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ABSTRACT

Coding systems developed for a study of the way mothers influence the cognitive development of their 2- to 4-year-old children are described in this report. The coding systems were developed for the analysis of data recorded on videotapes of 3 mother-child situations: 8 minutes of interaction starting with a reunion between mother and child, 5 minutes of lunchtime preparation, and 5 minutes in which the mother teaches her child how to construct a block design. The description of Coding Scheme 1 focuses on the initiation and termination of a shared focus between mother and child. Coding Scheme 2 recorded every request by child to mother for help or information, mother's response, appropriateness of mother's response, and presence or absence of cognitive content in mother's response. Coding Scheme 3 centered on the contents of mothers' speech and behavior. The coding of cognitive contents aimed at capturing all instances in which mothers imparted facts about the physical, social, and emotional world, and methods for acquiring knowledge, for knowledge representation, and for knowledge use. Coding Scheme 4 characterized the content of mothers' communication in terms of its specificity and availability to the senses. Coding sheets are attached. (RH)

Mothers as Mediators of Cognitive Development

A Coding Manual

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INTRODUCTION

The major purpose of this study is to investigate the way mothers influence the cognitive development of their 2- to 4- year-old children. There is a large body of research showing that the environment in which an individual develops has the power to affect the cognitive growth of that individual. For example, being born into a lower socio-economic class limits the child's chances of improving performance on intelligence measures between the ages of 8 months and 4 years. Similar results hold when the effect of genotype on cognitive development is experimentally partialed out, as in adoption studies. These studies indicate that the environment in itself has a substantial influence on the ability of children to do well on I.Q. tests. However, the existing data are largely correlational. While this research indicates the direction and consequences of certain environmental influences, these studies do not reveal the mechanism underlying environmentally caused deprivation or enrichment and leave us wondering how environments influence the quality of mental development.

We hypothesized that one mechanism by which the environment influences the cognitive development of children is social interaction. For the purpose of this study we decided to focus on interactions between mothers and their children. We argued that even mundane interactions between a mother and child contain material that can be labeled cognitive enrichment.

We conceptualized the role of the mother as a mediator of cognitive development in the following way: (a) The mother is frequently responsible for creating and maintaining episodes of shared focus in which the child can learn from the mother. (b) The mother responds to her child's questions by providing him or her with cognitive contents; (c) The mother through

her action and speech provides the child with cognitive contents

(d) The mother motivates her child to engage in cognitive activity.

In order to evaluate the mother's role as a mediator of cognitive development we devised coding systems that provide us with information regarding the above four areas.

The subjects for our study are mothers and children participating in the N.I.M.H. Child Rearing Study. The sample includes 116 dyads of mothers and children. Nine hours of interaction between the mother and her child are obtained. The children's ages ranged from 16 months to four years. From the video taped session two types of segments of mother-child interaction are selected, interactions during rearing situations in which no special teaching task is assigned the mother, and interactions when the mother has been given a specific teaching task. We chose segments of the interaction for which transcripts of the mother and child's speech were available. These are segment 8, eight minutes of interaction starting with a reunion between the mother and child; segment 17, 5 minutes of lunch time preparation and segment 1, five minutes in which the mother teaches the child how to construct a block design.

CODING SCHEME 1: SHARED FOCUS

In this study we focus on the mother as a teacher, a conveyer of cognitive contents. For the mother to be able to communicate cognitive contents to her child, the mother and child must attend to each other or "share focus". There is no question that the mother may convey information to the child when her attention is not focused on the child. If the child observes her and attends to what she does, the child will have an opportunity to learn. However, in this study we limit ourselves to

opportunities for learning that occur when the mother and child attend to one another. We define an episode of shared focus not in terms of duration of thematic content but in terms of the mother and child's behavior.

The coder starts to look at a segment of the tape at the prescribed start time. He or she is waiting to see an attempt on the part of the child or the mother to initiate a "shared focus". A shared focus is established when (a) the mother and child indicate via observable behavior or comments that they are attendig to each other or (b) are both attending to some common object or event and are aware of each other's attending to the same object or event. The shared focuse begins when person A behaves in a way that is acknowledged by person B. For example: The mother and child are sitting in positions that allow them to see each other. Mother is looking at a magazine. The child says "Mommy, see this!". Mother looks at the child and says "This is a nice tower, can you make a tunnel too?" The episode starts when the child started talking. However, if the mother does not respond, no episode is established and we code an "attempted initiation".

We will consider the episode to be terminated when the mother and child no longer share a focus. This happens when one or the other member of the pair ceases responding to the other one, moves away and/or starts a new task by him or herself. Below are some behaviors that we will take to indicate a break of shared focus: (a) One member of the pair starts manipulating or working with new materials which the other does not attend to. (b) One member of the pair moves so that he/she ends up with their back to the other. (c) One member of the pair physically moves away from the other. If the moving away is explained this may be noted as a closure. If his moving away is unexplained, it probably will be coded as an aborted

episode (Watch for nonverbal closures, not all closures need be dealt with verbally). (d) The mother probes, questions or commands the child and gets no response. These behaviors probably indicate that the focus was ended before with the child's attention drifting, but there was no behavioral indicant of this loss of attention. The episode is marked as ending when the above maternal behavior was observed. (e) All of the above will not signal the termination of an episode if there is active talking between mother and child to bridge the movement or change in one person's focus and attention. The talking indicates that, in fact, the pair is still focused on each other. In addition, if the break is short and what follows after the break is contingent on what happened before the break, the break is not indicative of a termination to the shared focus. For example: The mother stops talking and sits down to drink her coffee. While drinking her coffee she looks at her child. The child turns so that her back is toward the mother. A second later the child turns to the mother and offers some "sugar" for the coffee. Frequently, the conversation following a short break is a continuation of the conversation before the break. In such instances we ignore the break. (f) Examples of breaks in focus: Child, while playing with mother, moves to get some new toy and ends up with his back to her. At the same time mother and child are not talking. Mother excuses herself to go get a tissue for the child. Mother sends child to put napkins on the table.

For the purpose of this study we are coding two types of episode termination: (a) Termination associated with obvious release of the shared focus; (b) Termination associated with no obvious release of the shared focus. In the first case the mother (or the child) announced that she(he) is topping the interaction or that she is startig a new plan of action.

The other partner may or may not acknowledge the "obvious release". When no member of the dyad makes a clear statement regarding the end of their shared focus, there is no "obvious release". In such a case the terminator is the person who did not take up their turn in what was an ongoing exchange between mother and child. The beginning and the termination of shared focus must be clear. Consider a case in which the mother who sits next to her playing child reads a magazine. She puts down the magazine and resumes playing with the toys the child is playing with. Unless it is clear that the child was aware of the shift in the mother's behavior, an episode of shared focus was not initiated. In another case, the mother and child were in a shared focus and proceeded to play with the same toys. However, they stopped talking or signalling non-verbally to one another. In this case the episode of shared focus is not terminated unless one of the members of the dyad breaks the shared focus in the manner described above.

Responsibility for the maintenance of shared focus may be carried by the mother, the child, or both. This responsibility is judged in terms of acts (verbal or non-verbal) that maintain interaction. For example, talking to the other, helping with the carrying out of the task that the other is engaged in. If one member of the mother-child pair responds only by looking at the other, nodding the head or saying, "O.K." that person's contribution to the maintenance of focus is minimal and does not qualify as "responsible for focus maintenance."

The child's arousal during the episode is considered appropriate when the child seems interested and her (his) mood is neutral or positive. The child's arousal is not appropriately regulated when the child is disinterested, saying "there is nothing to do;" "I don't want to do that;" "Let's go

home." When the child whines, cries, is aggressive or goes into a tantrum, the child's arousal is not appropriately regulated. Under such circumstances, mothers usually try to bring the child back into a neutral, interested mood, a fact that we code.

The "responsibility for maintaining shared focus" and the "regulation of the child's arousal" are not codable when the episodes are very brief and the coder feels that there is not enough information to justify coding.

The coding system is designed to allow for the recording of information regarding (a) unsuccessful attempts to share focus; (b) successful attempts in which no cognitive contents were imparted and (c) successful attempts in which cognitive content was imparted. The relevant coding sheets are numbered 1, 2 and 3.

CODING SCHEME 2: RESPONDING TO CHILD'S QUERIES

We are interested in evaluating the mother's responsiveness to queries by her child. Mothers may respond or not respond to such queries. The responses may be adequate or not and they may or may not convey cognitive contents. We devised a coding sheet on which we indicate every instance in which the child asks the mother for help or for information and we note if the mother responded, whether or not her response was appropriate and whether or not cognitive content was imparted.

CODING SCHEME 3: THE CONTENTS OF MOTHERS' SPEECH AND BEHAVIOR

A. Cognitive Contents: An Overview and Coding Rules

The speech and behavior of mothers when they are in shared focus with their children can be thought of as providing opportunities for learning. When a mother labels an object, corrects a misconception, reasons, asks

ne child to explain what he or she mean, the mother is teaching the child even though she most probably is not aware that she is doing so. Our approach to coding the content of maternal speech and behavior was conceptual, "top-down", rather than inductive or "bottom-up". We thought of the knowledge that children between the ages of 2-4 need and are capable of learning. We then devised a coding system to assess mothers' behaviors in terms of what they do to promote their children's knowledge.

The knowledge that young children need to acquire was broken into four categories: I. Facts that the child needs to have about the physical world, the social world and the emotional world. II. Methods for acquiring knowledge. These include examining knowledge that is already available, asking questions, observing others and attending to critical aspects of the physical world. III. Methods for knowledge representation such as organizing referents in memory according to function, location, temporal order etc. IV. Methods for knowledge use such as planning, reasoning and methods for clear and effective communication.

The coding of cognitive contents is aimed at capturing all the instances in which the items we listed under "cognitive contents" are judged by the coder as present in the mother's speech and behavior. In other words, even if there are consecutive instances of imparting the same item of cognitive content within the same episode- all instances are reported. For example: If the mother labels every object the child touches, labeling will be coded every time. However, if a string of sentences convey a cognitive content, the cognitive content is coded just once. For example, the child offers to put some substance in the mother's drink. The mother responds: "Put that in my drink? Well, what is it? I don't want to put just anything in my drink. What is there? It won't hurt me, will it?" The mother demonstrates the content we describe as "Asking questions from

a social other as a means of acquiring information". She also demonstrates some level of "unelaborated reasoning". Here we do not code every question separately but the whole message in the connected discourse. As can be learned from the above, the same statement or unit of connected discourse may be coded under more than one category. An additional example in this regard is as follows: The child says "The car is blue"; and the mother says, "No, the car is green". Here the mother is "correcting a misconception" and "labelling" at the same time. Mother's speech and behavior may be more or less salient in terms of its instruction quality. For example a mother's statement can be an instance of planning (least salient), it could attempt to involve the child in the act of planning (more salient) or it could be elaborated on to explain the importance of planning (most salient). The salience of the teaching is coded by the number assigned to each coding of the cognitive content that is imparted. Whenever the information that is transmitted from the mother to her child is accurate and verbal we use the numbers 1, 2, and 3 to indicate the slience of the contents.

1 = The mother clearly and explicitly engages in a cognitive activity that the investigators are interested in. For example, the mother demonstrates reasoning or planning, without commenting that this is what she is doing.

2 = The mother explicitly engages in a cognitive activity and attempts to or gets the child engaged in a cognitive activity. For example: The mother asks the child if he knows how to open the suitcase which is in front of them. Here the mother checks on the availability of knowledge in the child's memory, thereby asking the child to search his memory for information. Another example: The mother tells the child that she wants the child to help her build a town out of Lego blocks. Here she invites the child to participate in planning, problem solving or exploring the properties of objects. If the mother responds to the child's query, her response is coded at either level 2 or 3.

3 = The mother tells the child the purpose, reason or importance of a cognitive activity or skill. For example, the mother gives information about the purpose of planning "To make sure that things will happen when you want them to happen or in the way that you want them to happen."

We are interested in capturing instances in which the mother conveys false information, and instances in which the mother models. If the information is not accurate we code 1F, 2F or 3F. Fantasy statements (i.e. statements regarding pretend objects or events) will not be coded as false information. If the information is presented by modeling alone we code 1M, 2M. When modeling is presented simultaneously with verbal information we code 1+M, 2+M, 3+M.

B. Cognitive contents: Definitions and examples

I. Knowledge about facts, principles

a. Facts about the physical world (includes animate and inanimate objects). Mothers statements pertaining to the categories below are coded when the mother seems not to assume a priori knowledge of the imparted contents on the part of her child. Criteria for designating that the words used by the mother need to be coded as "topic of conversation" or a "knowledge imparted" include: (a) Words are used contrastively: "This is red and that is blue;" (b) Words are stressed by intonation; (c) Words are repeated so as to emphasize: "This is a table; this is a table;" (d) Words are said in response to a question; (e) Words are said in order to correct a misconception: "No, this is big" or (f) Words are said as an elaboration on something said or done previously by the mother or by the child.

The coder notes the "topic of the conversation," for example: a doll,

a picture, the stove, the apartment. Then she checks off what aspects of the referent were mentioned. The mother's conversation that includes names of objects, events or principles or the description of their characteristics are not coded if none of the above criteria are satisfied. For example, if the mother says "Please give me the red cup" or "Look at the mirror", her labeling of objects or their attributes is not coded unless at least one of the above criteria is met.

1. Labeling objects, words, events, principles.

2. Contextual allocation and range of inclusion. "Contextual allocation" = Superordinate concept or structure to which the referent belongs. For example, Apartmentpart of a house; Gate - part of a farm. "Range of inclusion" = Items that the referent includes as parts or member of the class(es) it designates. For example: Doll - has a face, arms, legs. Farm - a farm house, a barn, a fence, a gate, animals, farmer. Include phrases where the mother says "on" if you can replace the word "on" with the phrase "is a part of." For example: The wheel goes on the truck, can be reqitten as: The wheel is a part of the truck. In our study, where mother brings a suitcase with toys, as promised, her statement "The suitcase has toys inside" is coded as an example of part-whole relations.

3. Function, (action, activity), purpose and role. "Stove is for cooking;" "Books - so I can read you stories;" "Toys - so we can play while we visit here." "Decoration - to make it pretty." (Excluding "how" questions and their answers.)

4. How things work. Simple answers to how questions. Often only modeled.

5. Cause - effect relations. This category includes antecedents and causes, consequences or results, and states of possible change that are not specific to this mother/child pair. Examples: "Bobbo" never stays down

because he has a very heavy base;" "If you don't put your coat on, you will catch a cold".

6. Material. the material of which a referent is made. "The tea set is made of plastic." "The decorative plate on the wall is made of wood." "The mirror is made of glass." "The rocking horse is made of wood."

7. Weight, size, orientation structure and dimensionality (including relative weight, size, orientation and dimensionality). The referent's estimated or measured dimensions or the referent's dimensions relative to other objects. Examples: "the 'people' in the farm-set are really small." "I weigh 120 lbs." "Daddy is taller than me but I weigh more." Conservation of weight, size or dimensionality in spite of changes in location e.g. You don't weigh any less when you are in water.

8. Quantity, volume and number. The referent's estimated or measured quantity. "This lego set has one, two, three ...eight buildings and five little people." "You have many cousins" "Here is another room" Conservation of quantity, volume or number despite changes in placement or shape.

9. Locational qualities. The referent's place in absolute or relative terms: "in," "on," "between," "above," "close," "far," "together." The referent's location as in place of residence e.g. "This animal lives in the jungle."

10. Temporal qualities. The time at which the referent exists, existed or will exist. For example, "now,: "later," "before," "after," "when you grow up," "forever."

11. Possession and belongingness. The referent's possession and to whom it belongs: "These toys do not belong to us:, "here, play with your doll", "The doll's bottle."

12. Sensory qualities. Sensory qualities characterizing the referent or perceived by the referent. Visual qualities include form, color, brightness, transparency. Auditory qualities include noisy, melodious, loud, soft. Smell qualities: e.g. "Can you smell it?" Internal sensory qualities like pain, temperature.

13. Judgement, opinions, feelings and evaluations concerning the referent or evoked by the referent. "This is an interesting picture," "I prefer a house to an apartment," "this house is quite old and beautiful." "Pictures of babies make me feel good inside,": "Playing with dolls makes me cheerful." Mother squeezed Bobb's (a toy) nose, theryby producing a noise. She then asks the child "How is that?"

14. Calling attention to the child's action or involvement with the physical world. Describing or asking about what the child is actually doing: "You are building a tunnel" "Did you just finish feeding a baby?"

b. Facts about social conventions, roles, attributes and relationships.

General social conventions - scripts

1. Labeling social events. Providing a name for a routine or social interaction. For example: "It is mealtime now"; "This is a lovely party".

2. Defining social terms. Explaining what "sharing", "being friends", "being nice" means.

3. Verbal and nonverbal social conventions. Socially agreed upon ways of verbally and nonverbally communicating on specific social occasions and/or socially agreed upon ways of behaving in regard to other people and in regard to dress. These include conventions that are defined by the child's family (e.g. praying before eating); by the culture

in which the child grows (e.g. greeting others when entering a home or an office), or by other cultues. For example: Cleaning up an area that one has used. Not touching precious objects belonging to others unless permission is granted. Mother exchanges greetings with the child or with the experimenter, For example: Mother says "Hi!" or "Good bye". Mother thanks the experimenter. Mother expresses exaggerated enthusiasm on the occassion of opening a "present" given to the child.

4. Routines. Sequences of behavior that are widespread in the American culture. For example, the eating routine includes: Washing the hands, sitting at the table, spreading the napkin in one's lap, or putting a bib on the baby, waiting until everybody at the table is served before starting to eat. Using utensiles appropriately. Other routines that we see in the child rearing study are the meal preparation routine, the toilet routine, and self-help/independence routines excercised by the child. Examples of independence routines include: The child ties her own shoe laces feeds herself, uses the phone to call the police or the parents at work.

Specific Social Roles Attributes and Relations

5. Social roles that are played by members of the culture. For examples: Fathers are the ones who fix machinery in the home. Parents are responsible for rearing their children. Girls do not hit; Boys do not play with dolls; Children do not stay up late; (In some cultures) children should not participate in adult conversation.

6. Kinship relationships. Familial relationships are defined in terms of parenthood, falial relationship and other blood or marital relationship. For example: Grandpa X is my father and Grandpa Y is your father's father.

7. Social Attributes. Statements that describe individuals as social beings, friendly, outgoing, uncooperative, interfering, etc.

c. Facts about emotions

1. Definition of emotion words, e.g. happy, sad, angry, frustrated. Also definition of emotions or internal states in terms of behaviors associated with them. For example: "When you are really sad, it is hard to smile." "When you love someone, you take good care of her." "When you are mad, you feel like shouting."

2. Labeling of emotions and internal states expressed by the child. The mother is teaching the child to label his behaviors as expressing internal states or emotions. For example: the child may sit very quietly, not exploring the environment and not playing. The mother may say "Why are you sad---?" or the child is playing and making car sounds. Mother asks the child: "Are you having a good time with those?"

3. Labeling of emotions and internal states expressed by others. The mother is teaching the child how to label behaviors of others as expressions of emotions or internal states. For example, the child may ask the mother why she looks "like that" and the mother may say "Because I am sad."

4. Methods for reading emotions and internal states. The mother may call to the child's attention the fact that facilal expression or body posture, or a situation may be helpful in inferring a person's emotions.

5. Culturally accepted ways for the expression of internal states or emotion. These include role specific rules and situation specific rules. For example: "Boys don't cry;" "You cannot laugh

out loud in church;" "When you receive a gift you are supposed to show pelasure."

II. Knowledge acquisition

a. The need for knowledge acquisition

1. Generating a situation that elicits or calls for exploration and/or questioning (i.e. curiosity behaviors). Example: "Oh, look at this. look what we have." "If you want to find out look inside".

2. Situations in which curiosity behaviors are appropriate. Examples: the child looks at the corner, next to the sofa. Mother asks: "What do you see there?" "When we go on a hike Saturday, you will abe able to do a lot of exploring".

b. Methods of knowledge acquisition

1. Figure it out yourself. Mother tells the child to figure things out but gives child no clues as to how to figure it out.

2. Examination of knowledge that may be already available. The mother encourages the child to re-think, to come up with information from his knowledge or skill based on what the child may already know. Mother tells child to solve the problem by thinking about it. For exampie: in response to the child's question the mother tells the child that he can generate the answer: "think about it" you already know parts of the answer."

3. Exploring the physical world by looking at objects, from different perspectives, manipulating them, moving them around. Elaborate examination of objects. This type of expoloration corresponds to what educators call "hands on" experience.

4. Asking questions from a social other as a means of acquiring information. For example: "I don't know the answer, we will have to ask Ann" or the mother explicitly tells her child that when the child does not understand a word or how something works, to ask questions of people that might know the answer (father, teacher).

5. Searching as a means of acquiring information. For example, mother and child would like to have more Lego blocks for building. The mother says: "Would you look in the box and see if there are more there?"

6. Observing others For example: Mother asks the child to look at how she is doing things, so he can learn, or Mother says, "Let me watch Ann close the gate so I will know how to do it myself" Or, while showing the child how to build a bridge out of Lego blocks the mother says "You can learn an awful lot by looking at how people do things."

7. Attention strategies

7.1 Avoding distractions. For example: The mother turns off the T.V. before sitting to play with the child, saying "The T.V. will disturb us", or The mother says "Let's clear the table first, so the tea-set and the doll will not disturb us", or the child plays with the Lego blocks and apparently there are objects cluttering the space and disturbing the freedom of her movement. The mother says "I will get these out of your way". The mother may at times instruct by saying "When working on something it is a good idea not to pay attention to other things."

7.2 Looking at the global configuration, not just at the details.

For example: "Tell me what this picture is about, not just the colors" or "It is a better idea to take all the toys out of the box and then look at them one by one."

7.3 Attending to one aspect of the problem. For example: When teaching her child to copy a block design the mother tells the child to do it one step at a time. When the mother and child play, the mother says to the child "Look here", calling his attention to one aspect of a total configuration. The mother may say "Look here, not there, this is where it will open".

III. Knowledge representation (memory)

1. Checking on the availability of memory for facts, events (Short term or long term Memory). For example: "Do you remember what I told you about..." "What is the color of my car?"

2. Strategies for adding knowledge to memory.

The emphasis here is on strategies for the addition of knowledge to an already existing store. When the mother imparts facts (section I), the facts may be entirely new to the child. At least, there may be no indication in the conversation that the child already knows something about the facts. We are coding situations where the mother provides a strategy (a method) for remembering, or classifying information. The child has facts and the mother tells the child how to organize them.

2.1 Rehearsal. the mother may ask the child to repeat a new telephone number or the home address.

2.2 Organizing contents in memory at time of learning.

Organizing information by relating items to other items, or facts or principles or events. Organizing contents can be done in reference to attributes, function, location, temporal order or other criteria of similarity among referents. Therefore, for the above the criterion by which cognitive contents are organized is marked by the coder.

3. Strategies for searching memory.

Searching memory may be done by using criteria such as attributes, function, location, temporal order, etc The criterion by which memory is searched is marked by the coder.

IV. Knowledge use

a. Planning-problem solving

1. Generating a situation that calls for planning/problem solving.

1.1 This can be done by posing an open ended question that may call for a multiple-step plan. For example: "What would you do if you had a snake?" Or, this can be done by the mother's actual creation of a situation. For example, the mother prepares all the items that are necessary for building "a town" and asks the child to create the makebelieve town.

1.2 Posing questions that call for decision making. The mother may ask: "Would you like to watch T.V.?" or she may ask the child to choose among alternatives: "Would you have apple juice or orange juice?"

Note: Only questions that can be construed as pertaining to problem solving or planning are coded here. If the mother asks her child to label an object or an event or if she checks the child's memory through a question, we do not code it here.

2. Information about when one needs to engage in a planning/problem solving. For example: a party, a vacation, having the keys to enter the house.

3. The purpose of planning or problem solving. For example: "To make sure that things will happen when you want them to happen or in the way that you want them to happen".

4. The consequences of planning/problem solving. For example: "The birthday party was a success because we prepared good food and good entertainment".

5. Type of planning.

5.1 Plan in action. (Statement and action overlap in time.)

One behavior or a sequence of behaviors which is/are performed to achieve an objective. Advance representation of the sequence of behaviors or the conditions under which they will be performed is not made explicit. For example: Mother describes steps in cooking as she carries them out.

5.2 Plan of action. (Statement precedes action.)

An explicit advance sequencing of planned behavior(s) designed to facilitate short term goal attainment. Representation of behaviors and situations in which behaviors are performed is symbolic. There is an explicit awareness of plan formation prior to action. For example: (1) The mother tells the child that they are first going to open a suitcase with toys, then

they will choose one of the toys, and then they will play with it. As soon as she finishes saying this she starts carrying out the plan. (2) The mother tells the child what to do (i.e. commands). Here we will code only if the goal or justification for the command is offered or is evident from a prior statement "Sit down" will not be coded but "Go get the doll from the other room so we can play house" will be coded.

5.3 Plan as deliberate representation. This is a deliberate representation of anticipated future states of the environment and/or a behavior or behavior sequences designed to deal with these long term goals. The planner announces a potential activity or situation that may be acted on in the future. For example: The mother says "You may draw with the crayons, if you want" or "We can play in the other room if you want to."

5.4 Plan as an end in itself. A deliberate and explicit effort to devise a plan. Recognition for a need for a plan is salient. The planner is explicitly aware that the plan may never be executed. For example: Mother talks about how the family would live if they won a million dollars in a lottery. The mother talks about the specifics of the household routines if the family included three more children.

6. Steps of planning/problem solving

6.1 Providing subgoals. For example: "Put the kitty to sleep (= top level goal). First, put him to bed and then rock him (= sub goals). The mother may provide subgoals by telling the child to carry out each step of an explicit or a tacit goal. For example, having asked the child if he wants to see

what is in a suitcase (= top level goal) the mother says to the child, "Can you pull that down? That's it! O.K' Do this one here, O.K. Open it up, now push this up".

6.2 Generating alternative procedures

For example: "You can play with Lego blocks or you can draw a picture" or: When the child's attempt to build a bridge fails the mother provides an alternative procedure for building a bridge.

6.3 Evaluation of generated strategies. For example: "I prefer taking the car to walking. If we walk, we will be able to carry very few groceries". "The best way to go about it would be to go to the toy store last. If it is closed, we could go another day; but if we miss the supermarket, we won't have bread for breakfast".

6.4 Error recovery. When problems arise in solution strategy - how to use that new information to generate a more satisfactory solution. For example: When the blocks fall while the child attempts to build a tower the mother says "That way, putting big blocks on small ones won't work. We have to put the larger ones first, then the smaller ones".

6.5 Final evaluation behavior.

Is the solution satisfactory? Was the original problem solved? For example: "You drew a good airplane" "The tower is just like the one in the picture."

b. Differentiated and explicit thinking

1. disambiguating, clarifying, giving unelaborate explanations.

Disambiguating a referent especially in response to a request to do so; clearifying a statement e.g. "Who fell down"?, Explaining

a statement that appears to be a conclusion. For example: The child says "I hate snakes" and the mother ask "Why?" When explanations are given they are relatively short, unelaborated. For example: "Don't cross the street, it is dangerous" or "Leave it alone, it is not a toy".

Note: If the mother seems not to understand the child's speech and says "uh?" as a way of asking the child to repeat or to clearify, we do not code her speech as a request for clearification. This is so because she is not asking the child to be more explicit, she only wants to make sure that she heard the child.

2. Elaborated explanations. For example: "Last time the doll and everything that belongs to her were in the corner of the side room, so let's start looking for the doll's bottle there." or "When you drop glass things to the floor they break, so be very careful with that vase. It is made of glass and it will break if you drop it." or "Don't cross the street. The traffic is heavy and a car may hit you."

3. Elaborating the details of "a story".

The mother elaborates or asks the child to elaborate on a statement. For example, the child may say: "I saw a policemen." The mother may ask for details about "when", "where", "what was he doing", etc., thereby helping the child to flesh out the story.

4. Requiring the child to reflect/evaluate the child's own behavior.

The mother presents the child with an opportunity to think about his own activity or ability. For example, the mother asks "Have you done a good job?", "was that hard to do?", "Do you think

you can figure it out?" Note: These questions will not be coded under "posing questions that call for decision making."

5. Correcting the childs misconceptions. The mother corrects an apparent misconception held by the child. For example: The child points to a model of a "truck" and says "car". The mother says "No, this is a truck", or the child says "Time to go home" and the mother says "Not as yet".

C. Motivating and reinforcing speech and behavior.

The mother is in a position to motivate her child to engage in cognitive activity. She can do so by expressing positive affect when engaging in cognitive activity, by expressing positive affect on seeing the child engaging in cognitive activity and by verbally reinforcing the child's involvement in cognitive activity.

I. Motivation and enjoyment.

Motivation and enjoyment as they pertain to the engagement in or performance of cognitive tasks.

1. Maternal affect

1.1 Maternal positive affect (for this mother). (a) The mother seems to enjoy the interactions in which she communicates the cognitive contents or skills that have been elaborated on in this coding system. (b) The mother expresses positive affect on seeing the child engaging in questioning or exploration (curiosity) or when the child succeeds on a cognitively demanding task.

1.2 Maternal negative affect (for this mother). (a) While communicating cognitive contents or skills to her child, the mother expresses negative affect. The mother conveys apathy, lack of involvement, irritability, anger, annoyance while teaching her child. (b) The mother expresses negative affect while seeing her child

cope with a cognitively demanding task. For example: The child opens the mother's purse and puts something in her mouth (i.e. explores). The mother is alarmed and says in a voice expressing anger "What did you just put in your mouth?"

2. Maternal verbal or non-verbal expression of interest in cognitive contents or skills. For example: The mother says with great interest "I have never seen an object like this" and then she touches the object and explores it. The mother may say to her child "How did you learn to draw like this?" (said with admiration and interest). The mother may tell the child that she enjoys reading, learning about new places, solving cross-word puzzles etc.

3. Mother comments on the value of knowledge and cognitive skills. The importance may be defined in terms of the family standards, the culture, future aspirations for the child. For example: "I think reading is important" or "Paying attention is important" or, "I want you to listen carefully to what people say" or "Making things work is fun", or "In our family we first think and then do".

4. Urging the child to engage in cognitive activity.

4.1 Intrinsic motivation. The mother tells the child that the task is interesting, fun, challenging.

4.2 Prosocial motivation. For example: "Do it, so mommy will be happy".

4.3 Image related motivation. For example: "Do it, so I can see what a smart boy you are".

4.4 Competitive motivation For example "You can do it, your brother did it".

II. Reinforcement

1. Reinforcement of child's skill or success in engaging in specific cognitive acts (exploring, labeling, reasoning etc).

1.1 Positive feedback. For example: "You did it very well", or Mother says in an approving tone "That's right" or "uh-hum", or mother repeats what the child just said implying that the child was right. At salience level 3, the mother would refer to the child's enduring skill. For example "You draw so well" or "You are so good with numbers".

1.2 Negative feedback. For example: "You did it wrong" "You did not understand me" or "You always have a hard time building with blocks".

2. Reinforcement of the child's effort

2.1 Positive feedback. For example: "You tried hard on that one" or "You always try your best" (the latter is at level 3).

2.2 Negative feedback. For example: "you are just being lazy" or "You are alwayws sloppy".

CODING SCHEME 4: THE SPECIFICITY AND PRESENCE OF REFERENTS

In this study "referent" is an object, situation or event that the speaker referes to, responds to or creates (as when planning) and which leads us to code the mother's speech and behavior as imparting cognitive contents. In "This is a nice tower" the referent is the tower. In "Would you like to draw?" the referent is the act of drawing which the mother proposes to the child. When the mother says "Goodbye, Anna" (to the experimenter) the referent is the departure, a social situation that gave rise to the excercising of a social convention. The referent of "Let's see what's in the suitcase is the plan.

We are interested in characterizing the content of the information that mothers impart to their children in terms of its specificity and availability to the senses. The assumption is that cognitively it is more difficult for a child to deal in generalities and with referents that exist in memory rather than with those existing in front of the child. A referent therefore can be coded as particularistic or as general. It is particularistic when it is a specific instance of a class of referents. It is general when it pertains to general rules or truths. The referent may be present or it may be absent. We distinguish between two levels of absence. If the referent is a conversation or another event that occured a short while back in the study or is about to happen we code it as different from a referent that was not available to the senses in the very short term past or will become available in the future.

When the mother conveys different cognitive contents pertaining to one referent, we code the qualities of the referent just once. For example: The mother may talk about the Lego set and impart information about its sensory qualities and how it works. She may also carry out a plan in action by building a tower from the Lego pieces. In this instance we code that the referent is particularistic and present and we code this just once. However, if the mother continued by making a plan for what she and the child may do with the Lego set later on, the referent of her conversation will be a representation of an event that is about to occur but is not currently present. In this case, we add an entry under absent, level 1. We do not code particularistic again.

CODING SCHEME 1: SHARED FOCUS

(See Pages 2-6 in the manual)

Coder's name _____

Subject number _____

Segment of tape _____ Time of segment

Begin _____

End _____

ATTEMPTS TO ESTABLISH FOCUS

#	TIME	INITIATOR — M, C	METHOD VERBAL — ST, DIR, QU	METHOD NONVERBAL — GESTURE, MODEL
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

M = mother, C = Child

ST = statement, DIR = directive, QU = question

Coder's name _____ Subject number _____

Segment of tape _____

EPISODE #	1	2	3	4	5	6	7	8
TIME BEGAN								
TIME END								
INITIATOR								
Mother								
Child								
METHOD								
Statement								
Directive								
Question								
Gesture								
Model								
RESPONSIBLE FOR FOCUS MAINTENANCE								
Mother								
Child								
Both								
Not codable								
REGULATION of CHILD'S AROUSAL								
Appropriate								
if no, Mother attempts								
Not codable								

Coder's name _____ Subject number _____

Segment of tape _____

	1	2	3	4	5	6	7	8
Cognitive Content IMPARTED								
Cognitive Content NOT IMPARTED								
TERMINATION								
IF OBVIOUS RELEASE	//////	//////	//////	//////	//////	//////	//////	//////
WHO INITIATED								
Mother								
Child								
RELEASE ACKNOWLEDGED	//////	//////	//////	//////	//////	//////	//////	//////
Yes								
No								
CLOSURE METHOD	//////	//////	//////	//////	//////	//////	//////	//////
Statement								
Directive								
Question								
Non verbal								
IF NO OBVIOUS RELEASE	//////	//////	//////	//////	//////	//////	//////	//////
TERMINATOR	//////	//////	//////	//////	//////	//////	//////	//////
Mother								
Child								
METHOD	//////	//////	//////	//////	//////	//////	//////	//////
Focus drifted/no response								
New behavior								
Moving away								
Termination not codable								

CODING SCHEME 2: RESPONDING TO CHILD'S QUERIES

(See page 6 in the manual)

Coder's name _____

Subject number _____

Segment of tape _____

EPISODE #	1	2	3	4
MOTHER ANSWERS	////	////	////	////
no				
yes, adequately but no cognitive content				
yes, inadequately				
yes, adequate and cognitive content imparted				
EPISODE #	**5**	**6**	**7**	**8**
MOTHER ANSWERS	////	////	////	////
no				
yes, adequately but no cognitive content				
yes inadequately				
yes, adequate and cognitive content imparted				

CODING SCHEME 3: THE CONTENTS OF MOTHRS'S SPEECH AND BEHAVIOR

(See Pages 6-25 in the manual)

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

	EPIDOSE NUMBER...													
FACTS ABOUT PHYSICAL WORLD	LABELING													
	CONTEXTUAL ALLOCATION													
	FUNCTION,PURPOSE,ROLE													
	HOW THINGS WORK													
	CAUSE - EFFECT													
	MATERIAL													
	WEIGHT, SIZE, etc.													
	QUANTITY/NUMBER													
	LOCATIONAL QUALITIES													
	TEMPORAL QUALITIES													
	POSESSION													
	SENSORY													
	JUDGEMENTS/FEELINGS													
	ATTN TO CHILDS BEHVR													
SOCIAL CONVENTION	LABELING SOCIAL EVENT													
	DEFINING SOCIAL TERMS													
	SOCIAL CONVENTIONS													
	ROUTINES													
	SOCIAL ROLES													
	KINSHIP RELATIONS													
	SOCIAL ATTRIBUTES													
	COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

	EPIDOSE NUMBER...													
FACTS ABOUT	DEF. OF EMOTION WORDS													
	EMOT LABEL.CHILD'S EMOTIONS													
	LABEL.OTHER'S EMOTIONS													
	METH FOR READ.EMOTIONS													
	CULTUR. ACCEPTED RULES													
NEED FOR KNOWLEDGE	GEN. SIT. FOR CURIOSITY													
	SITUATION FOR CURIOSITY													
	PURPOSE FOR CURIOSITY													
METHODS OF KNOWING	FIGURE IT OUT YOURSELF													
	RE-EXAM. OF KNOWLEDGE													
	EXPLORING PHYS. WORLD													
	QUESTIONING OTHERS													
	SEARCHING													
	OBSERVING OTHERS													
ATTENTION	AVOIDING DISTRACT.													
	LOOK AT GLOBAL CONFIG.													
	ATTEND. TO ONE ASPECT													
	COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

EPISODE NUMBER...													
CHECKING MEMORY													
STRATEGIES:													
KNOWLEDGE REPRESENTATION I. REHEARSAL													
II. ORGANIZING													
CRITERIA FOR:													
a) ATTRIBUTES													
b) FUNCTION													
c) LOCATION													
d) TEMPORAL ORDER													
e) OTHER													
STRATEGIES FOR SEARCH:													
CRITERIA FOR:													
a) ATTRIBUTES													
b) FUNCTION													
C) LOCATION													
d) TEMPORAL ORDER													
e) OTHER													
COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

	EPISODE NUMBER...													
	GENERATING SIT.FOR PLANNING:													
PLANNING AND PROBLEMSOLVING	a) OPEN/END ?'s													
	b) DECISION MAKING ?'s													
	WHEN TO PLAN/P.S.													
	PURPOSE OF PLAN?P.S.													
	CONSEQUENCES OF PLAN/PS													
	TYPE OF PLANNING:													
	a) PLAN IN ACTION													
	b) PLAN OF ACTION													
	c) PLAN AS DELIB. REP.													
	d) PLAN AS END ITSELF													
	STEPS OF PLANNING/P.S.:													
	a) DIV. INTO SUB-GOALS													
	b) GEN.ALT. PROCEDURES													
	c) EVAL. OF STRATEGIES													
	d) ERROR RECOVERY													
	e) FINAL EVAL/													
THINK	DISAMBIGUATING CLARIFY													
	ELABORATED EXPLANATIONS													
	ELAB.DETAILS OF STORY													
	EVALUATE OWN													
	CORRECTS MISCONCEPT													
	COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

EPISODE NUMBER...													
MOTIVATION													
MOTIVATION: POSITIVE AFFECT													
MOTIVATION: NEGATIVE AFFECT.													
MOTIVATION: INTEREST													
MOTIVATION: VALUE													
MOTIVATION: URGING													
REINFORCEMENT: INTRINSIC													
REINFORCEMENT: PROSOCIAL													
REINFORCEMENT: IMAGE													
REINFORCEMENT: COMPETITIVE													
REINFORCEMENT													
REINFORCEMENT: C'S SKILL													
REINFORCEMENT: POSITIVE													
REINFORCEMENT: NEGATIVE													
REINFORCEMENT: EFFORT													
REINFORCEMENT: POSITIVE													
REINFORCEMENT: NEGATIVE													
COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

CODING SCHEME 4: SPECIFICITY AND PRESENCE OF REFERENTS

(See Pages 26-27 in the manual)

SUBJECT # _____ CODER _____ SECTION OF TAPE _____

EPIDOSE NUMBER...													
CONTENT: PARTICULARISTIC													
CONTENT: GENERAL													
CONTENT: REFERENT IS PRESENT													
CONTENT: REFERENT IS NOT PRESENT — 1													
2													
COLUMN NUMBER	1	2	3	4	5	6	7	8	9	10	11	12	13

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