. (He stops working and sounds like he is on the verge of crying.)
Mother: I understand. (She waits for about 10 seconds while he sounds like he is quietly sobbing.) Okay,

let's look at the row again.

And a little later:

Child: (He stops working and says in a whiny tone:) This is too hard for me.
Mother: I don't think it's too hard, but it's not very exciting, is it? Not very interesting.
C: I can't do this.
M: Hm? Did you look for more A's?

Here the mother permitted her son to temporarily stop working on the task so that she could attend to his needs and perhaps to give him a little time to regain some control.

Ignoring Strategy.

On some occasions, mothers would simply ignore their child's complaints or off-task behavior and act as if the child was not complaining or was on-task. This was a common strategy of dyad 1.

Child: Mom, I can't do this no more.
Mother: Anymore. (Mother laughs.)
C: Anymore.
M: What's that right there.
C: This?
M: Yeah.
C: 'g' (And they get back to the task.)

The mother was able to get the child back on-task without acknowledging his complaint, but focusing instead on his misuse of language. As a result of this deflection of attention, she was then able to direct his attention back to the task.

Accommodation Strategy.

On a number of occasions when their child repeatedly resisted, some mothers got to the point that they gave in to

their child's desires for a period of time. This behavior pattern is called strategic because the mothers acted in such a way that implied that they expected the child to continue working or to return to the task eventually.

Accommodating strategies appeared to be used by the mother of non-ADHD dyad 20. After working for a few minutes, the child began to experience some difficulty staying on task, and he put on the headphones and tried to watch some television. However, his mother would not permit it.

Child: It's hard. God. Okay. (He puts the pencil down.) You do it. Let's see you do it.
Mother: I can do it. It's up to you, to see if you can do it. (Then he takes pencil, knocks on her head.)
C: Hello, hello. Anybody home.
M: (She laughs.) She said you, um, he said you gotta do it with me.
C: I am doing it with you but you hafta do it. (He looks at the television.) What the ...?
M: (She waits a couple of seconds.) John.
C: I wanna see what he changes into.
M: Then what? Then will you take it off?
C: Yes. Not this off (pointing to the headphones), but I'm gonna ... play. He brought cars! Are these my cars.
M: No, honey. (He gets them out of the box.) Johnny. Yo, John.
C: Cool cars, especially that one.

He soon put down the headphones and began to work but said that after he was done with a row he would play with the cars. When he finished the row, his mother allowed him to play with the cars for about three minutes and she reminded him of the deal he made to do another line.

This strategy may have produced more work than would

have resulted without it. However, it seems likely that the child accomplished less than he could have had the mother opted for an authority strategy.

Dyad 3 provided another example of the use of accommodation strategies. The child in dyad 3 was quite persistent about wanting to watch the program over the 20 minutes of their dyadic interaction. Early on the child made it clear he was interested in watching television, but his mother made it clear he could not. After being repeatedly distracted, the child asked if he could work during commercials. His mother said no. Later, his mother noticed that he was watching during a commercial.

Mother: You know what you're doing? You're watching just the commercials. You said you were going to do this on the commercials. Are you doing that? What are you doing? There's another letter.

It appears that the mother had to some extent conceded his right to establish a criterion for when he could watch television. This impression was confirmed later.

Mother: There's another N. There's a T. All you have to do is circle them, and do it. And you can get them done. Alright, commercial's coming on. Let's see how many lines we can get done while the commercial's on. Okay. What this letter?
Child: (inaudible)
M: That's a T. Okay. Let's go. Okay. Keep going. Good. We're halfway done with that line. Good. Okay, let's do the next line. What letter is this? (He turns to look at the television.) You said while commercials were on you were going to do this.
C: Oh, yeah.

Throughout their interactions it appeared that the mother was highly expedient in her handling of her son. She

used a variety of strategies to keep him on task during the condition. However, as a result of his continued resistance, she appeared to be wearing out and began encouraging his task performance in terms of the compromise that he had suggested, implicitly communicating that the new rules were acceptable. However, there was never a clear message that she was permitting him to work only during the commercials. Then, when the commercials ended she appeared to change the implicit rule and directed him to keep working. While she was able to obtain some compliance with these strategies, it is unclear how the child made sense of the inconsistent messages.

Overall, accommodation strategies had limited success. Besides resulting immediately in less work accomplished than other strategies may have produced, over the long run they may have also undermined the mother's legitimate authority role in the relationship. Accommodation strategies seemed least helpful when mothers completely relinquished the right to define the activity, becoming reactive and yielding total control to the child. However, it must be acknowledged that the children did produce some work in response to such strategies signifying some compromise in their joint construction of the activity. Moreover, the particular children exposed to these strategies may have produced more work with them than without them. Nevertheless, it may be that the use of such strategies increase the likelihood of

resistant behavior in the future.

The Mood of Attention Mediation

Mothers of high- and low-functioning ADHD and non-ADHD children used a variety of speech and strategies in their attempts at attention mediation. However, one characteristic of the interactions did distinguish some dyads among both groups: the emotional tone or affective mood established by the mother. One subset of mothers showed a combination of firmness and warm flexibility. In contrast, one subset of mothers were characterized by a certain degree of hostility and anger; another subset seemed anxious, fearful, and uncomfortable.

Negative affect is often prompted by an unpleasant or difficult activity. Mothers forced to deal continually with a demanding or difficult child may become habitually negative (Ross & Ross, 1982). Nevertheless, regardless of the source of the negative affect, the emotional tone set by the mother provides the motivational and affective context within which attention mediation occurs and it would impact that mediation. In fact, one could argue that scaffolding includes, not just the provision of cognitive assistance, but also the motivational and emotional medium that sustains difficult task activity.

The vast majority of the children gave no evidence after the first couple of minutes that the circling task was intrinsically interesting. Consequently, most mothers were

called upon to work with a frustrated child. Of present interest is the way this potentially negative emotional event was jointly experienced. How did the mother respond? Was there some form of affect attunement (as discussed in chapter 1) among these post-infancy children and their mothers? And beyond affect attunement, were other kinds of intersubjective emotional unity and support attained in the interactions?

Negative affective intersubjectivity

The child of dyad 7 had the most difficult time with this task of any of the participants. His dyadic activity had to be stopped after about eight minutes because he began crying. Throughout that time, he did little work and alternated between whining and complaining. Faced with this behavior, his mother demonstrated little empathy. For example, when he once stated that he was tired, she responded, "I imagine. Okay, now. Look at the letters...." Perhaps somewhat overwhelmed with her son's emotional intensity, her responses did not seem to be attuned to her son's remarks and affect. Furthermore, his mother seemed mildly anxious and uncomfortable with her son; in response to his distress, she did not respond in an appropriate mannter that addressed his needs.

In addition, throughout the eight minutes the child was becoming increasingly troubled, whining and complaining. Nevertheless, his mother never provided any strategies that

would help him control his emotions. Given his emotional lability, it seems unusual that she never provided any strategy for dealing with his feelings.

At one point, the child began to complain especially forcefully:

Child: I want to get done with this.
Mother: Okay. Are there any more K's or G's in that row?
C: No.
M: D.
C: I don't want to do this. (anguished)
M: I understand.
C: (At this point, the child says something despairing and begins to look and sound like he is crying.)
M: Okay. Let's look at the row again. You find any more?
C: No. (Said in a whiny tone while looking at his reflection in the two-way mirror.)
M: You like looking at yourself?
C: No. I want (inaudible; said in whiny tone.)
M: Hm? Here. Follow my pencil down the row.

The mother was task-focused. However, at one point when her son was quite upset she teased him about looking at himself in the mirror. The comment seemed to lack responsiveness to his needs, and again suggests that she was not attuned to his affective experience. Though without overt hostility, these interactions provide some evidence of a lack of emotional intersubjectivity between the two participants. The mother was mildly anxious, uncomfortable, distant, and showed a lack of empathy or deep responsiveness to his feelings; while her son was disappointed, whinny, and full of complaints. Furthermore, the mother did not successfully model positive emotions giving her son an emotional alternative.

Dyad 13 also provided an example of a lack of affect attunement and intersubjective agreement. The reader will recall that the mother of dyad 13 brought a magazine into the experimental condition and read it off and on throughout the 20 minutes. Here we have a case, unique to this experiment, in which the mother defined the condition as solely her son's task, in spite of the fact that she received the same instructions as everyone else. As a result, she acted primarily as a proder to get him to perform, but she did not seem to see herself as a co-participant in the activity. In such a context it may not be possible to achieve intersubjective union. The mother defined the situation such that their tasks were completely independent or mutually exclusive: her son had a job to do and her job was to periodically prod him to do his job. Their interactions were limited and perfunctory and seemed to exemplify conflict more than unity.

The following was typical of their interactions:

Mother: Alright. Start and find all the G's.
Child: This is boring.
M: Okay. All the S's.
C: Are you gonna help me on this. (pause) All the G's.
M: All the G's. (She looks at magazine and puts it down.)
C: And all these. And all the D's. Why do I hafta do this?
M: Keep goin'. All the N's. Come on. (pause) All the I's.
C: (Inaudible)
M: Next line. (Child groans.) Come on. (She looks at the magazine. He stops working and looks at her long and hard.) Come on.
C: This is boring. This is giving me a headache.
M: Oh, please. Come on.
C: Oh, please, it does.

M: John. (She stops looking through magazine and looks at him.)
C: Mom.
M: What? This is what you're supposed to be doin'. You only have to do it for 20 minutes. Now, do it. (Last statement said aggressively.)

Then, a little later the following exchange occurred.

Child: I've gotta do all of it, or as much as I can?
Mother: As much as you can. Yep. (She is looking at magazine.)
C: I said I've done as much as I could. (He pauses and looks at her.) If you don't wanna moustache, you better shave. (She looks up.)
M: You are supposed to be doing something, not paying attention to me, thank you very much. Get busy. (He starts working and she looks at the magazine.)

Underlying their interactions was a degree of quiet hostility. They seemed to be speaking at cross purposes. The child was being goaded into an activity in which neither he nor his mother was invested. The forms of attention mediation that the mother used were more often like verbal shoves than messages that might create intersubjective unity or evidence affect attunement. Not surprisingly, they did seem to have similar affect: mildly hostile. However, they seemed to be hostile by themselves. Perhaps there was some form of intersubjective agreement but it seemed, paradoxically, to be intersubjective hostility.

While the above cases were unusual, the fact is that they were examples of a number of cases in which the mother and son appeared to be in conflict and lacking in jointly experienced positive emotions. In dyad D1 the child was basically quiet and withdrawn during the interaction, while the mother was pushy and verbally aggressive throughout the

interaction. Similarly, in dyad 5 the mother was periodically angry and punitive, while the child was comparatively quiet and detached. In dyad 3, the son was quite upset and even angry about the task and extremely distracted. However, his mother vigorously enforced the rules of the experiment, using a wide variety of strategies in order to get her son to stay on-task. Yet throughout the interactions, she remained stern, detached and emotionally uninvolved. In all these cases, there seemed to be a lack of genuine empathy and warmth.

Typically, dyads lacking in jointly experienced positive emotions had children who acted in one of two ways. One group of children seemed withdrawn and detached, seeming to go through the motions of task-performance when their mothers were present, but demonstrating no affect regarding the task. In these cases, the mothers seemed to impose the project so strongly upon the child that no complaint could be made. If complaints were made, the mothers could be quite harsh in their response.

Another group of children was visibly and verbally frustrated with the task and the mothers seemed anxious or afraid in response and unable to deal directly with their child's affect. Whenever these children went off-task, the mothers seemed to respond indirectly or helplessly. In neither scenario did the mother provide warmth or joy.

As suggested above, in most cases there did seem to be

some similarity in negative affect among the two members of each dyad. However, the similarity did not seem to indicate there was any pro-social unity in their affect. On the contrary, the feelings of these dyads seemed characterized by a lack of empathy or joy, signifying some alienation from each other. As a result, there was also an absence of true affect attunement.

Positive affective intersubjectivity.

In contrast to these cases were the few cases in which the mother and child seemed to attain some measure of jointly experienced positive affect. These dyadic experiences were generally characterized by an overall atmosphere of warmth, joy, and comradery. Unfortunately, it is not possible to convey on the written page the precise nature of this warmth, but it's existence as recorded on the videotapes was undeniable. Consequently, an attempt will be made to describe this phenomenon.

During their interactions, the mother of dyad 19 maintained her son's attention with a gentle firmness that allowed for no exceptions but was nevertheless mild in rebuke. At one point, while the child was working on the task, he began to look at the reflection of the television and she caught him.

Mother: No watchin' TV. Come on (She says this in a laughing sort of way and then chuckles some more.) I see you watchin' in the mirror. (Both are smiling.) That's cheatin'. (Said with a smile.)
C: (He returns to the task.) I know. It is.

M: You what? You can't resist? (Said with a smile, then changes tone.) You're doin' a good job. (Then he continued working for about 10 seconds and he looked up again. He looked back down just before she saw him. Then he looked up again and was caught again.)
M: Get your work done. (Said without a smile, firm and business-like. He jumps back to work.)
C: Some TV.
M: What?
C: (inaudible)
M: Okay. Well, get it done and then you can sit and concentrate on TV and not worry about it...not worry about havin' to do this.

Here, she responded to his misbehavior cheerfully but firmly. She originally took the off-task period humorously. But when he persisted, she stopped smiling and non-aggressively but firmly reminded him that he must keep working.

Smiling and laughing were an important component of the interactions of dyads that experienced jointly experienced positive affect. Such behaviors on the part of the mother indicated that she was enjoying the experience and provided positive emotional leadership that presumably helped to draw the child into task performance.

Even when her son was complaining, the mother of dyad 6 maintained a basically positive, encouraging emotional orientation.

Mother: Okay. Next row.
Child: Here.
M: Um-hum. (Child made a Donald Duck-type sound.) You see anything there in the first three letters. GAD. Good. Keep going. Good. Yeah. It's a race. Yeah.
C: Mommy, I'm too tired. (Said in a whiny tone.)
M: Keep goin'. You're doin' great.
C: No. I'm too tired.

M: Yeah.
C: I'm too tired Mommyyyyy.
M: (Inaudible) It's not very exciting work is it. Good. Keep goin'.

In spite of his resistance, she maintained an encouraging stance that eventually overcame his complaint without confronting or challenging the child directly.

However, within an overall context of positive affect, rare moments of anger may occur. For example, at one point the child of dyad 6 got out of his chair to scratch himself, and while scratching turned towards the television.

Child: I'm itching.
Mother: (Said while laughing:) You just happen to be looking at the TV while you itch. (Pause for a moment till he seems to have scratched long enough). Okay. Put your pencil right here. This is as far as you had gone. (She put her hands to his chin without turning it but he continued watching.) Put your eyes on the paper. Come on, John. (Said with a hint of anger. He now turned back to the task.)

The mother took his itching strategy in stride and laughed. However, when he persisted in off-task behavior she did get mildly angry because he was not responding to her. Such a response, since he disobeyed for a period of time, may have been necessary to get the child back on task. However, because of their infrequency, such mildly angry remarks do not take away from an overall positive affective context. The mother quickly changed back to her more upbeat tone as soon as he returned to the task.

For such dyads, angry responses were definitely exceptions. In contrast, some of the other mothers

mentioned above seemed to be continually angry at their child during off-task episodes and appeared to believe that their child was deliberately misbehaving. Mothers who had a positive emotional tone made negative moral evaluations only after repeated resistance. They gave their child a chance to correct their behavior and only after clearly deliberate resisting did the mother respond with anger.

In addition, mothers of dyads that had positive emotional intersubjectivity were determined to keep their child on-task; yet paradoxically they seemed composed during their supervision, even in difficult periods. For example, when the son of dyad 6 briefly turned away, his mother would say nothing. However, if he turned away for anything longer than a couple of seconds, she would tell him that he needed to work. Quite often, when she noticed he was looking away, she did not directly address the problem but made statements regarding the task to draw him back:

Mother: Shew. Another line done.

(Later) M: Okay. You did the E, you erased the E. Look at the next one.

In these cases, she saw that he was off-task but simply made statements that induced him to return to the task without a confrontation. Nevertheless, this relaxed approach was used in conjunction with firm redirection when the child was off-task for too long. Either way the mother seemed composed and in control of the situation throughout, apparently trying to avoid making any more of the situation

than was absolutely necessary to get him to return to the task.

The mother of dyad 19 would turn a potentially negative situation into a game. For example, towards the midpoint of the condition she noticed a mistake had been made:

M: You done?
C: Yeah.
M: Missed one.
C: Where?
M: (Laughing) I'm not tellin' you. You gotta find it. (Both are smiling.)
C: I didn't miss one.
M: Yes, you did.
C: What letter?
M: You missed a D. (He looks.)

In this case, the mother was able to correct her son without threatening his esteem and without completely providing the answer. The two of them seemed to realize that she had created a little game of this error. With this type of gentle but firm management, she was able to keep him on-task without serious complaining from the child. While there was no evidence the child really enjoyed the task, for the most part he seemed content to participate in the task.

These examples suggest that there are dyadic differences in affective intersubjectivity among parents and their school-aged children. While in the present study it is impossible to know the effects of this intersubjective emotional unity, it can be argued that a positive affective intersubjectivity provides the medium within which the most successful attention mediation occurs. Perhaps this union is composed of at least two dimensions. First, what is

termed affect attunement, the mother's capacity to empathize and feel what the child is feeling and her ability to respond sensitively to his needs. Secondly, the capacity to set a positive emotional tone during the joint activity, by modeling positive affectivity. Such modeling seems contagious, resulting in the child experiencing positive affect as well. Through such positive affective unity, the mother is able to share the project in an interpersonally enjoyable context; to enforce compliance in warm, non-aggressive ways; to respond to his needs sensitively; and to provide the kinds of attention mediation that may be most easily internalized because they are heard and experienced without the sorts of negative emotions that might interfere with such internalization. However, the warmth is not experienced at the expense of the task demands. When necessary, these mothers drew lines that informed the child that the project had to be completed, manifesting morally-based anger only after repeated disobedience. But because of the overall non-aggressive nature of these remarks, the focus of the vast majority of the interactions remained the task, as opposed to the child and his misbehavior.

Having examined a few aspects of the interactions from a qualitative standpoint, the last task is an integration of the results of the quantitative and qualitative portions of the study and a discussion of the results.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

This study examined the attention mediation of mothers of children with attention deficit with hyperactivity disorder (ADHD) and of mothers of normal children. Thirty-four mothers and their sons were placed in a task-setting that placed unusual demands upon the son's ability to control his attention, once with mother present and once with mother absent. Measures were obtained of the amount of work the child accomplished in both settings and of the time he spent on task. In addition, measures were obtained of the forms of speech and frequencies of each form used by the mothers to shape their child's attention when they were together. Results from analyses of these measures were presented in chapter 3.

As was expected, when their mother was present all children were significantly better at maintaining their attention on task. In addition, it was found that regardless of the setting, children with ADHD were significantly less successful at staying on-task and did not accomplish as much as the non-ADHD children. Furthermore, while the ADHD children were less successful across all settings, they were especially limited in their attention control when their mothers were not present, as measured by letters circled.

Few differences were found between the mother-child

interactions of the ADHD and non-ADHD groups. There were no significant differences in total utterances, commands, or questions, the percentage of total maternal utterances that were commands and that were questions, in maternal assisting behaviors, and maternal redirecting behaviors. However, the children of the mother first, ADHD group did appear to have a comparatively high number of complaints. The only significant group difference found was the mothers of the independent first, ADHD group scaffolded significantly less often than the mothers of the other groups, perhaps because they were having difficulty dealing with ADHD children who had already worked for 20 minutes on the task and were getting weary.

Fairly strong negative correlations were found on maternal directiveness and child time-on-task and amount of work accomplished regardless of whether mother was present or absent. This leads to two plausible interpretations. Mothers who had children who did not work much with mother or by themselves tended to be more directive when they were together in order to get and keep them on-task; whereas mothers of children who worked well had little need to be directive. At the same time, the directive speech of mothers who were especially controlling may have undermined the child's ability to control and regulate his behavior. The one exception to this trend was the positive correlation discovered for the non-ADHD group on the percent of focusing

utterances that are commands and the amount of work accomplished by the child. It appears that the use of directive speech with non-ADHD children for the purpose of focusing their attention at important features of the task environment either facilitated on-task performance or was used more with non-ADHD children who tended to stay on-task. A moderate negative correlation was found between number of maternal questions and amount of work child accomplished when mother was present, however, the same trend was not significant regarding number of maternal questions and amount of work child accomplished when mother was absent suggesting that questioning may have been less effective than is desirable.

There was also a significant positive correlation between maternal scaffolding and child time-on-task when mother was present, and scaffolding and the amount of work child accomplished when mother was absent. Mothers who had positive affect, and provided "just enough" structure, withdrawing when necessary, had children who tended to stay on-task or accomplish more. Scaffolding appears to facilitate self-regulation or it may be the case that hard-working children are easy to scaffold.

As a result of the qualitative analysis presented in chapter 4, the following observations were made. The primary task of the mother was to keep her son's attention on an unpleasant task when she was present and absent.

During the task conditions, the child was faced with a choice of whether to do as he pleased and watch an enjoyable television program, or to comply with his mother's request that he work on the unpleasant task, a task that seemed to have little meaning to the child. The study provided the mothers with an opportunity to negotiate task compliance under challenging circumstances, and demonstrated the ability of the dyad to co-construct and work together on a common project. It also revealed the underlying affective unity or disunity of the dyad.

Attention mediation was found to occur through a variety of forms, including behaviors like pointing, tapping the child, and physically redirecting his gaze; and many types of speech. It was argued that all speech is attention-mediating in some way, however some forms are more explicitly used for attention mediation than others including adverbs of location, adjectives that denote characteristics of importance, and certain nouns (especially one's name). In addition, different forms of sentences each have peculiar meaning from the standpoint of attention mediation. Imperatives forcefully direct one's attention to a behavior desired by the speaker; indicatives simply point out a certain feature or state of affairs of importance; while interrogatives invite the hearer to find the important state of affairs or feature him or herself. Also, attention mediation was found to be a skill that required the use of

various strategies to assist the child to return to the task once he had left it.

Lastly, the affective dimension was explored. It was found that some dyads seemed to lack positive affective intersubjectivity. As a result, the difficult task seemed to provide a context of hostility or fear within one or both of the members of the dyad. However, the mothers of some dyads demonstrated the ability to build and maintain an overall positive affective environment that seemed contagious. It was suggested that such a milieu provides the best possible context within which attention control can be mediated and transferred to the child. This is because maternal affect attunement is evidence of sensitive, responsive maternal style that would be most supportive of independent activity, and because positive maternal affect provides an enjoyable atmosphere for task-performance.

Integration of the Quantitative and Qualitative Portions of the Study

While some attempt was made to integrate the two portions of the study in chapter 4, a fuller integration, remains to be done. As noted, most of the children controlled their attention significantly better when their mothers were present than when absent. Their interactions were based on the implicit right of the mother to direct the child's behavior. The mothers directed their children to work on an unpleasant task and most of the children were

compliant most of the time. Few children openly defied their mothers while they were present. However, in general when their mothers were absent, the children's desires determined the direction of their attention more than their mother's wishes. Nevertheless, few children ignored the task completely. Most seemed compelled to focus on the task, even if only sporadically. Although their mothers were physically absent, the boys periodically returned to the onerous task they had been assigned.

However, the ADHD group experienced more difficulty maintaining their attention on the task than the non-ADHD group, with mother present and especially with her absent. For whatever reasons, these children were less able to identify with their mother's goals. Their behavior suggests that they were less constrained by their mother's directions and more willing to act impulsively than the non-ADHD children. When directed to work on a task outside of their interests, the ADHD children became more oppositional and required their mother's immediate presence to procure compliance than did the non-ADHD children. Perhaps it was due to a greater need for sensory or neural stimulation not provided for in the task, for immediate gratification of their desires, or for immediate reinforcement (Barkley, 1989a). But this only provides part of the picture. It remains the case that such individual 'needs' take priority over the need to accomplish or fulfil the mother's goals

exhibited more by the non-ADHD children.

The lack of clear differences between the two groups in terms of maternal speech and behavior indicates that the two groups of mothers attempted to mediate their child's attention with the same types of speech that were measured. Furthermore, these forms of mediation were demonstrated to be more or less successful in keeping the children on-task since the children did perform much better when mother was present and helping.

As noted, scaffolding was moderately and positively related with child performance both with mother present (time-on-task) and with mother absent (letters circled). To some extent, the scaffolding variable was a measure of some important aspects of maternal behavior that help the child to assume the mother's project, and that foster intersubjective affective unity, including a helpful use of strategies. Mothers who had a lower percentage of scaffolding might be characterized by harshness; ignoring, teasing or laughing at the child; physical discipline; detachment; and/or the use of strong authority strategies. Such practices may alienate the child and make him less able and willing to enter into the mother's activities. Mothers characterized by high scaffolding might use praise, encouragement, verbal play and laughter, sympathy, strategic withdrawal, restructuring the task strategies, and mild authority strategies. These activities make joint activity

more enjoyable while providing 'just enough' structure to facilitate the child's independent, task-relevant activity. It is not surprising then that the use of such speech and strategies was related to task compliance with and without mother present. This type of maternal interaction warmly compels the child to act in concert with the mother's design while providing the cognitive and motivational structure that directs and enhances the child's self-regulatory attention abilities.

Comparing the Present Study to Other Studies of Mother-ADHD Child Interactions

The present study in some cases found the same group differences and in other cases it did not. First, mothers of ADHD children have consistently been found to use more commands than mothers of controls (Cunningham & Barkley, 1979; Mash & Johnston, 1982; Befera & Barkley, 1985; Barkley, Karlsson, & Pollard, 1985). As noted above, the mother first, ADHD group did have a higher number of commands proportionately but this difference was not significant. It is possible that the present study's low power due to small sample size made it impossible to detect actual group differences (all the above studies had larger n's). Also, Campbell (1973) found that mothers of hyperactive children provided more direct physical help, a phenomenon not found in the present study.

However, the present study did not find any significant

differences in the two groups in the number of utterances, which is similar to Campbell's (1973) finding that hyperactive children and their mothers did not engage in significantly more interaction than normal children and their mothers. Also, the present study also found no difference in the proportion of utterances that were questions, similar to Barkley, Karlsson, and Pollard (1985), but different from Mash & Johnston (1982) who found mothers of controls asked significantly more questions.

In addition, at least on a descriptive level, the mother first, ADHD group complained much more frequently than the other groups. Similarly, other studies have found that ADHD children tend to be more 'negative' than normals during mother-child interactions (Barkley, Karlsson, & Pollard, 1985; Befera & Barkley, 1985).

Lastly, while scaffolding is a molar behavior pattern and not a particular behavior, there is still some ground for comparing the present study's findings regarding scaffolding and the overall results of other relevant studies that examined molecular interaction patterns in detail. As mentioned, the present study found that the independent first, ADHD group had mothers who scaffolded significantly less than did the other groups. Consequently, this group's behavior pattern bears a resemblance to the behavior patterns of the mothers of ADHD children documented in some other studies, who evidenced greater negativity,

greater control, and less responsiveness.

However, the mother first, ADHD group provided just as much scaffolding as did the control groups. Interestingly, most of the important studies of mother-ADHD child interactions exposed the mother-child dyads to two conditions: a 10- or 20-minute free-play condition, followed by a 20-minute task period in which the mother and child worked on a number of tasks (Cunningham & Barkley, 1979; Mash & Johnston, 1982; Befera & Barkley, 1985; Barkley, Karlsson, & Pollard, 1985). However, order effects were never examined. Two of the studies (Befera & Barkley, 1985; Barkley, Karlsson, & Pollard, 1985) reported that the mothers were negative during the task condition but not during the play condition, and they concluded that greater problems occurred in the parent-child interactions of ADHD children during task settings. This observation is probably true for a number of reasons. However, the present study found that mothers responded more maladaptively after their ADHD child has already been involved in a task but not when they had begun working together on a task. This suggests that the above studies' conclusion may have been somewhat confounded by the fact that they did not observe the dyads in the opposite sequence: task first, play second. It is possible that the mothers would have been more negative during the play period after working with their child during the task period.

Similarly, Campbell (1973) presented four different 10-minute or less tasks (two verbal and two non-verbal (cross-classified as two easy and two hard tasks) to groups of mothers and their normal, hyperactive, and impulsive children. While not taking order into account in her analysis either, she did counter-balance presentation. Campbell reported that the ADHD mothers were not more punitive or disapproving in the interaction task-situations she provided, and she wrote that the quality of their interactions in her study could be described as "supportive but could not be characterized as intrusive" (p.347). Such positive behavior sounds similar to the behavior of the mother first, ADHD group of mothers who had higher scaffolding percentages than the independent first, ADHD group. However, because order effects were not studied there is no way to tease out the effect of weariness on an individual child or mother in Campbell's study.

It is probably the case that some of the differences in maternal behavior that were found in these studies as well as the present study were due to differences in task setting and ordering of the tasks. In the present study, it appeared that mothers of weary ADHD children were less constructive in their interactions than mothers of fresh ADHD children.

In addition, given the importance of intersubjective affective union to mother-child interactions implied in the

present study, it is unfortunate that so little attention has been placed on the study of affect in mother-ADHD child interactions. Most of the studies have examined 'negativity,' and praise and encouragement; behavior patterns that are certainly related to affect. However, the notions of affect attunement or positive affective intersubjectivity are qualitatively different constructs than that which is measured by 'praise behaviors.' Admittedly, the study of affect is methodologically daunting (let alone, intersubjective affective union!). In the present study, such investigation was only conducted qualitatively. However, it would seem wise to work towards the study of intersubjective affectivity in this area in the future.

Perhaps the most important contribution of the present study to the field of relevant research is that it is an examination of the attention-mediating dimension of the mother-ADHD child interactions. While previous studies have examined certain aspects of mother-ADHD child interactions with possibly greater clarity and certainly greater power, the present study was the first exploration of how mothers of ADHD children shape and control their child's attention through their interactions. Though suffering from some serious limitations (which will be discussed below), the present study at least provides an initial foray into this potentially important area of research.

The study also demonstrates that a child's ability to attend cannot be construed only as an individual structure existing within the child. The child's ability to attend is profoundly shaped by the child's social world, their understanding of that world, and the extent to which they are participants in the projects of other people. If they are not enlisted into the projects of others, their attention remains guided primarily by impulse and desire. This study suggests that the development of the child's ability to control his attention in adaptive ways may be dependent on the child's ability to enter into the projects of others and the willingness of others to warmly bring the child into their projects.

There is also evidence in the present study that a child's ability to attend is not simply a <u>cognitive</u> process. Attention seems also to be related to one's motivational orientation, one's affect, one's values, and one's morality. Barkley (1990) cites numerous studies that failed to find problems with attention in ADHD children across all experimental conditions, suggesting that at least some ADHD children do not exhibit attention problems in all contexts. Questioning whether ADHD is an attention disorder at all, Barkley (1990) has recently concluded that some symptoms of ADHD may be better explained by appeal to a neurologically-based motivational deficit consisting of an insensitivity to behavioral consequences.

The present study found that the ADHD children observed were highly successful in attending to the television program. However, most of them had difficulty consistently following through on their mother's wishes and maintaining the motivation necessary to comply throughout the activity time. Is this evidence of a cognitive problem or a motivation problem? Unfortunately, Barkley's behavioristic assumptions leads him to construe the hypothesized motivational problem individualistically, abstracted from the child's social context. However, as noted above, the child in this study was situated within a motivational context provided by his mother (and the researcher). Together, mother and son had to negotiate their goals and behavior. Consequently, the child's motivation was not simply a function of physiology and reinforcement but was socially constructed. Watching some of the children fight to stay on-task when mother was not present was to witness what seemed to be a profound struggle between conflicting values that reflect different motivational goal-hierarchies (Carver & Scheier, 1981) and that have important moral implications for the children. Indeed, the special difficulties of the ADHD children seem to have been due, in part, to a lack of connectedness, a sense of responsibility, or deference to mother that distinguished them from the non-ADHD children. All the children were motivated and behaved in-relation-to their mother, but the ADHD children were

simply less responsive to their mother's wishes than the non-ADHD children.

Focusing narrowly on the cognitive dimension of attention has resulted in overlooking what are arguably some of the most important dimensions of attention control, including motivational, axiological, and moral factors. It is instructive to note that at least one early twentieth century author viewed what is now called ADHD as a deficit in volitional inhibition and moral consciousness (Still, 1902; cited in Barkley, 1989a).

The study also provided further documentation of the relevance of the concept of a zone of proximal development for understanding the formation of attentional abilities. As has been stated many times, in both ADHD groups and in the independent first, non-ADHD group, the children were able to accomplish more and all the groups were able to attend for a longer time when their mothers were present than when they were absent. This suggests that children have only partially internalized their maturing attentional abilities, and that they are capable of greater attention control with the assistance of others who augment their limited abilities. In addition to the cognitive structure that is provided by the adult within the zone, it is likely that motivational, affective, evaluative, and moral structure is also provided. These additional factors make possible the co-construction of meaning that occurs during

such interactions. While Vygotsky (1978) and others have suggested that such a zone existed, there has been little research that has focused as directly as the present study has on the mediation of attention within the zone of proximal development.

In addition, using the concept of this zone may have the following positive results. Understanding attention development through a contrast between the child's attention control independent of others and the child's control with assistance underscores for the researcher or worker the potential for attention control that may exist. Some rudimentary attention structures exist and their development can be enhanced with appropriate assistance. An awareness of this zone could enable parents and teachers to more easily recognize the responsibility they share with the child to facilitate attention control in a particular environment, as well as encourage the child that he or she has some attention control and is in process, and not in a state of permanent biological disability.

Finally, the present study also provided an opportunity to study the concept of the scaffolding of attention. The notion of scaffolding has been acknowledged to be useful in understanding the role of social mediators in a wide variety of contexts (Bruner, 1983; Rogoff, 1990). However, the concept has not been studied expressly in the context of attention mediation. The present study demonstrated that it

is possible to measure the scaffolding of attention, and as a result, has underscored the relevance of the concept of scaffolding for attention mediation. Adults provide attentional structure for the child by identifying projects to attend to and work on, pointing out important features in the task environment and problem space, breaking down a task into manageable parts, providing motivation that isn't in the child's motivational repertoire, and to do so in ways that are tailored to the child's ability level, ways that can be modified as necessary. This is the scaffolding of attention, and the present study provides evidence that it is an important and necessary task of anyone working with ADHD children.

Limitations of the Study and Implications for Future Research

Perhaps the most obvious limitation concerns the small number of subjects and the consequent low degree of power that was available. For a number of variables that were studied, the possibility of decision errors was very evident. In addition, there is a danger of bias when there are only six to eight dyads in each of the four groups that are being investigated. It is possible that the effects that were observed were due more to the particular grouping of the subjects that resulted from the sampling methods and random assignment into order of presentation groups. Nevertheless, no differences were found in the four groups

on any potential confounding variables such as child's age, child's verbal intelligence, or mother's education.

The event-sampling method and the coding system that was used in the present study was very time-intensive. In retrospect, it must be acknowledged that the types of data collection used by other mother-ADHD child interaction researchers have some definite advantages in terms of their simplicity and efficiency. While the aim of the present study to go beyond the recording of simple interactional behaviors is still believed to have been valuable, little headway was made in operationalizing some of the most important phenomena of interest to the present researcher.

Furthermore, it must be conceded that the Mash, Terdal, & Anderson (1973) interaction coding system used by Barkley and his co-workers would have provided more information on some variables of interest than were provided for by the coding system in the present study. Moreover, the use of the Mash, et al coding system would have made comparisons between prior research and the present study easier and more comprehensive. In addition, few differences of importance were found between the ADHD and non-ADHD groups on variables in the present study that were isolated because of their relevance to attention mediation, e.g. distinctions in utterances in terms of their attentional purpose (focusing, refocusing, and so forth). This could be due to problems resulting from small sample size and also because of the

infrequency of some of the categories of speech acts that were being investigated. Regardless, at present the gains from the quantitative microanalysis that was attempted seem to pale in comparison to the amount of work that was required to obtain them.

Still, the qualitative analysis only underscored the importance of some of the phenomena of attention mediation that seem so difficult to quantify. New methods will have to be developed that will enable a researcher of parent-ADHD child interactions to describe and quantify where possible the kinds of patterns of speech that are of relevance to attention mediation.

A related limitation of the present study is that the quantitative data used were cummulative data gathered over a period of interaction. However, to really understand discourse, methods are needed that can trace the influence of interactive speech over time. Some work has been begun in the study of interactions (Patterson & Moore, 1979; Gottman & Bakeman, 1979; Griffin & Gardner, 1989). However, this type of quantitative analysis has not been done with parent-ADHD child interactions. Consequently, such research forms the likely next step in the study of interactional patterns of families with ADHD children.

Lastly, the present study was severely hampered because it was a study of development without a developmental design. The research examined 40 minutes of interaction

between two people who had lived together from five to ten years. The sorts of interactional processes and influences that were of most interest had been experienced for years. Doubtless, some of the present behaviors of the dyad members had been shaped by interactional processes that were no longer in evidence since the children were already in middle childhood. Obviously this is the bane of ADHD research because the typical ADHD child is not identified until around age five to seven. Nevertheless, longitudinal studies are needed; either that have a large number of ADHD children identified by age 3, and that study the interaction patterns of parent-child dyads from age three to age seven; or that have a sufficiently large number of families of infants who become ADHD during the course of the study so that retrospective analysis of parent-child interactions can be done (cf. Jacobvitz & Sroufe, 1987).

It should also be mentioned that the present study was also limited in its generalizibility because of its exclusive focus on mothers and sons. Much work needs to be done to explore the quality and influence of father-son, father-daughter, and mother-daughter interactions with dyads of ADHD children.

Implications for Practice

Seeing oneself as an attention mediator is a useful perspective for people who work with children with attention problems. An attention mediator assumes some responsibility

for the child's attention control and works at shifting attention regulation to the child. A child's struggle with his or her attention is a complex problem transcending his own will and biology. There are important steps that people in the child's life can take to provide additional support for the child that will make attention control more successful, such as scaffolding practices.

The attention mediator should strive to make the task as intrinsically interesting to the child as possible. This will only help the child. However, the mediator should not give up simply because the task is boring. Many important tasks in life are not intrinsically interesting. The job of the attention mediator is to promote on-task behavior through a warm, but firm, interactional style that provides limits for behavior while drawing the child into the activity.

The attention mediator is called upon to provide 'just enough' structure for the child to work with success. Too much structure or harshness will dampen initiative and enthusiasm for the task. However, too little structure may promote ensure failure. Consequently, the attention mediator needs to set up the task and to provide supervision so that the child is able to successfully work on the task.

The mediator should avoid ineffective speech, such as excessive utterances (especially commands). At the same time, an overly punitive, harsh style of speech may procure

immediate compliance but result in less compliance when the mediator is absent. The mediator should avoid the extremes of over and under supervision, being just firm enough to ensure compliance.

The most helpful strategies for getting children to return to task seemed to be mild authority strategies, restructuring the task strategies, and some motivational strategies that helped to tie the task into the child's motivational framework. Some flexibility also seems desirable. However, accommodation strategies seem counterproductive to the overall aim of helping the child to control his or her attention.

Children with attention problems get weary easily and quickly. The sensitive attention mediator will take into account the length of time a task will take when designing tasks. The mediator may decide on a long-term goal of increasing task-compliance over longer periods of time. However, such a goal will only be reached through repeated success in shorter and more highly structured tasks.

Most importantly, working together with a child is best done in an overall atmosphere of interpersonal warmth and delight in the task. Such qualities go surprisingly far in making a difficult task endurable. Sometimes anger will be appropriate and briefly called for. Such a response demonstrates to the child the importance of his or her actions. However, the overall tone of the interaction ought

to be one of joy. It is in the medium of love and delight that a child best learns how to attend.

This dissertation brings to a close work begun over five years ago. This project illustrates the difficulties involved in interaction research. However, it has also underscored the importance of human interactions in human development, particularly the development of attention. The study was initiated on the basis of the Vygotskian assumption that individual cognitive processes are internalized through facilitative social speech. Possibly because of methodological limitations, evidence clearly supporting this assumption in the present study was not found. However, the quantitative and qualitative findings suggest that non-cognitive factors within the social interaction, such as motivation, affect, empathy, and morality, may also be implicated in the formation of attentional ability. Perhaps future research will be led to explore the importance of such factors in addition to the importance of speech in cognitive development.

APPENDICES

APPENDIX A

Michigan State University
Department of Pediatrics/Human Development
B240 Life Sciences
E. Lansing, MI 48824

April 16, 1990

Dear Family,

A research project has been proposed involving children with attention deficit hyperactivity disorder that may be of interest to you. The study will focus on how children stay on task and will be supervised by Eric Johnson, a Ph.D. candidate in educational psychology at Michigan State University.

A post card has been enclosed that you may return indicating whether or not you would like to have more information or possibly participate in this study. You will not be obligated in any way should you wish to hear more about this research.

Your relationship with our Developmental Clinic and with me as your pediatrician will not change in any way should you choose to participate or not participate in this study.

Be assured that no one will have access to your records without your consent.

If you have any questions about the study, please feel free to call me (353-5042) or Eric Johnson (355-9756).

Sincerely,

Marsha D. Rappley, M.D.

APPENDIX B

Eric Johnson
College of Education
Michigan State University
E. Lansing, MI 48823

April 19, 1990

Dear Parent,

A research project has recently begun at Michigan State University that would involve mothers and their early elementary school male child. The project will focus on how children stay on task and will study children working together with their mothers.
Participating in the study would mean coming to the University for one two-hour session. (If transportation is a problem, arrangements on this end can be made.) This session would be videotaped. In addition, you and your son will be asked to fill out some questionnaires (he will have some assistance) during this time and answer some questions about how you help your son stay on task.

For those who might be interested, two voluntary parent information meetings will be offered to all participants. One meeting will be held after the data is collected and will focus on current thinking about parenting and child development that we hope will be of general interest to most parents. A second meeting will present the results of the study. Also, each child that participates will receive an activity pad.

Please mark the post card and mail it back to me whether or not you are interested in the study. If you have any questions about the study please call me at 355-9756. I would be delighted to have your assistance. Thanks for your attention.

Sincerely,

Eric Johnson

APPENDIX C

Consent Form

I, _____, mother of

_____, agree to participate in this research project and give permission for my child to participate in this research project and give permission for my child to also participate in this study.

The research project has been explained to me. I understand the procedures and have been informed of the potential benefits and possible risks. I also understand that my participation and my child's participation is completely voluntary. I've been encouraged to call if any part of my participation or my son's participation in the project causes me or him any concerns about my parenting, my son's attention or my relationship with my son.
I am free to call Eric Johnson (355-9756) regarding any questions I might have about the project.

I further understand that:

All information is confidential and that neither my identity nor my child's identity will be revealed to anyone.

I am free to withdraw my consent and discontinue my participation in the project at any time without penalty.

Any questions I have about the project will be answered.

_____ _____

Date Signature of Mother

APPENDIX D

Random Letters

b l g k h o y p r t l r i w k d u x j z n a b s h d q o w e i r u
v n t y f g j v c n d h s y a j c v n s h w y d d s i u c j n a h
d m n s j f d u w j s n m f b d j h u q j w i s k d j e n d h s y
f d j z n a q p s l e o k e i r u j e n c h g s o w l e k r u d s
j c n c g s d d q x c w d s c x f e r z a b a m n d m n k j i u l
i g p l r m w j d u c h n v n h d g s t y w h f b f b j n d j w n
w h d s t a h s b w g q f w t s b d f j g k t m r l g l k h o j l
y p o e l w i q k u d j r y f d h s n e w n f d h f y d h j w u e
j j d h u s n c y u e n y r u i n c y u r f i h f j h w y u r h h
j x c b h j d s l h q u q e y u r q o o v j p k x h j v h j c x x
b n h u v i a h r u i q o u j d f v k s o z x h f u y r e q i y t
g h f i a y r u i e q i f g y q u i e r n j o s k x j i f q i r y
u h u i e h g j c x h x j g f g w q y q g w f g y x z n j c d i w
w j g p t k o f w g u i e w g h d j k n x v c z h v g h d y w u e
y h u e q r w j k f d l o w q j u e l g f d y u j k v c n w j h u
d f h q j i o j f k o x m c j k h w u y 8 d y h g u i h h g q w t
y w q r t q k j h n c j d k h s j k v n j h s a h d j k e h f j k
j d s f a l p e l w l y e y r t f q y w g h c x s a b n c x b g q
e t g y w q e t h c x s b s c f q d r r t w v c d b v b f f m j k
l u y l j u p i t r i t u y y r t g y t e f g q e w t f d k b s v
c b n z b c v n m f d n h k t h k u j l o l y t k p u y k t r o i
t u u r y y u e w t e t w q r f d s g g g d s a a c d f s r d w e
q u e j w q e l o q w q p o q p l a a l p a l s u l e u e k j s l
u k i d f u j d n d h j q w h r k e w o j d c u f y h w e t q g d
j j m c n v j h d u q u r k x m i q w e i d l s k d f i v m x c d
n z n c k q w u w l o f k l d p q w l f o d e u w e m v c n x h a
y w k f k j d e i k s g o p c j v u e w n w q s h c h u s a k d m
f u q n s d j v c k a s u j s w m q i d u d t o t p k g l e y j k
i w n c j q u q w u w e w n y u i w q n y u i c n h g d s y u b g
x s t w q b x g f d t v q s g d y u n w j r g m v k i r t f o w m
o p c d k q n h w y u q b c g f y e w n m j v l o r m e w k o p d
w q k o x d n h y w q u e b g r f v t y u q n j l o x d m k w o p
q a s x k q s o p m s q j u l n d h e u i q w n h f c u w d k o p
w q m k d l x n m h e q w y u b g d c f y t q n h d u l q w m j x
o i d m w e q j u l f b g y s q m j x s i o q m j x i o q e n h f
y b u c g e y w u q n d i q e m j x s i o w q m x h u q w y b f g
y u e n q j i w o q m j x z u i e w q h f g y u b c g q w y u c h
d u m q x j k i x s o m j w q u e y g e w i d c m w q o x m j q e
u l c r b g e y w u b n c d j q n m a j l o n m k f l e v o o l d
k e i c v m d c l k d l f l k e o v c l k j q o q q s x p d k e o

APPENDIX E

Target letters

g s t a d n i

APPENDIX F

Event Identification

You will be coding every action of mother and child. An action is a discrete behavior that can stand on its own, either behavioral, spoken, or both, performed by an individual.

a. However, concentrate on speech. Score each self-contained speech unit. This includes every sentence but also every exclamation (e.g. "Oops." "Oh, no." "Good job."). However, do not record vocal pause sounds as independent speech units (e.g. Umm. Ahhh.), unless they are meaningful (e.g. saying umm as an affirmative reply to a question). Most times the pauses that occur between speech units provides the natural break that will permit you to distinguish acts. However, sometimes sentences will be strung along with ands and no real pauses. Remember in speech 'and' can begin a new sentence. If the new clause is a different form of speech (i.e. command, statement, question) than the previous clause(s), then consider it a distinct act.

b. Code unfinished sentences as 60.

c. Do not include singing or making sounds/noises with mouth. Speech acts must be spoken words.

d. With regard to behavior do not record every movement of a finger. Only record important behaviors (those outlined on the coding sheets).

APPENDIX G

Variables Used in Coding System A

Actor

Maternal Speech Acts

Maternal Behavior

Maternal Attentional Purpose

Maternal Directiveness

Child Speech Acts

Child Behavior

APPENDIX H

Maternal Behavioral Act Codes (M's Beh)

10 Being interested (looking towards child or task, perhaps leaning forward, no other activity; score even if M. looks at TV briefly)

20 Assisting child within task (while child is on-task) This includes demonstration, pointing, placing materials in front of child. Helping behavior. Holding sheets for child.

30 Physically/Acoustically orienting child when child is off- task
This is helping behavior that involves physical contact with child or that acoustically gets childs attention. It includes tapping child to get attention, touching child, taking things (toys) out of child's hands, physically moving child's head or hand, and tapping the table to get child's attention. Also, holding child's hand and making him circle letters.

40 Doing task herself
This involves erasing or circling letters herself.

50 Off-task movement or behavior (e.g. reading a magazine)
Mother obviously focused on other things (do not include when mother looks at TV unless it is obvious to child that she is watching TV.

APPENDIX I

Mother's Attentional Purpose (At Pur)

1 **Off-task/No purpose/Off-task Responses**

Only score this after child has been on task at least once. These are maternal statements or behaviors that seem unrelated to the task, including statements that are off-task responses to child's off-task speech acts while child is off-task.

Helping Child to Focus on Task

2 **Attentional Enlistment**

This occurs at the beginning of the task; usually lasts a short time and involves orienting the child to the task and encouraging the child to get started and "join in." This ends as soon as child begins focusing on task.

3 **Attentional Maintenance**

Primarily motivational; serves to maintain joint attentional focus. If an utterance cannot be classified anywhere else, it probably belongs in here.

When the child is on-task, mother may make comments that serve simply to support continued task-involvement. This serves to maintain intersubjective union. This includes any maternal discourse that does not direct the child's attention anywhere, includes praise and response to child's questions, also small talk while child is on task, and talk about the task itself.

"I like the job you're doing."
"Um-hum."
"I've never seen a task like this."
"Good work."
"Thinking about something else?"

If praise is used please mark (P) in Remarks section.

4 **Attentional Focus** (Directive within task)

When the child is on-task, the mother may still wish to direct the child's attention to some important feature of the visual field or task space, includes going over instructions, error correction.

"Circle those letters right there."
"What do you wanna do next?"
"Remember, we have to finish this up quickly."
"Check that 'g'."
"You missed a letter."

Responding to Negative Child Act

5 **Attentional Encouragement**

This occurs when mother responds to child when he is on task but complaining (child speech that clearly indicates child is not enjoying task).

6 **Attentional Refocus** (Directive back to task)

Sometimes the child will become distracted. When this occurs, the mother must attempt to redirect the child's attention back to the task. Refocusing is necessary whenever child is off-task and the mother acts so as to bring the child back on task.

If child's misbehaving and mother's comments are directed at misbehavior still score this. Include comforting statements. Any statement during child's off-task behavior that is not definitely off-task itself.

APPENDIX J

Scaffolding Coding Categories

C's Behavior	M's Response	
	Appropriate	Inappropriate
On-task		
	1. Maintaining Att.	
	Praise	Teasing/laughing at child
	Non-commanding verbalization	Off-task statement
	Verbal play or laughter	Harsh
	2. Withdrawal	
	Strategic Withdrawal	Silent, detached
	3. Focusing Attention(w/in task)	
	Pointing out errors	Strong commands
	Reducing degrees of freedom	Harsh
		Neg. correction
Distracted		
	2. Withdrawal	
		Ignoring child
		Silent, detached
		Helpless
	3. Focusing Attention(back to task)	
	Reorienting attention	Strong commands
	Reducing degrees of freedom	Harsh
		Negative correction
		Teasing/laughing at child
Frustrated		
	2. Withdrawal	
		Ignore child
		Silent, detached
		Helpless
	3. Refocusing Attention (back to task)	
	Reorienting attention	Strong commands
	Reducing degrees of freedom	Harsh
		Negative correction
		Teasing/laughing at child
	4. Responding to Emotional State	
	Praise	Teasing/laughing at child
	Encouragement	Harsh
	Non-commanding verbalization	Physical discipline
	Verbal play or laughter	
	Sympathy	

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