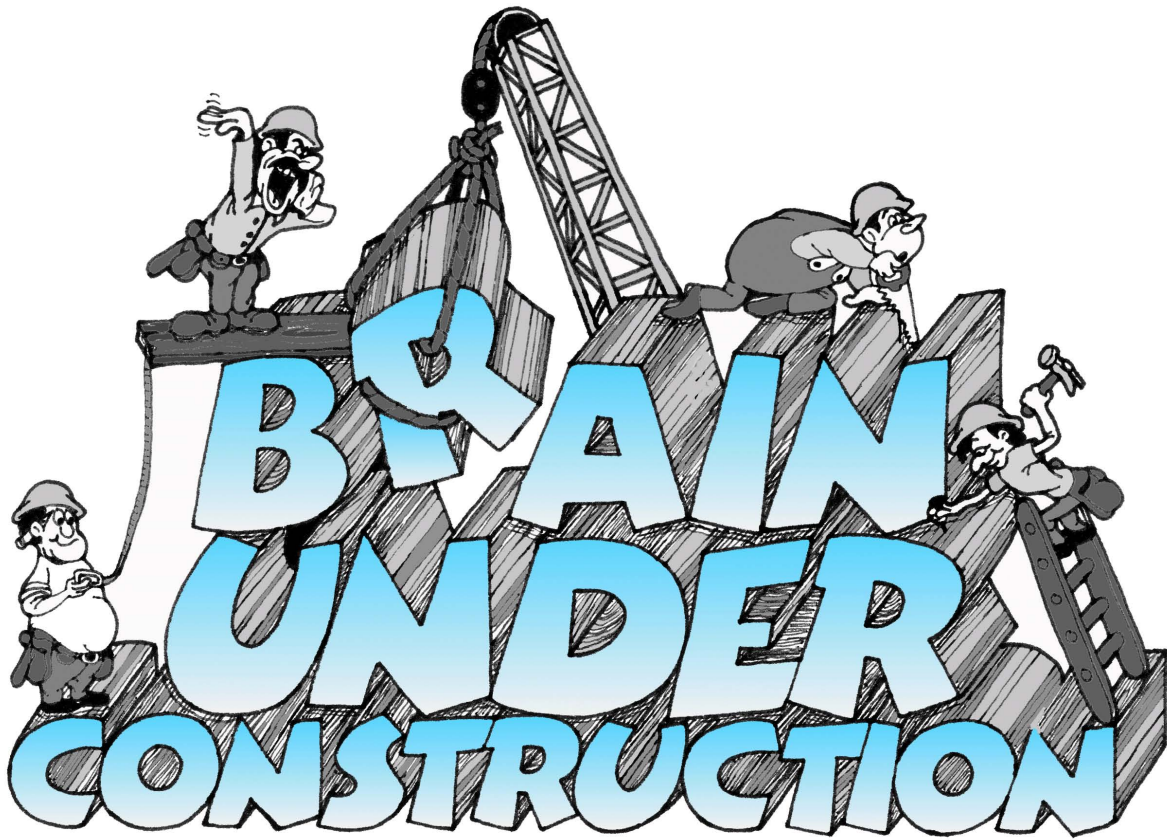




***Experiences That Promote
the Intellectual Capabilities
of Young Toddlers***

Book Two of a Series: 8 to 18 Months

by

William H. Staso, PhD

Great Beginnings Press

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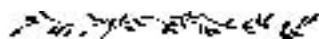
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Prologue



In his preface to his first edition of his book *The First Three Years of Life* (1975), Burton White stated his belief, after some 17 years of research, that “not one child in ten gets off to as good a start as he could”. He repeated that comment in his second edition in 1985, and in the third edition in 1990 he lamented that “For the most part, our educational system still operates as if no important learning takes place until a child’s sixth birthday is reached”. This opinion is being

shared by an increasing number of individuals and groups.

The Carnegie Task Force in 1994, in reviewing the status of young children in this country, concluded that “our nation’s children under the age of three and their families are in trouble, and their plight worsens every day”. They cogently argued for a “national response” to what they refer to as a “quiet crisis”. The task force cited a report completed in 1993 by the National Educational Goals Panel that “only half of all infants and toddlers are routinely read to by their parents, and many parents give insufficient attention to their children’s intellectual development”. “Teachers,” they state, “report that one in three American kindergarteners arrives in school unprepared to learn”. They add this warning: “if left unattended, this crisis will ultimately compromise our nation’s economic strength and competitiveness”.

Staff at the Frank Porter Graham Child Development Center reviewed four large studies of infant-center care centers from 1992-1995 in a report entitled “Quality of Center Child Care and Infant Cognitive and Language Development” (1996). These studies, they observe, uniformly found poor quality of care in these facilities. For instance, a 1995 report of 214 care centers in four states indicated that “only 8% provided developmentally appropriate care based on process measures of quality”. Some centers were even seen to jeopardize the development of the infants and toddlers. The authors of the report (Burchinal, Roberts, Nobors, and Bryant) conclude that “researchers and policymakers should focus on how quality of infant and preschool care can be enhanced to improve, not impair, child development”.

Joan Beck, columnist for the Chicago Tribune, and an advocate for early childhood education, wrote the following in her column in October 1996:

“Of all the stories I have ever covered, nothing is more exciting or important or promising than the new research about the human brain. And nothing has been more frustrating than watching so much of this new knowledge go unused when the potential benefit for individuals and society is so enormous.”

In Time magazine's special report "Fertile Minds" (1997), writer J. Madeline Nash makes a similar point: "If parents and policymakers don't pay attention to the conditions under which this delicate process [of brain wiring] takes place, we will all suffer the consequences".

"...there is a growing awareness that something is seriously wrong with the way we raise our young children. Separately, neuroscientists and early childhood experts have reached the same conclusion: A young mind denied opportunities is a young child denied potential".

This book is dedicated to those who are working to orient this country's focus of educational efforts where it most importantly belongs, on the developing minds of infants and toddlers. We indeed have a lot of information. The time has come to use it.

Introduction

If you have a child in the 8 to 18 month age range, consider yourself lucky. The excitement children this age generate is contagious, it rubs off. Your little one has a thirst for knowledge and learning unparalleled at any other time in life. No longer does he* just watch the world around him. With curiosity and interest he will launch out, investigating on his own, in much the same way that an experimental scientist does. His facility for understanding and using language will develop rapidly as he attends to sounds and the words he hears. And in this marvelous development, you can be of great help to him.

In this first part of the book, you will be assisted with many ideas, some of which are illustrated with the help of a young toddler named Jonna and a few of her age mates. Here is a photo of Jonna and two of her day care associates:



That's Nicholas (aka "Spike") on the left, Lauren in the middle, and Jonna on the right. Indeed an exuberant threesome.

*Book One referred to all infants in the feminine gender. This book will refer to unspecified members of this age group as males, simply forwell, simplicity.

Others you will meet include Joe, Jasmine, Jason (I think there is a pattern here!) and Blythe.

In the last decade, neuropsychologists working with new computer technology have given us important insights into the ways the brain changes with experience. For instance, it is becoming increasingly clear that as a species we have predispositions to learn and understand certain information, such as languages, physics, and even math!!! Experimental studies using sophisticated imaging equipment reveal that when the brain receives environmental stimulation, its physical structure is actually changed. With respect to the topic of this publication, the research indicates that **the experiences we provide our infants and toddlers will affect how well they understand, reason with, and remember information.** There is a growing consensus among developmental psychologists that a child's environment may well influence his developing IQ by 20 or more points ---and this is **the key time** for your attention to that environment.

If you provided your infant the types of stimulation suggested in the first book in this series, *Neural Foundations*, you will recognize some of the emphases discussed in this present book. As a world class explorer, your toddler will experiment with cause-effect events, look for

similarities and differences, and begin to organize visual, auditory, tactile, and other sensory data in constructive yet complex ways. And his language capability will expand greatly. Even if you don't hear your child speak many words, he will be learning hundreds of new words during this time period and understanding what you say better day by day.

Inside your child's brain, connections among nerve cells are continuously being formed. These physical connections reflect associations among events and objects he encounters in the world in which he is being raised. This book will inform you as to what types of experiences contribute most critically to the development of the skills and competencies that are commonly regarded as the basis for intelligence.

The book is arranged in two major parts:

→The first part focuses on suggestions you can use as a parent or caretaker to optimize your young toddler's capabilities

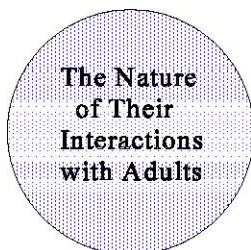
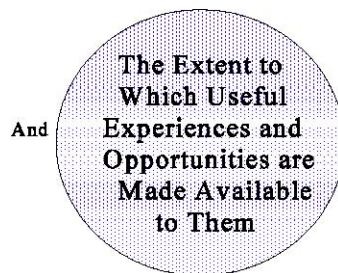
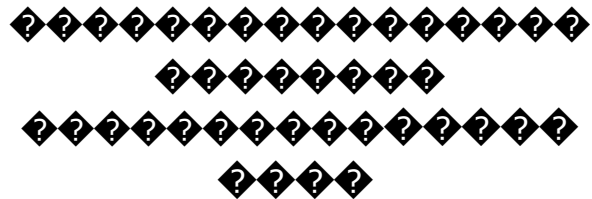
With an understanding that most parents and caretakers are interested in locating ideas to assist their children, the "suggestions" section was placed in the first part of the book. However, the ideas were not meant to represent a comprehensive range of possibilities. Everyone's environment and interests are different. What your family values as important for your child to learn may be different from what your neighbor values. Thus, knowing the underlying basis for brain development becomes important in order to forge your own ideas and activities. That's where the second part comes in.

→ The second part of the book is divided into three chapters: Chapter 5 provides information about recent research on early brain development; in Chapter 6 the question of what we should be teaching our children is addressed using a task-analysis approach; last, Chapter 7 presents a model that utilizes a cognitive-developmental approach for deciding what experiences most help young children. The focus of this model responds to the educational community's recent emphasis on the need for children to develop critical thinking skills.

An Appendix gives you the typical ages that children develop certain other key skills--primarily those that are preparations for success in school.

The more you understand the nature of the factors underlying intelligence (and intelligent behavior), the more impact you will have on your child's later successes in school and life. There is considerable information awaiting you in the chapters that follow. You might want to start a booklet in which you make lists of activities you want to use with your child in the course of each day. With repeated use, such activities and practices will become more routine, more part of your lifestyle, and more impactful.

Although you will encounter many specific suggestions, in a collective sense what will be recommended to help your toddler expand his intellectual capabilities will be to help him develop neural associations that sponsor understanding, language skills, problem solving abilities, and evaluative expertise. Is he too young for all of this? Not at all: one of the main tenets of this book is that these skills are the very competencies that all toddlers are **naturally** trying to achieve. The degree of success that children in this age range have in establishing such neural associations will depend on two factors:



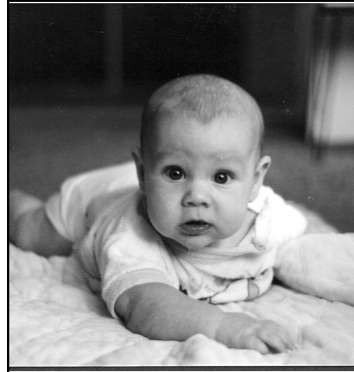
Part One:

Chapter One

An Overview of the Birth to 30 Month Period

◆ During the first 7 months of your baby's life, he went through a period of sharpening his sensory skills, coordinating them with one another, learning how to use his hands and fingers, improving his balance, and "tuning into" and then establishing neural networks reflecting the language sounds and the common sights around him. In general he was preparing himself to begin negotiating the world. His greatest need was to be able to see what the world is composed of and how objects act. And he relied on his parents or caretakers to give him access

to that important environmental information.



Jason at Five Months



**Lauren watches with interest as Jonna tries
out a grapefruit**

◆ In the time frame addressed by this book, 8 months to 18 months, the young toddler refines his sensory-motor equipment, he begins cataloging sound groupings of the language of the home by relating them to objects and events, he establishes more complex networks of



associations such as in cause-effect sequences, he deepens his understanding of object properties, and he becomes a thinker who plans and makes decisions. His greatest need is to have unrestricted opportunities to interact with objects and to receive guidance from you.

❖ From the 18th through the 30th month, the child learns social rules, engages in representational play, develops more extensive, expressive language, understands an increasingly larger number of concepts related to time, space, and quantity, anticipates actions of objects, and shows active recall of happenings in his life. During this time he needs increasing social guidance in his dealings with others.

The first 30 months of your child's life lays the foundation for his usual, ongoing orientation to objects, people, events, and ideas. These early experiences will determine what types of information will capture and sustain his attention, how he will relate to and reason with that information, and what he will do with that information.

Why These Experiences Are So Important Now

Whether or not you provide the experiences suggested in this book, your child

will learn to talk, to understand and reason about events/ideas, and to remember what he learns. But there are wide differences in children's abilities in these areas, differences that clearly show themselves after 18 months but appear to be formed during this age period. If asked the question "do you want your child to do well in school?" any caring parent would certainly say "yes". But few parents are aware that by the time their children are of school age, **their experiences from ages birth to 5 years have already determined whether they will be an outstanding, average, or poor student.**

Your toddler's brain is putting together a network of associations RIGHT NOW to form the foundation as to how efficient and productive his brain will become.

Burton White, whose book *The First Three Years of Life* was cited in the Prologue, provided families with valuable information from his and his associates' extended study of the roots of competency during the 1970's and 80's. He concluded that before the age of 8 months infants really didn't look much different from one another as to their competency; but by the age of 18 months there were clear differences among them. Something seemed to happen during those ten months.

What research is now suggesting may be happening is that the neurological foundation of the child's brain is being constructed. The physical "wiring" is being organized as to how he will react to objects and events. While this structuring can be altered, the basic architecture is being established. In attending to your child's intellectual needs during this age period, you will be helping him in ways that will assist him far into the future. Parents who spend the type of quality time with their child as suggested in this book can expect to see noticeable differences in their child's learning rate by 18 months compared to most other children of that age.

Smartness Comes From More Than Just Genes

Continuing research on the relationships among genes and temperament, personality, and even learning ability has strengthened the position that human behavior is indeed greatly affected by pre-coded biological instructions. But, as Robert Hotz (1996) notes, the effects of genes "can be overwhelmed by other influences". He goes on to write that "Many genes involved in neural development do not become active until after birth" and that "conditions in the world....can alter what they do or whether they become active at all". Sara Meadows (1993) describes the gene-environment relationship in her book *The Child as Thinker: The Development and Acquisition of Cognition in Childhood* with these words: "the genes you inherit from your parents may determine the potential you have for intelligence, but the environment in which you are raised determines how nearly you reach that potential".

You are of vital importance to your child's development of intelligence during this age period! From allowing him unrestricted opportunities for involvement with a variety of objects, to engaging him in interactive activities, to guiding his attention to what you model, you impact the structure of his developing brain. You make a difference! In the succeeding chapters, specific ideas will be offered to you as to what you can do during these months. But you also need to have the attitude that your involvement with your child is the most productive use of your time possible. If you can't provide 8-10 hours a day of active involvement, then you should find capable others who can assist you or by themselves provide such

quality service. Young toddlers have a great desire to learn; if you give your child only custodial care or sporadic attention, you will be ignoring the greatest opportunity you will

Page 15

ever have to positively impact his future. No amount of homework help or tutorial aid when he is older will compensate for the loss of constructive time spent during these months.

Kiester and Kiester (1996) report on the 30 year work of Dr. Craig Raney, professor at the University of Alabama at Birmingham. In addressing the issue of stimulation, Raney is quoted as saying "Parents need to recognize how important their input is". On *Primetime Live* (1995) he added that in order to make a difference, there has to be intervention by the time the child is 12 or 13 months of age. In one of his studies, a group of infants given extra stimulation via songs and games scored as much as 20 points higher on measures of IQ at preschool age than did another group who did not receive such stimulation.

The Importance of Balance

Balance is an important feature in lives at all ages. It is of particular importance during the first few years of life. There are three types of balance that you need to keep in mind with your child during this age period.

The first type involves that balance between allowing your child complete and unguided exploratory/discovery learning opportunities versus providing him with direct and guided experiences. Your child needs both. Exactly what balance is needed varies from child to child, situation to situation, and sometimes from day to day. If your youngster is not interested or ready (sometimes one and the same) for an activity or interaction, pushing the engagement is not advisable. By knowing what types of activities would be interest to him, you can set the stage for a variety of possibilities. Within the context of his interest, for instance, you

can model certain manipulation methods or give demonstrations of objects' properties and relationships. There exist a variety of studies demonstrating the value of such guided experiences. As one example, Rosengren, Behrend, and Perlmutter (1993) speak of the importance of "didactic" (or "teaching") exchanges between caregivers and their children. They found that the practice of direct teaching offers significant advantages to young children: didactic exchanges, they write, "focus a child's attention on task-relevant dimensions, introduce the child to new areas or novel ideas, and help the child to interpret aspects of the environment or aspects of the task".

A second type of balance concerns overstimulation versus under stimulation. It is best not to use a "kitchen-sink" approach, wherein more (and varied) stimulation is seen as better, leading to the provision of many objects or multiple activities at one time. While a young toddler is indeed more capable of focusing on one source of stimulation in the midst of other distractions than is an infant, concentration and focus is important in the encoding of more complex associations. So be careful to not impact your child with too much at one time. On the other hand, toddlers get bored quickly, so finding that "middle ground" can be a demanding task, especially in the months before your little one becomes fully ambulatory.

A third type of balance relates to restrictions versus unlimited access. To the child who is approaching the end of this age period, restrictions toward objects and locations can be considered a means of helping to teach self-control. Before that time, the fewer restrictions you have on his behavior, the more he will learn about the world. In a research document entitled "Caregiver-infant Interaction Antecedents of Children's School-Age Cognitive Ability" (Olson, Bates, and Kaskie, 1992), a finding was reported that has been true of every such study going back to the early 70's. The authors state: "two major dimensions of maternal behavior, non restrictiveness and verbal stimulation, were significant predictors of children's later cognitive competence". Fewer restrictions require more personal involvement, of course. Realize that you are a major force in shaping what types of behavior your child will exhibit both now and in the future. What behavior you encourage and reward will greatly affect his style of interactions. More on this subject later.

Chapter Two

Some General Points of Importance

In this section, the ideas are divided into two groupings: those related to enhancing thinking abilities and those related to enhancing memory.

(1) ***Maintain a low level of stress in your child's environment.*** You should be concerned about the purity, intensity, and duration of stimulation. This statement means that

- ❖ you should make an effort to minimize “mixtures” of noises in the home, such as the TV blaring, the stereo playing, other children yelling, and cars rumbling outside

- ❖ loud noises (which can produce startle and emotionally upsetting reactions) should be avoided

- ❖ the general pace of life should be casual. Your child's brain is developing connections to environmental events during this time, and excessive stimulation yields poor and inefficient neurological wiring. Over-stimulation produces negative effects and likely creates more stress than under-stimulation.

(2) ***Afford opportunities for your child to engage in/witness a variety of common object-object, object-event, and event-event associations in his environment.*** Wow that was a long phrase..... Let me try to explain.

Sensorimotor experiences, wherein the child engages both his senses and motor skills in learning, are particularly valuable. That means you should constantly be trying to get your child physically and sensorily involved in experiences. The environment should afford--either through your child being able to openly explore or your directing his attention---ample opportunities to take note of events and situations that reflect physical/social realities. Some of these realities involve objects and other objects. For instance, a block will make a sound when dropped on a counter but not onto a pillow. Other situations may involve objects

and events. An example of an object and event might be the phone being picked up when it rings or a light switch being toggled when a dark room is entered. Lastly, An example of an event-event occurrence might be someone saying some words and another person giving them a hug or handshake. Toddlers are fascinated by all such relationships and will spend considerable time watching and/or exploring them. Jasmin, pictured above, picked up and dropped



**Jasmin explores
"bounciness"**

tennis balls on a linoleum surface for some fifteen minutes one day.

(3) ***Interact with your infant.*** Frequent and sustained interactions with an

adult are of vital importance to your child's development during this age period. When he is 3 or 4 he will learn more on his own. But for now, he needs you and your time. There are many toys on the market that supposedly are of interest and educational value to children

Here, Joe, at 10 months, shows how much he enjoys dealing with the real world --and with his mom.



in this age range. Some have bells and other noise making capabilities that are activated when the child pushes a button or slides a switch. These products catch the attention of young toddlers because they have a cause-effect quality. But few of the toys actually help the child learn about how the real world works; moreover, because they are contrived, any neural circuits developed in the child's brain to mirror the specific cause-effect events will be useless later. In a sense, the child is being "tricked" into attending to information that is not of survival or adaptive value. If the toy has no correlate in the natural, social, or educational world it should not be presented to the child at this time. When he is of preschool age, fanciful toys can add to his sense of pretend. But during brain construction, it is reality that he needs, and he needs you to be the guide. Letting your child sit by himself with a toy that is a distraction from reality will not assist him to construct a useful brain system.

(4) ***Provide practice.*** As neurologist John Mazziotta of UCLA states, “practicing the simple stuff makes the acquisition of later information more efficient” (quoted in Psychology Today, 1992). When clear and solid connections are made among nerve cells, practice reduces the energy demands on the brain. Practice can include object manipulation or involve motor activities, but it also can mean just looking at an object or viewing the actions of an event over and over.

(5) ***Balance Discovery and Guided Learning.*** Even if your are a virtual paragon of interactive knowledge and skills, you will have to allow your child time to interact with objects and witness events on his own to gauge at what level of development he needs assistance. (These levels are those introduced by the cognitive model: see Chapter 7). He may be primarily yet in the exploratory mode, thus needing more time to engage in attending to or manipulating objects to assess their properties. At this level he needs more discovery opportunities (your job being to engineer the environment with a variety of objects of differing properties). At the next level, that of the experimenter or processor, he can use your direct involvement considerably more often. You are the one who can set the stage for him to notice or otherwise discover important relationships among objects or between himself and objects.

(6) ***Be Sensitive to Your Child’s Reactions.*** Every child is different in the extent to which he responds to stimulation, wants to be physical, or wants “alone” time. Some of these differences appear to be inborn. Everything stated in this publication has to be used in a personal, not a blanket, approach with your child. Being sensitive requires patience and the capacity to put the child’s needs first. Realize that you are striving to organize your child’s environment to match his level of interest and development, not pushing experiences upon him.

(1) ***Use a multi-sensory approach.*** Brain scan imaging technology is confirming that input and memory are stored in many parts of the brain. As will be discussed in the second part of this book, each feature of an object is stored in a different location, and memory of one element can bring up the whole network of associations. So by helping your child attend to the varying sensory properties of an object or event, you facilitate his construction of a functional associational network. When you introduce him to an object or an experience, you can call his attention to the varying ways that it looks, feels, smells, tastes, etc. as appropriate.

(2) ***Repetition is important.*** Practice or repetitive exposure aids not only

the thinking process but the memory system as well.

(3) **Establish meaningfulness in the environment.** Meaningfulness is enhanced when the child's routine is consistent and the child is alerted to the constants in the environment. And once he is focused at the processing level, promoting his involvement in cause-effect events will aid his sense of meaningfulness as well.

(4) **Add the emotional element.** Another term for the connections made among nerve cells or groups is "learning". Psychologists have long noted that learning is facilitated by reinforcing or rewarding circumstances. For the young toddler, having an adult make an event of his accomplishments usually is reinforcing and helps to solidify neural links. Saying "WOW, you did it!" with



excitement in your voice really will make a difference.

But pick and choose your WOW's. Not everything is of equal importance.

Chapter Three

Specific Ideas for Helping Children in the 8 to 12 Month Age Range

Though every child is different, most infants by this age range have developed the vision, hearing, smell, and taste necessary to appreciate the basic forms and patterns in their environment. They are increasingly involved with refining their senses so as to be more aware of the subtleties that eluded them previously. For instance, they are more likely to spot a small object on the floor, to notice a person's moustache, or to alert to a dog's bark or a cat's meow. Below are some ideas for activities and interaction that should interest your child during this age period and help him to develop useful neural networks. These ideas are grouped under the headings outlined by the model presented in Chapter 7 and include *sensory input, reception/awareness, processing, and output*.

Sensory input is necessary to help the child refine his sense of hearing, vision, touch, smell, and/or taste. As he uses his senses, the information he receives is "encoded" by his brain cells to establish a neural representation of what his world is like. This encoding is critical as a foundation for further intellectual development. Receiving sensory input of value is a primary need for an infant under 8 months of age. After that age, children still need to be exposed to sensory stimulation, but with the consideration that their needs now involve coordinating input among the sensory systems. This process is referred to as "cross modal integration" in the professional literature. When a child, for instance, pulls a string of a guitar, information about the look of the guitar and string will be captured by one set of nerve cells, the feel of the string will be coded by another separate set of neurons, and the sound produced by the string's

vibration will be “recorded” by yet a third set of neurons. For either the look, the feel, or the sound by themselves to bring out the entirety of the sensations requires that a link be established among the three neuronal sets. But by this age range such is exactly what is happening in your child’s brain.

Here are some ideas to stimulate and refine your child’s sensory equipment:

❖ Expose him to different --but common-- sounds as you show him what makes the sounds. The more “real life” these showings are the better. For instance, there is more intrinsic meaning in hearing/seeing your car door shut than watching a similar occurrence on television. For babies and young toddlers, “real life” is where it’s at. Here are some sounds you might consider:

- 1 Crumple a piece of paper in front of him
- 2 Point out the clicking made by a pendulum of a clock
- 3 Whistle (or blow a whistle)
- 4 Rap on a window/door
- 5 Turn on the faucet full-force in the bathtub
- 6 Shake a clear bottle of pills
- 7 Pretend to sneeze (or if you can do it, don’t pretend)
- 8 Open a creaking door (many oven doors creak)



As your child gets into the 12-18 month range, he will be wanting to create these sounds himself as an explorer and experimenter.

❖ Vision is a dominant sense in the first year of life, but learning about how objects have a distinguishing feel is developing. Try putting an object your child is already familiar with into a paper sack when he isn’t watching. Then encourage him to put his hand inside to feel the item. Ask “what is it?” and when he pulls it out, make a surprised comment such as “it’s a ball!” You can continue this game for months and months to come (even 5 year olds delight in guessing by touch). As he becomes more capable of understanding you, try to get him to

really *feel*, not just touch, the different parts and/or characteristics of the object while his hand is in the bag. For instance, in showing him a small rubber ball, you can rub his fingers over the ball, telling him “I’m rubbing your fingers over the ball; feel how it is smooth and round” (encircling the ball). A few minutes later, you surreptitiously put the ball in the bag. When you ask him to put his hand inside the bag, you can then suggest he rub his fingers over what he feels.

❖ If your child is putting objects into his mouth as a primary means of engagement, consider that he is getting something valuable out of the experience and don’t rush him to consider other properties of the object. He will at some point turn his attention to those other features. Let him mouth safe objects--those that are not small enough to go completely in his mouth and can be “gummed”. Always be sensitive to what types of stimulation are interesting/need-fulfilling to your child. Helping him to more completely work through a stage in development is far more valuable than using a “

While infants below 8 months definitely profit from activities that sponsor their sense of awareness of the environment, there emerges a readiness for heightened stimulation sometime during the normal 8—12 month period. This readiness likely is related to further neurological organization and is reflected in the child’s ability to focus/attend in the midst of distractions, to understand the symbolism of language, and to perceive similarities/ differences. During this age range, some parents even report an almost overnight change in their infant’s level of awareness of objects and events, both close and far away. Another index of this change is when your child stops putting nonedible objects in his mouth as a primary mode of interaction and instead begins to explore them with his hands.

Accompanying these changes will be the rise of curiosity. Your child’s agility in getting around, his hand control, and his ability to orient to sights and sounds improve. Youngsters at this neurological age play more of a pro-active role in seeking stimulation. It is thus important that objects of educational value are in their vicinity. Further discussion of topics under this heading of Reception/Awareness is divided among five subareas. They include Sensory-Motor Perception, Receptive Language, Attentiveness/Focus, Time-Space

Orientation, and Social Awareness.

Reception and Awareness SUB-AREA :

Sensory Motor Perception

By 8 months, infants have good visual discrimination ability. They are able to differentiate people they have and have not seen before. They can see distinctly across the room. Their visual attention is notably attracted to moving objects, such as clocks with pendulums, animals, fans, balls, flowing water, and so forth. Over the next few months their ability to discriminate sounds and sound sequences improves as well. Identifying objects through touch develops, as does their appreciation for categorization by physical properties [resulting from their manipulation of objects]. Sensory integration, which involves the coordination of various senses in exploring and identifying objects, also improves. So now the child is not simply gaining a *global* sense of the environment from his alertness and activities: he is beginning to define and organize the information made available to him as he studies and acts. He is forming an encyclopedia of knowledge as his experiences are expanded, repeated, and correspondingly encoded by the brain in its system of networked associations.

Ideas for Activities Related to Sensory-Motor Perception

1. *Show him what is in the house.* Helping your child to become aware of what exists where is very important starting at this age. There is a great deal of information to be shared through this process. You will need to take your little one on the household “tour” over and over these next 10 months. Of course, as his motor and language skills improve, the nature and content of these tours will change. In the 8—12 month range, you will likely be carrying him about and then putting him down in certain locations in order to allow supervised exploration and/or more focus. Here is a sample portion of a tour for a child under one year of age:

Holding your baby, you enter the kitchen area, verbalizing “we are going into the kitchen....here is the cabinet where we keep the glasses...I am

going to open the cabinet door....(you say “open” as you swing the cabinet door outward)...now see there are the glasses (remove a glass and allow him to touch it)...let’s put some water in the glassI am going to turn the faucet handle...when I turn the handle water comes out of the faucet!...now I’ll put the glass under the water and, see, the water goes into the glass (hold up the glass to show the water inside)....now I will pour the water back out and put the glass on the counter... and now I will turn the faucet handle again and the water will stop... Let’s look at the shelf again.....see, there are some cups here too, they have handles (you select one and let him touch it)...now I’ll put the cup back on the shelf.....I am going to close the cabinet door..(you say “close” as you close the door)...

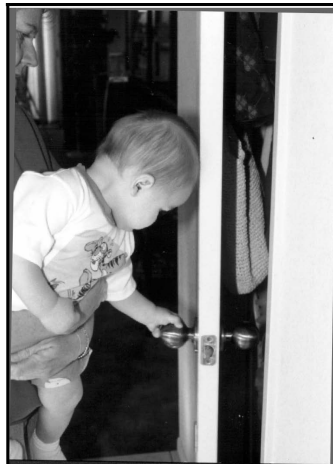
On another occasion you can have him open the cabinet door, secure a nonbreakable object inside, replace it, and close the cabinet door. You can similarly open the refrigerator door, the pots/pans door, the oven door, and so forth. His interest should be noticeable in all these demonstrations. At the sink, you can show again how to make the water flow and allow him to try. The



pantry is a place where he can secure for himself a cracker or get out an item for use in preparing a meal. Going through the motions is important. In the process of using such strategies to show your child where objects are located in the house, you are providing a wealth of knowledge. More specifically, you are

demonstrating the following types of information:

A. How Objects Are Obtained or Activated: The child learns that pulling on handles such as those on cabinets, drawers, closets, and refrigerators will allow exposure and access to items contained inside; twisting a handle can open a jar lid or a door (or it can open the valve in a faucet to allow water to flow); lifting or depressing a toggle switch can turn a light on/off; pushing a button can also activate a tape recorder, TV, VCR, or other electronic device; and putting a key in a lock (or car door) will unlock the lock. These revelations are of great natural interest to young children. With their new ability to focus, remember, and manipulate, the world is fresh and exciting. Your child will enjoy a set routine in these tours, with additions thrown in here and there. At some stage, he may even want you to go through the house with the exact same sequence, pointing to



what he wants to see next. **Nicholas learns to “pull” the handle of the door**

B. How Objects Work/What Can Be Done With Them: He learns what will hold what (ie., what fits/won't fit inside other objects); what supports objects (table, shelf, counter); what is involved in the cleaning process, the food preparation process, the laundry process, etc; and how some things are "used up" (such as soap, food, or a candle) and others are unchangeable from day to day. As with other experiences, your child will need to observe and participate in these events many times before he will understand what you are doing and how such actions relate to other events.

C. How Certain Events/Processes Occur in Sequence: Being able to watch events that occur in live time affords your child an understanding of time (see section on the topic of TIME and SPACE below for more information), cause and effect, and antecedents and consequences in situations, among other learning.

D. What Objects/Locations/Experiences Are Called: Labeling is instructive during the entirety of this age period (and well into the next several, actually). Narration+action helps the child to notice what it is you are referring to; but the process of learning labels in the context of learning the entirety of the syntax of the language is a great task and you should not expect your child to learn a word with just a few references or narrations. What the child attends to in any experience is but a portion of the whole, so multiple exposures are necessary to "fill in" the gaps and pieces. Some ideas relating to other receptive language activities are addressed under the RECEPTIVE LANGUAGE section below.

2. Let him explore a variety of types of objects. In the sample narrative, you probably noticed how the cup and glass were presented to the child to feel. During the 8 to 12 month growth period, children start taking a greater interest in exploring the physical features of objects beyond the sensations they produce. Such perception adds to their developing knowledge base about object properties and enhances their "cross-indexed" network of sensory understandings.

If your child is still putting all objects he encounters into his mouth without

regarding them otherwise, you will need to focus more on sensory input with him (see previous section on this subject) and less on “variety of type” of object input. If he shows that he explores objects by staring at them, finger probing, carrying them around, swinging, or especially using them functionally (as in rolling a ball or turning the pages in a book), then provide him objects that vary in all the following ways:

1 ❖ Changeability: some objects can appear to change when they actually don’t. For instance, if you put a hat on your head, you will appear different to your child. If you roll up a newspaper, it will appear different from its usual flattened appearance, but it is still a newspaper. Scarfs are interesting to children as they can be used to cover up their heads (in peek-a-boo) or worn in various ways to change their look.

 ❖ Color/brightness: few objects are described primarily by their color, and few objects are of only one color. As a result, while children can distinguish hues, they don’t really pay much attention to colors unless colors are somehow made to be significant. At 14 months Jonna picked up the personal blankets for Nicholas, Lauren, and herself--all of which were identical except for color-- and gave each to the proper owner. Children learn to discriminate what is important in a situation or object when the information is consistently made available to them.

 ❖ Complexity: this category concerns whole-part relations. When you peel a banana or an orange in front of your child, you can motorically demonstrate and verbally explain that each is made up of an outer peel and an inside fruit. The orange can of course be further naturally subdivided into sections. Look in your home for objects that have parts or layers (eg., lampshades, picture frames, the bed sheets and covers of a bed, books on a shelf) that can be assembled and disassembled in your child’s view.

2 ❖ Flexibility: objects that can bend offer a great deal of functionality in our life style. There is the “spring-ness” of a phone cord, the “bend-ability” of a thin, plastic ruler, the “stretchability” of a rubber band, and even the “pull-ability” of one’s cheek or lip. You might organize these and more in your household for observation and exploration.

 ❖ Functional uses: this is a very interesting category, and one that for many people serves as the primary means to distinguish or characterize objects.

Functionality addresses that question “What is normally done with this” or “What is it good for?” There is some evidence that the brain’s location of storage of information about an object may be highly influenced by the object’s demonstrated functionality, particularly if it moves when being functional. An acquaintance gave this example: when a visiting neighbor showed her 15 month old daughter how his watch band was flexible, he elected to put the watch on her shoe, seeing how skinny her arm was. Several days later, the neighbor visited again and the daughter pointed to the neighbor’s watch. Given the watch, she sat down and immediately tried to put it on her shoe. The lesson here is to show the child the proper relationships from the beginning. Having to undo learning adds extra “noise” in the physical circuitry of the brain. In considering classes of objects by their functional use for your child, you might start with this list:

1. *Inscribers*: markers, pencils, crayons. If you model for your child the marking with a crayon on a paper, he will do the same (if only briefly) sometime during this 8-12 month range. By the next age range he will take greater notice of the differences in colors, and by 24 months he will be interested in creating something (though likely only recognizable by him).

2. *Cleaners*: soaps, powders, sponges, rags, toothbrushes, brooms, vacuum cleaners, mops. You might use the word “cleaning” when you describe these various objects, helping your child gain a sense of the similarities involved.

3. *Transporters*: wagons, strollers, tricycles, bicycles, motorcycles, cars, trucks, boats, trains. When you describe these items, you can point out how they carry people or objects or move them from one place to another. Such discussion affords the use of such words as “large”, “fast”, “road”, “tracks”, and “wheels”, among others.

4. *Givers/controllers of light*: lamps, flashlights, lanterns, switches, blinds. Again, when you show how one of these items work, talk about how there is more or less light (or darkness) depending on what you do.

5. *Those that act as containers*: pans, shoes, cans, bags, boxes, etc. The notion of containment is very interesting to children in the 12-18 month age range, as they experiment with inserting and removing objects. Prior to that age they will attend to how containers hold and hide objects. “In” versus “out” is intriguing both spatially and conceptually.

6. *Communicators*: phone, tape recorder, TV, radio, CD. You can point out how you hear someone talking on the phone or the radio. He will be interested in a tape recorder for several reasons during the 8-18 month range. How it works

will be intriguing, and later he will get the idea that if you make a noise you will be able to hear yourself afterwards making that same sound.

7. *Supporters*: tables, counters, desks, beds, stands. You can say to your child at the appropriate time, “I am going to put these clothes (or whatever) on top of the counter/bed/table”. More about both supporters and containers is presented in other sections of this book.

8. *Those that sustain/nourish/nurture*: food, drink. Children during this age become increasingly alert to what is and what is not edible. They will watch adults or older children and will begin to recognize specific types of food. Before he is 18 months you may find that your child will refuse certain foods just looking at them.

9. *Repairers*: tools, tape, glue, nails. This category is of course the “fix-it” grouping. Your child will begin to notice when a frequently seen object is incomplete /broken and will be interested in such state of affairs. By saying something like “let’s fix the doll”, you will introduce the notion that things can be returned to a former condition (of course, that depends also on the extent to which you can repair items).

❖ Hardness-softness: finding similar objects that vary only by hardness and softness can be a challenge. Clay is one medium that has both properties depending on whether or not it has been hardened. Play dough, which is soft when purchased, will harden with exposure to the air and still visually appear the same. So will bread dough. In these activities, mold a piece of dough in a particular shape and let it harden. Then mold a fresh piece into the same shape. Introduce your child to the 2 objects, point out the similarities (for instance, that they are both round), and then

use the terms “hard” and “soft” to describe their relative firmness. As with other activities listed in this book, you will need to repeat the experience, or variations of it, many times before your child will grasp what you are attempting to teach.

1 ❖ Malleability: clay and bread dough also afford shape-changing, as does paper, a banana, and fabric to a certain extent. With such materials you can discuss such words as “bendable”, “foldable”, or even “malleable” and demonstrate differing ways of changing the shape of objects.

2 ❖ Movement: some objects move by themselves, others are designed to be put into motion by someone or something. If you move objects in the air, your child will likely visually focus on them. You can show your child how certain toys require a battery to perform. Just let them see how when you remove the battery the toy does not work with the switch. When you cause an object to move, verbalize the action, as in “I’m going to kick this ball”.

3 ❖ Physical state: Not only do we have solids in the environment, we also have liquids and gasses. A suggested demonstration about gasses is discussed in #3 below. Children should have supervised opportunities to explore the properties of water in varying ways and in differing situations. At the sink, with a hose, in the tub, or in a small pool, there is much to be learned (more on this topic shortly too). With all activities suggested in this publication, YOU SHOULD BE WITH YOUR CHILD in his explorations. It has already been emphasized that your involvement is vitally important to your child’s developing brain structures. Another important reason you should stay near him is that his safety is more at peril during this age period than most any other. With poor standing balance, an interest in pulling objects down from over his head, a fascination for very small items and a tendency to still place objects in his mouth--- all coupled with a lack of any sense of danger, your child needs a protector as much as an educator-facilitator!

1 ❖ Predictability: being able to predict comes from having witnessed or experienced the same set of sequences several times--or at least enough to recognize the identity of the situations and to anticipate what will be happening. Being able to predict reduces anxiety, infuses meaning into life’s events, and adds to one’s sense of time. But again, lots of repetitions are necessary.

2 ❖ Size: show him similar objects of differing sizes. Balls of varying size are one good example, from the smallness of a ping pong ball to beach balls over two feet in diameter. Use words that describe the feature you are presenting, in this case “here is a small (little) ball; look it fits in my hand; this ball is larger (bigger) than that ball, here you hold it; and this ball is the largest ball, WOW is it big, you can roll on it!”

3 ❖ Shape: balls also illustrate a common shape, roundness. Blocks and cubes provide information about squares, and doors and dressers are rectangular

in shape. For the shape of a triangle, look at a clothes hanger. Your child can imitate you in running your hand over the perimeter of these objects. You can group them to emphasize a particular shape.

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1 ♦ Smell: Smelling is usually a coincidental affair in the lives of many children, and that is unfortunate since smells enrich our experiences and can be useful memory enhancers. As you transport your child around the house, expose him to the smells of foods, spices, freshly cleaned clothes, flowers, fabrics, and even perfumes and colognes. Make a list and tie it into your activities. First, you must imitate the “sniffing” process for him. Then hold the item near his nose. If he does not sniff, model the process again for him. After a few days he will get the idea. If he does not, he is nevertheless learning about associations tied to those objects, and at some point soon in his development he will begin to imitate your sniffing.

- ♦ Sounds produced: although humans and other living organisms do make sounds on their own, a few objects also produce their own distinguishable sounds (though the infant learns early that most all objects will produce a sound if struck against another object). Radios, stereos, TV’s, computers, and the like will make sounds; so do many household appliances and machines. Air passing

through or over an opening will produce a sound.



1 ◆ Supportiveness: learning what will support other objects (or oneself) comes from direct observation and experience. In book one, demonstrations are suggested as to the supportiveness differences between a piece of paper and a table top. Your young toddler will likely be interested in how, when an object is slowly moved to the edge of a table, it will fall when less than one half of its base is supported. You can also demonstrate this tendency with blocks. If you stack the blocks so they don't fall down, you can be sure that your child will learn quickly how much fun it is to knock them over!

2 ◆ Temperature: most objects are experienced at room temperature by children. See if your child responds to having a warmed blanket wrapped around him on a cool morning! On a warm day, give him a popsicle and note his reaction. Put warm water in one pan and cool water in another and let him feel the differences. Let him touch warm bread, a cold window, and feel a breeze from a fan. Use words to describe what is happening.

3 ◆ Texture: consider wood, paper, tape, fabrics, stone, bricks, concrete, foam, rubber, glass, sandpaper, metals, and fruits and vegetables for their smoothness, bumpiness, grittiness, stickiness, softness, etc. You can show (and tell) him about the characteristics of these objects. If you rub



your finger over a piece of bark, for instance, you can describe how it is smooth on one side and rough on the other-and have him touch the bark in the same way. An additional approach, if he seems interested, would be to organize various objects by some characteristic related to their texture. For instance, all the items that you collect that are sticky could be shown to him to touch and

explore.

- ◆ Weight: balls again can be useful to illustrate varying weights, as they come in both solid and air-filled varieties. A ping-pong ball is both small and light; there are some metal balls that are smaller than ping-pong balls and yet heavier. You can likely find rubber balls about the same size as a bowling ball. The two would make a good contrast for weight.

3. Arrange demonstrations. There are at least two good reasons to demonstrate actions and events for your child: he is at an age where he learns quickly through imitation, and without your demonstrations he may not encounter important realities about the environment that he could profit from learning now. In your home tours you are engaging in some demonstrations already, as when you turn on/off a light switch. But there are many more possibilities. Consider the following:

- ◆ Collect different size/shape containers to fill with water and then pour out. Soy sauce/tabasco bottles can demonstrate a drip rate (as will an eye dropper); a “squeezable” catsup bottle can illustrate forced stream; upending a full soda bottle will result in a stop-start flow motion; and a wide-mouth jar will give a full steady cascading effect. At another time you can show the effect of water striking surfaces from varying heights. Consider also temperature and density (eg., honey versus water in the flow rate).

- ◆ Heat water in pan and show the bubbles and steam that develop. Changes in state are not normally so readily observed in the course of a child’s normal activities. To illustrate changes from a liquid to a gas, heating water is a logical choice. Show your child how you fill a small pan with a small amount of hot water, put it on the stove, turn on the burner, and then shortly thereafter can witness the “boiling” process, wherein water is changed to steam.

- ◆ Put an ice cube on a warm skillet and watch it melt. This time, of course, the change in state is from a solid to a liquid. If the weather is warm outside, you

can place the cube on the sidewalk and watch the same action.

◆ Crumple a piece of paper then “uncrumple” it

2 ◆ Break a cracker in two parts; rip a slice of bread in two; if you encounter a fallen leaf, tear it into 2 parts and then position it “back together”



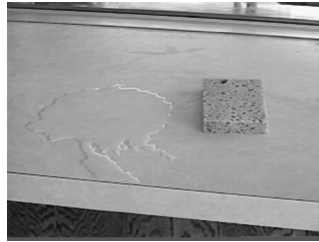
◆ Tear off a piece of tape and put it on the wall; remove it and replace it again; put it on his arm; put it on his finger.

◆ Place objects inside other objects, some that fit and others that do not. Verbalize these relationships. This process illustrates the principle of containment, a subject covered in Book One. Several writers and investigators point to the value of children exploring containers. Sinclair, Stambak, et.al.(1989) state that when the child puts objects into and out of containers, the notions of whole-parts and separations culminate in a knowing how, which “via a new series of assimilatory settings, prefigures logical concepts such as transitivity, classification, seriation, and so forth”

1 ◆ Use a sponge or rag to absorb a small amount of liquid on a counter or floor. A sponge mop can also be used. When it is “wrung out”, there is the added proof that the water was absorbed by the sponge.

2 ◆ Use an aerosol can within your child’s view to spray an air freshener into the air. You can also demonstrate the effect of pressurization with a can of

whipped cream or by blowing up a balloon and letting it go to fly around the room.



◆ Put differing amounts of water in same size glasses and then use a spoon to strike them gently, one after another. If you are musically inclined, try a song.

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◆ Put some soap in the sink and turn on the water (something you are likely to do at some point daily anyway, right?). Soap bubbles are fun to poke and chase. By the end of this age most children will be able to swing a wand with a soap film to create a large bubble out-doors. “Bubble” baths are also entertaining experiences.

◆ Young toddlers are also interested in how common tools work. Such tools include scissors, screwdrivers, and hammers. You can demonstrate

with the real objects and then provide plastic equivalents for them to operate.

◆ Arrange several glass containers of different shape and size on the counter. Pour a colored liquid (such as cherry juice) into the leftmost container. Then pour the liquid from that container into the next container. Continue down the line. This process will illustrate how the shape of liquids changes to match the shape of the container. As always, you should comment on what is happening.

Also take note of naturalistic and socially constructed cause and effect events in and around the house. These ideas, also discussed in the first book in this series, continue to be valuable demonstration subject matter. They include:

◆ a ball being rolled slowly and striking another object

◆ children or objects sliding down a slide

1 ◆ a knocking on the door, followed by going to the door, opening it, and finding someone there (at least I hope so!)

- 2 ◆ the telephone ringing, followed by someone picking up the receiver and beginning to talk
- 3 ◆ the pulling of a string of blinds, causing them to raise or lower

Receptive and Awareness SUB-AREA ◆:

At eight months or thereabouts, most children can distinguish between a tone of voice that means "you are so cute" and one that warns "don't you do that". Among all the sounds available to be heard in the course of a day, the child is asked to discriminate what is important without being able, initially, to understand the symbolic meaning of the language. To help a child become more proficient with language requires more thought and planning than other types of interactions. Yet language is arguably the most critical ability your child will learn in these first 3 years of life. It is very affected by environmental conditions. During this age frame, children learn their first words and sometimes even produce their first real words. You will find your young toddler interested progressively more and more in learning the names for objects throughout this 8-17 month developmental age. You probably will see him stare at your lips frequently as you produce sounds. The more dramatic you act, the more wide-eyed he will be. During this period he may attempt to imitate you-either immediately or on a delayed basis. Imitation is a fun act for children, and language is part of that fun.

Ideas for Activities Related to Receptive Language

In order for your child to understand the symbolism of language (that a series of sounds can represent an object, event, sequence, etc), he must attend to the words in conjunction with what is really being described. Trying to teach the names of objects is difficult because of this lack of shared clarity. Here is an idea to make it more clear as to what you are labeling. Put objects of interest in a closet. You might arrange a few of your child's favorite objects around the inside perimeter, spaced about 18 inches apart. Then, armed with a flashlight, go into the closet with him, turn out the lights and shut the door behind you. Turn on the flashlight and shine it on one of the objects. Name it, then after a pause of some 2-3 seconds, move the light to another object and name it. Continue this pattern for a couple more cycles, as long as he shows an interest. Realize that your child

may need many repetitions before he actually "knows" the word for an object.

Inasmuch as your child's attention is drawn to objects that move, you will more likely get him to know/use terms like "ball", "cat/dog", "car", and so forth. But once he learns a few words, he will grasp the idea that everything has a sound representation: then you may see him gesturing in such a way to let you know he wants to know the name of this or that object. He will need many repetitions, but he will begin to understand more and more every day.

If a word has an action relationship, use it. For instance, children will learn the word "kick" much quicker if an adult motors their leg to kick a soft ball while saying "kick". Other such words to consider might be "roll over", "jump", "up", "down", "inside", "in front", "behind", "on top", "under", "next to", "touch", "open", "close", "pull", "push", "lift", "throw", "lick", "smell", "eat", "drop", "roll", and "wash" among others. Make a list and try to work such action and spatial terms into your routines.

Some Comments on Expressive Language

Most children do not communicate through language much during the 8-18 month time frame, as has been mentioned. Vocalized sounds can be used as associative links or shared understandings, however. That is, a child might refer to a dog as a "wuff-wuff" or a car as a "ruhm-ruhm", using the sounds made by

the objects. When using these sounds, the child is not attempting to convey any information other than identity of the object or simple association (as when pushing a toy car and making the engine sound). The learning and use of these sounds is qualitatively different than the use of the word "dog" and "car", as those words are symbolic and have no intrinsic relationship to those objects. A different set of neural linkages is needed to produce symbolic language.

It seems that young children, particularly those in the 13-18 month range, do

know what they want at times but lack the means of using language to make those needs known. Many use gestures which may or not be understood by the caretaker. If your child shows that he has clear preferences and is attempting gestures (as even in pointing), turn to the section on Expressive Language, ages 13-18 months.

Receptive and Awareness SUB-AREA ③:**Attentiveness/Focus**

With increased awareness of his surroundings, your child will notice singular objects and

characteristics. You will observe him attend to parts of objects, to explore details, to notice an object from across the room and be able to go to it without being distracted. The environment is not so overwhelming as it once was to him and he can begin to parcel out slices of this or that which



interest him. With his fund of memory as to what is or is not novel, he is able to add to his knowledge base in a more systematic manner.

Receptive and Awareness SUB-AREA ④:**Time and Space Orientation**

As was stated earlier in this book, the young toddler is constantly trying to make sense of his world. This attempt at

organization relates to object properties, functional associations, cause and effect understanding, being aware of where things are in space, and gaining a sense of the nature of time. Time is a complex construct that initially is understood against the backdrop of event constancies, ie., as patterns of events that occur sequentially. Space, as it is referenced in this section, refers to locations where things are found. During the 8 to 18 month time range your child should have experiences that assist him in developing a sensorimotor reference for space concepts (such as “inside” and “under”) and time concepts (such as “after” and “next”). One interesting observation made by Sinclair, Stambak, et.al. (1989) in

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Receptive and Awareness SUB-AREA :

Social Awareness

Children in the 8 to 18 month range are social and really want to be around adults. They enjoy give-and-take exchange, being shown this and that, and simply knowing you are near. And they themselves are fun to be around. Their high level curiosity and quick smile reward you for the energy you have to expend to tend to their needs. If you find that you are telling them “no” often and chasing after them to keep them “out of trouble”, you are not fully appreciating your role as facilitator, educational engineer, and companion.

The primary interest of most children during this phase of development focuses on becoming more knowledgeable about what exists---thus the rationale for the relatively lengthy discussion in the past few pages. Processing relates to the use of sensory information/associations in some combined manner to produce a more complex but yet adaptive understanding of the environment. The most basic type of processing is making sense of some object, event or situation. In exploring the environment and becoming aware of constancies and how the world and its elements “work”, your child is establishing a foundation of meaning. Once comfortable with this level of understanding, he will show an increasing interest in experimenting or “getting involved” with the world. In fact, exploratory activities such as opening and closing, object combination, putting objects in and out of containers, twisting and turning lids, and fingering various switches and knobs become the bases for experimentation. It is as if the child begins to ask the question “Now that I can _____, what will happen if I _____?”

For a detailed account of the types of processing experiences likely to be of interest and value to children who have already done a lot of exploration and are beginning to experiment, see the next age grouping under this same section.



The child during the 8-12 month age frame engages in activities or manipulates objects not to create or produce information but to explore and gather information. Thus while explorations may result in productions, they are incidental to the chief interest of the child.

Chapter Four

Suggested Activities for Toddlers 13 to 18 Months of Age

“What can be done with this?” might be one of the hallmark questions of the 13-18 month old experimenter. That doesn’t mean that he does not engage in or profit from sensory stimulation or exploratory activities, just that he is more driven to use his time to check things out. When the child interacts in this “let me try it” manner, he develops a considerably more refined and sophisticated understanding of objects and their relationships. Being able to physically interact with objects in a cause-effect, experimental style provides a perspective and source of understanding of that object and the circumstances surrounding its handling in ways that could not otherwise be obtained.

Provided with ample opportunities to locate, manipulate, and in various other

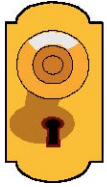
ways “deal” with objects and situations, your little one will be a busy --perhaps seemingly tireless-- youngster. You will also be busy. Though generally happy when allowed free rein to do his experimenting, he will inevitably encounter frustration; sometimes, necessarily for his safety or the sanity of the household, he will need to learn restraint. It is not uncommon for children who have rich experimental opportunities to display temper tantrums when they become overly frustrated. Let him try, but be alert to those times when he has had enough but somehow cannot extricate himself from continuing to try: you may have to disengage him before he gets too upset. Jason at 16 months was observed to be screaming when he was unable to pick up a pillow. His problem was that he was standing on it at the time! Jonna at about the same age became quite upset when she could not raise the hinged top to the clothes hamper. The top was not broken-- she was just trying to open it from the hinged side! Young toddlers are unable to distinguish all the conditions related to being able/unable to do something. Your guidance is needed.

You need to be consciously aware that your 8 to 18 month old will be highly influenced by what he sees you do, either intentionally or casually. Take advantage of this instructional opportunity. Whether you are trying to teach something about an object, a process, or a behavioral convention, modeling should be included as one of your strategies.

You are the guide, the facilitator, the teacher, the modeler, the one who provides the environment and directs your child’s attention to what is most important to experiment with and to learn. You have the most important job that anyone can have, shaping the mind of a human being.

With your child’s increased mobility, he is able to provide himself with the types of sensory input that most interests him. You don’t have to “bring it” to him as you did before he could crawl or walk. You might consider a wider range of sounds (such as different musical instruments) or sights (such as peering through

binoculars or a

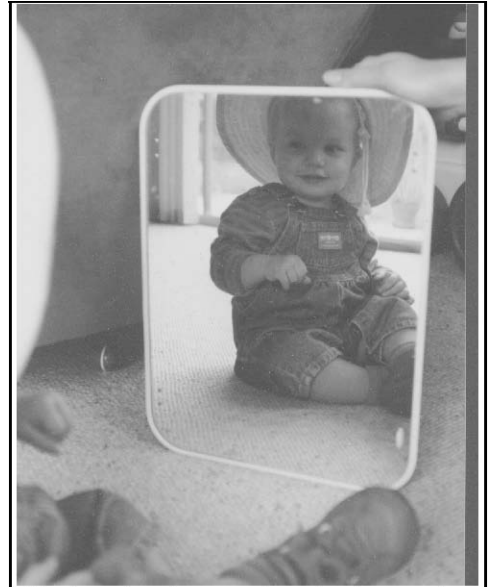


keyhole, or into a kaleidoscope tube). But otherwise, with exposure to a variety of environments and objects, sensory input will become less of a needed arranged ingredient in his neurological development.



While the 8-12 month old is interested in becoming aware of what exists, the 13-18 month old is interested in getting personally *involved* with what exists. He will want to pull the handle instead of simply viewing you pull the handle. He will want to turn on the switch, not just watch you. He will want to give the pet a treat.

The 13-18 month old also develops a sense of self that was heretofore absent. At some point during this period, he will recognize it is himself that he sees in the mirror. If you ask him to touch his hair as he is looking into a mirror, for instance, he is likely to touch his hair as he looks at his image. With this new sense of self, he will stare at his image if you put various hats on his head or glasses (without lenses) on his face. If



Blythe checks out her look in a hat

someone in your household has a moustache, use some face paint to draw a moustache on him. Notice his reactions when he sees both his “moustache” and the adult’s in the mirror.

Your child will get more out of your visits to locations outside your home now as well. Taken to the park, zoo, market, mall, a friend’s home, or just “outside”, he will notice and take interest in a greater variety of objects and events. Within reasonable constraints, allow him to explore in those environments. If exploration is not possible, then verbally explain or describe what is visible and what is happening.

As is noted on the graph on page 136, it is the area of processing that primarily occupies the interest of the child during this age period. Your child has been accumulating informational “bits” over the past several months, hopefully enhanced by your facilitating efforts. Now he is in a position to organize that information constructively. Thereafter he will link associated information into concepts and to engage in higher order thinking, such as in reasoning, discriminations, predictions, and judgments.

The way in which the brain organizes and links information is to assemble the

the conscious level, however. In contrast to the sequential style of the conscious operator, the subconscious structure uses simultaneous processing, meaning that many bits of information and/or associations are accessed in no particular order. The sub-conscious associations also relate and are compared at an extremely faster rate than is processed by the conscious part of the mind, likely due to the sequential and “patternlinking” nature of conscious thought.

The child’s ability to attend to a series of events as a pattern of activity in time thus means that his subconscious structures have established many complex levels of neural associations. Knowing what associates with what in sequences is aided by first-hand experiences, a practice you have been aiding for many months.

Sequences descriptively can be subdivided as 

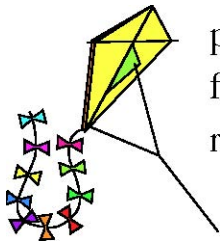

Within each of these types of sequences, there may be sensory, motor, and/or linguistic elements. For instance, some may involve sounds, such as those that comprise words/sentences and those that form a musical composition. Other sequences may involve visual and/or motor actions, as in traffic signal lights, the preparation of a meal, or the turning of a door knob before opening a door.

 sequences reflect the physical realities of planet earth. These sequences are typically of a cause-effect variety, but your child may not be aware of what causes what. For instance, when the wind gusts and blows a tumbleweed down a road, it is as likely that your child would think the tumbleweed was alive as that it was simply following the laws of physics and being “blown”. Here are some thoughts on helping your child process

four types of “natural” sequences, one involving the effects of air, another of gravity, a third concerning water, and one addressing mixtures.

❖ Demonstrate the characteristics of air flow. “Fan” him with a stiff piece of paper and let him practice the “fanning” technique. Blow on a thin sheet of paper and have him do the same. Blow

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across a soft drink bottle to create a noise. Let him try. Manipulate the switches of an electronic fan to produce varying intensities of breeze. Put him in front of the fan (the blades of which of course should be well protected from little fingers) and allow him to manipulate the switches. On a windy day, take a piece of paper out with you and while he is watching, put it in front of you and let go. Give him some paper too. Then go retrieve the paper!! Kite flying would also serve the purpose.

◆ Explore the properties of gravity. Use an incline (such as found on a small slide---or you can prop up a bread board at about a 45 degree angle) and give him several different objects to “slide” down. You can try balls, poker chips, wadded pieces of paper, blocks, toy cars, and even items that will not slide, such as a banana. If you have a large enough slide, or can locate one at a park, having him slide down (initially perhaps in your lap and then with guided hands) will add to the experience. Walking onto/off a 2"-3" platform can be fun for seasoned walkers. Tossing objects into the air to watch them fall shows the effects of gravity, as does dropping them from a height (maybe the top of the park slide). Filling a plastic container half full of liquid and then “tossing” the liquid a distance outside also illustrates how liquids are affected by gravity. The oft used party game of dropping clothes pins into a wide mouthed jar is of interest to children beginning at this age.



1 ♦ Investigate objects and water. The use of water has already been discussed in several contexts. While in the bathtub, your teen month old child will show increased interest in water activities. Adding objects that float will provide him with a fledgling familiarity with buoyancy. He can also practice pouring water from one container to another, scooping, and of course dropping objects to watch them splash.

2 ♦ Work with mixtures. You can model then have him pour a drink powder into a pitcher of water. Next, with a stirring spoon, have him mix the ingredients. You can also use water based paints or colored puddings. A drop of food coloring on a small mound of whipped cream will make for an interesting experience.

♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦♦ represent a second type of sequence. They reflect what people agree has value, and generally go by such terms as standards, rules, regulations, mores, traditions, manners, customs, or laws. The degree to which they have to be followed varies greatly. For instance, a handshake between two people who meet for the first time may be expected but not required. But keeping quiet on entering a library is generally not considered a personal option. Knowing “how the game is played” refers not only to formal games such as baseball and checkers but also to social interactions as well. Given certain conditions/situations, such and such behavior is called for. It is to your child’s benefit that he begins to learn about these explicit and implicit manners of sequential behaviors at a young age.

The young toddler is learning how his behavior affects other people and how he can get his needs met. You should be pro-active in helping him

develop strategies that are constructive for him and acceptable to you and the community at large. Simply put, if you give him what he wants (whether that something is social or material) when he is exhibiting behavior you do not want, you are encouraging a process that both of you will regret and will find difficult to escape from. When you plan and arrange activities in the context of a prescribed environment, you will be in control of what your child is doing/learning. Too many

parents become “reactive controllers”, meaning that they are interacting with their child primarily after the child engages in some behavior they feel they need to stop or control. Such style of relationship is frustrating for both parent and child. The plight of parents who are forced to “give in” to their young children’s demands for candy or the like at a store in order to keep them from screaming is an all too common sight. Once entrenched in this cycle, extricating oneself is more painful than never allowing it to begin. Being pro-active is effective, and that means (1) giving your child something interesting to do in keeping with the environment you are in; (2) encouraging, by making an issue of, behavior that is positive and constructive; (3) modeling behavior you want him to display. If you commit to spending time engineering the environment & nourishing your child’s natural interest in exploring/ experimenting--in the belief that such use of your time is highly worthwhile--your frustration index and that of your child’s will be minimized.



likely comprise the largest type of sequences. Everyone has certain routines or ways of doing things. This patterning of behavior allows us to complete tasks, usually correctly, while leaving our conscious mind free to think on other matters. For example, most adults do a good job grooming or getting to work the correct way because the routines involved are so well established. Habits

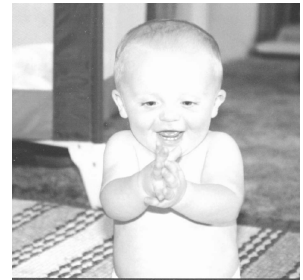
can be very helpful and constructive. Here are some ideas to get you thinking as how you can assist your child to develop useful habits:

- 1 ◆ Have your child help you prepare his bath sequence. He can get his towel and his change of clothes, start (not regulate) the water, get the bubbles and any play toys he wants, etc.
- 2 ◆ Give him opportunities to help with the food preparation process. That could mean getting his cereal from the pantry, selecting a spoon from an accessible drawer, pouring a small amount of milk from his cup to his bowl, peeling his banana, and even putting on his velcro-secured bib.

- 3 ◆ Give him guidance in what is involved in taking some of his folded clothes to his drawer to put away. Putting books back on the shelf or other personal items that have a designated spot would also be a useful habit.

Language + Actions and Their Effect on Memory

When several sensory channels and/or motor actions are a part of a sequence, learning takes place often more quickly and information is retained longer. Language also aids the memory process. Children this age range will attend to, participate in, and enjoy songs that are accompanied by motor movements. A well known example is the “itsy btsy spider” song. You can make up your own verses, melodies, and actions.



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A refrain to help teach body parts might go Clap your hands (you clap)



And touch your nose (do so)
Stretch real high (reach with both arms upwards)

Then touch your toes (being barefoot would help)

You can use words that reflect a particular routine. As an example, if it is cold outside and your child needs to be dressed in a hat, gloves, and a coat, you can pretend to put them on with a melody, encouraging your child to imitate your actions:

It's cold outside (hug yourself and shake)
Do you know that? (Wiggle your index finger)
So I'll open my drawer (pretend to pull a drawer open)
And get out my hat (reach in and get the hat, of course)
I'll put my hat on my head (hands to head)
Put my gloves on my hands (exaggerating)
Then I'll find my coat (walking fingers)
And stick my arms in (more exaggeration)
Now I'm ready you know



I'll open the door (pretend to open)
And then I go...go....go!! (move your arms in running motion)

There are many well known and useful songs that use movements which your child will enjoy for several years, such as "This is the way we eat our food, eat our food, eat our food, this is the way we eat our food so early in the morning....This is the way we brush our teeth, brush our

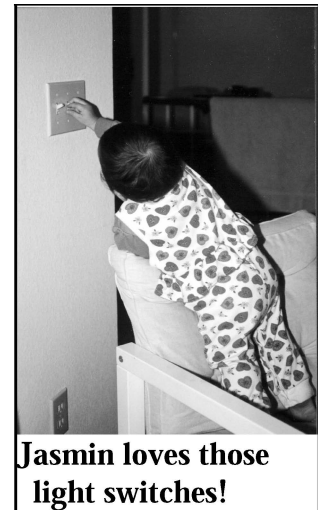
teeth, brush our teeth," and so forth. You might want to look in your local library.

Memory is enhanced when meaningfulness is added to a sequence. Try this memory game with your child: Go to the living room with him and some item he knows (let's say your car keys). Show him the keys and say "I'm going to put my keys under this pillow." After you do so, go to a different room with him. Then ask "where are my keys?" If he needs a prompt, say "let's go see if we can find my keys" and walk into the living room. Of course, this activity also affords you the opportunity to use such terms as "inside", "behind", "next to", and "on top".

The receptive language of children in the 13-18 month age range increases so quickly you might find yourself saying "I didn't know he knew that!" on more than one occasion. Your descriptive language and specific efforts at vocabulary building over the past several months are helping him to develop a strong base of understanding. While at first his understanding is limited to nouns, you can assist him to understand verbs at the same time you help foster his grasp of how he can directly affect objects and events. In the previous age grouping a sample "housetour" was presented. These tours should continue into the 13-18 month age grouping with one major alteration: your child should engage in motor actions on all the objects in the house. For instance, in the bathroom, you can say to your child "I am going to take a towel out of a drawer". You then open a drawer, saying "I am pulling open this drawer. Now I am taking the towel out. Now I am closing the drawer." You then say to your child "Now you get a towel out of the drawer". You can add "First you pull open the drawer," gesturing with your hand.

When he opens the drawer, if he does not remove a towel, give him another verbal prompt. If he goes ahead and removes a towel, verbally describe what he is doing. Continue in the same way until he pushes the drawer closed.

You can use this pattern to illustrate action verbs in situations all over the house. Knowing which direction and how to exert finger force on switches, dials, handles, and knobs takes considerable practice. You are likely to find your child struggling trying to push a light switch up when it is already in the up position, for instance. The motion to be used has to not only be consistent with the type of task but to some orientation of the switch or dial as well.



Through your guidance you will be helping your child, then, to form a network of understanding as to what type of actions (pushing forward/up/down/sideways, pulling back/down/up, twisting, etc.) “work” on what types of objects. Such experiences, when accompanied by your verbal descriptions of the actions and results, are very powerful and will greatly impact your child’s language competency. For comments on expressive language, see the section below on “Output”.

Many questions parents ask of teen month children begin with “who”, “where”, and “what”. You might be able to aid your child’s understanding of these words through role play demonstrations, involving you and some other person (even a 5 year old could be an able assistant). With your 13-18 month old watching, you ask your assistant “where is

the _____” (pick an object known to your child, such as a ball). Gesturing as you emphasize the word “where” will draw attention to what you are saying. Your aide should pick up the object and say “here is the _____”. Use this pattern again and again throughout the next few days with differing objects. When your child seems to understand, ask him, when the two of you are alone, “where is the _____” and see how he responds. Questions of “who” and “what” can be used with pictures or live objects/people, with the answers coming as identification labels. For instance, “who is that?” and “what is that?” The words “why” and “how” are more complex but can be introduced at this age range nonetheless. Your arrangements will have to be more creative. As one idea, you might be in the hallway facing an open door into a bedroom or bathroom. Have your assistant stand inside the room behind the door and push it closed. In this way the door will close in front of your face for no obvious visual reason. You then ask aloud “Why did that door close? Why?” With your toddler in your arms or on the ground walking, slowly push open the door, and seeing your assistant, remark “Oh, _____ pushed the door closed, that’s why”. The use of the word “how” can be brought up in such conversation as “this is how you kick the ball” or “here is how you turn on the faucet”. Working these terms into your verbal interactions takes conscious effort, but the modeling and emphasized use will promote the development and understanding of an important class of words.

◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆ ◆. The child’s experiences with objects and situations also enable him to form categories of understanding. Objects, events, and situations can be organized by any number of patterned features. In the objects category alone the list is immense. For instance, objects can be classified in terms of “things that ... bounce... are

eaten....cannot be moved....light up ...float mark...make noise..are seen in gas stations....” and so forth. To handle these myriad possible characteristics, we develop concepts. But useful concepts are based on pertinent experiences, experiences that should be made available to your child in his first 2--3 years of

life. Here are some ideas for helping your child “process” objects into useful patterns---meaning categories and later, concepts.

Sample Ideas for Aiding Processing of Object Categorization

◆ Locate two balls that differ only in size. Make sure that the larger ball is at least 4 or 5 times larger than the smaller ball, in order to make the size differences very noticeable. Engage your child in activities with the balls. Use the terms “small” and “large” (or “little” and “big”) in conjunction with the balls in each activity. For instance you might say “let’s roll the large ball.....now let’s roll the small ball.....look, the large ball won’t fit into the bottle, but the small ball goes in”. After a week of playing with the balls intermittently, place both balls together across the room and ask your child to “go get the large (or small) ball”. He can learn this distinction before he is 18 months, as he can other terms, such as “long” and “short”, “thick” and “thin”, “round” and “square”, and even “soft” and “hard”. But he needs to be actively involved in some way. You introduced these concepts during your tours or demonstrations when he was 8-12 months; now he is in a position to actually make them a part of what he understands is meaningful about the world.

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◆ As has been mentioned, children this age have a great interest in putting objects into and removing them from objects that serve as containers. MacLean and Schuler (1989) found that 14 month olds who were “trained” by having opportunities to play with both cans and tubes in their homes were as sophisticated in their understanding of containment as untrained 21 month olds. As an example of the play involved, the children dropped blocks into cans and into

tubes and explored the differences. Using tubes and cans in the bathtub also serves the purpose.

You will also find that your child's interest is heightened when a top or lid comes with the container. Some containers which should interest him include small boxes, jars with lids (those that push on or screw on), pans with lids, purses, socks, and shoes. The objects used to put into the

containers are less important. Most children will enjoy putting poker chips into a piggy bank (you can make one yourself with cardboard and a slot). You will need to model the process on occasion, especially the action of screwing the jar lid. You may even need to use a "hand-over-hand" type of assistance. You should, as you normally certainly do, verbalize what you or your child is doing.



◆ You have likely seen TV game shows wherein contestants have tried to guess categories for objects (or vice-versa). You need to think like one of those game show designers. There are many ways that objects can be categorized, some of which are even particular to your family (as in "what types of food are fed to dogs/cats" or "which objects are placed



Jasmin shows how inserting & removing film canisters from a camera's flash case (and closing the lid over and over) is so downright intriguing.

on the bamboo display case"). Make a list of those categories that reflect your child's immediate environment. Then involve him in some action with those categories. You might say "let's go turn on all the lights in the house!" and proceed to have him flip on the switch of every overhead light, twist/push the stem of each lamp, and even activate every flashlight (you might follow this

activity up with a “let’s go turn off the lights now”). Such an activity would certainly capture Jasmin’s interest at this age! Or you might locate all the places water can be found, including the hoses outside, the washing machine in the garage, the jug in the refrigerator, and even the water pistol.



Sample Ideas for Aiding Processing of Event & Situation Categorization

Your child’s brain will extract from events and situations those elements that form distinctive, meaningful patterns. These patterns of understanding are valuable to the extent that they reflect useful adaptive learning. For instance, once your child has experienced going to the market a certain number of occasions, he will learn what is typically involved during this event process and will associate or link the elements to the event. These elements may include the particular arrangement of the environment, the people present, the sounds/noises being heard, or some other situational context. You should assist your child to notice those features of his surroundings that are related to various routine events as well as those that are important for him to

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know about. Here are some ideas to get you started thinking about useful “event learning”.

At home:

- 1 ◆ When it is time for bed, there should be a set of evident indicators heralding the event, such as a blanket, certain attire, the sound of a certain song, etc.
- 2 ◆ Bath time similarly should be associated with defined objects or sounds.

In all cases, words should be used to describe what is or is about to happen.

◆ When you are ready to eat, you might point out how the table has been set in a certain way with glasses, plates, silverware, etc.

On outings:

3 ◆ When you go out to eat, tell your child “we are going to eat at a restaurant”. When you arrive at the restaurant, focus his attention on what characteristics in particular make this place a “restaurant”. Such might include the table and place settings, the fact that people at another table are eating, the fact that the menu has pictures of food, and the fact that there may be food smells in the air. Those elements are suggestive of an eating event about to happen. There should be no sense of randomness in his having food placed in front of him.

4 ◆ At the park, you can comment on (and have him physically get involved with when feasible) those items located there, such as the swings, slide, trees, BBQ pits, etc.

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◆ Other locations in which your calling attention to those elements that distinguish the site would help include banks, drug stores, markets, zoos, schools, and hospitals. And there is a lot to point out and describe. For instance, at the bank you might say at the appropriate time, “I’m standing behind him and that lady is standing behind us.....we are in line with other people.....I am writing a check.....I am getting money...I am putting the money in my wallet.”



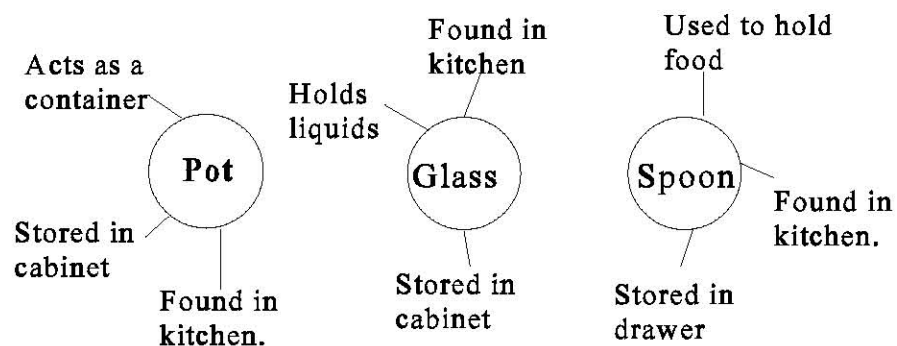
During the process of organizing information in his environment, your child will start linking sequences, object commonalities, and events in even yet more complex ways. These linkages will foster the incisiveness to compare and differentiate, the perceptiveness to notice inconsistencies, and eventually the use of concepts and the ability to make accurate predictions. I noticed in the September 1997 issue of *Reader's Digest* a quote that pertains to the value of such learning: “Wit consists in knowing the resemblance of things that differ and

the difference of things that are alike” (attributed to Germaine de Stael). The foundations for such capabilities are formed through the brain’s constructions of more intricate neural connections. These connections reflect the patterns of associations the child has experienced. If the experiences have afforded a richness in pattern linking, the result will be efficient and effective understanding, reasoning, and judgment.

There are, in this section, several types of cognitive abilities of value that arise from the associations made among learned categories of objects and events. They include comparisons and contrasts, hierarchical understandings, and concepts.

I. Similarities → Comparisons among objects can only occur once the child has some appreciation for the individual properties of the objects, of course. But with these increasingly informative experiences, the child begins to link what is similar. Here is a question that demands that three objects be considered simultaneously:

Question: how are a spoon, glass, and a pot alike? When this question is addressed graphically and categories of associations are related much as how the brain relates them, the following type of organization emerges:



The child may know that pots, pans, and the stove are used in the cooking process. He has also come to know that when eating he encounters dishes, spoons, and cups. Some relationships common to all of these objects are that they are found in the kitchen, are all containers, and are related to the feeding process. It is important to appreciate that a child's ability to extract such similarities is based on the knowledge he has gained from his personal associations with the objects. For instance, noticing that 2 objects are similar on the basis of use may only come to mind (ie., be a part of one's neurological network) if there has been

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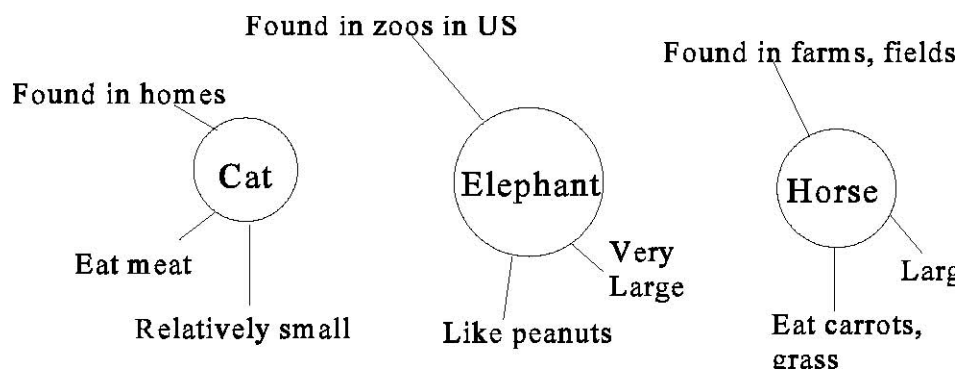
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experiences with such use. There are various ways to facilitate this learning. You might say "these are all plates.....these forks are all put in this box.....you can

drink out of a cup or you can drink out of a glass”, all the while demonstrating with actions what you are talking about.

II. **Differences** ❖ If/when the child has enough associated bits of information about objects and events, he will be able to derive both the similarities and the differences, though what you say can assist in this process. Here is an example using animals.

Question: How are a cat, elephant, and horse different?



These animals are similar, but they are different in many ways also. “Same” and “different” are difficult concepts for the young mind to attain, in part because of the abstract nature of the words. But such is also true because most all objects simultaneously have differences and similarities.

As one example, consider the two forms below:



Are these two images the same or are they different? They are the same in the sense that the outside shape of each is round. If they represent spheres, then they both are balls, perhaps. But one has a stripe. They are regarded as the same if placed among a group of blocks; but they are seen as different if they are amongst a group of circles each with a different exterior marking. That these objects can be similar or different depending on context is readily understood by adults. But toddlers and preschoolers are not able to follow this reasoning. Their perceptions attend to only one dimension at a time, and they cannot reason about something they cannot see in front of them. You need to help your child to focus on specific properties of objects, as what you think you are showing may not be what he is looking at.

Here are two sample interactions to focus your little one's attention on salient object properties. As you gather cleaned forks, spoons, and knives, show him the manner by which you stack them into the silverware tray. Get him to attend to the differences between the spoons and forks and where they are placed. Second, have him assist you in sorting parts of the laundry, such as wash cloths by color or hand towels/bath towels by size. Keep in mind that young toddlers need to

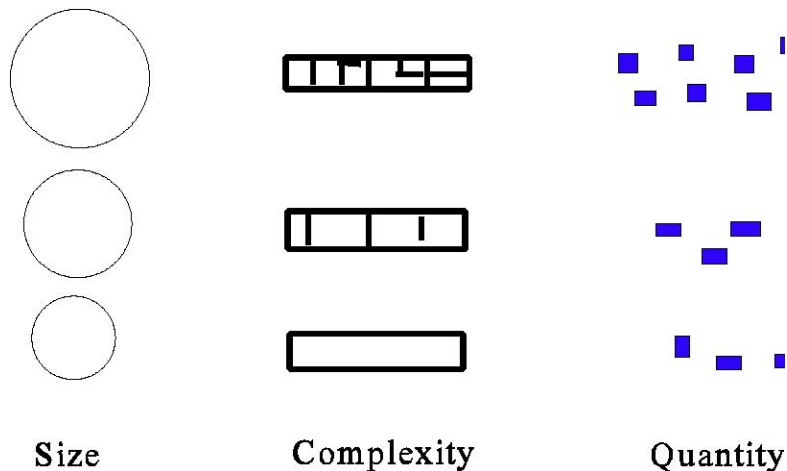


encounter many of the same class or type of objects before they will grasp the notion of inclusion by similarity or difference.

When you use more than two sizes of towels, you are addressing a somewhat more complex type of comparison, that of a hierarchy.

III. Hierarchies Hierarchies involve an ordering or ranking. Such ranking is of interest to children in this age range. Nesting cups and the plastic rings that fit on a post are popular representations of this type of ordering, but there are other possibilities.

Question: How many different ways can objects be ranked?



What else is there? Consider weight, length, height, loudness, softness, strength (power), quality, purity, and probability. Make your own list as to what is relevant in your home and lifestyle. As one example, first consider length. You can introduce and discuss such words as “long”,

“longer”, and “longest” by cutting three pieces of yarn or ribbon into lengths of

1", 2", and 4". Take the shortest and place it on your child's wrist. Say something like "it is not long enough to go all the way around ", tracing your finger around his wrist. "We need a longer ribbon". The 2" ribbon will also not be long enough. So you then say: "we need the longest ribbon" and after putting it around his wrist, point out how it then fits (now that I have written this example, I notice a resemblance to the story of the 3 bears; but don't worry, you won't ruin that story for later).

And what about size? For some reason size is considered as one of the most apparent hierarchical differences among objects. Perhaps it is a natural interest, as young children are also intrigued with size differences. Common objects in the home that can be arranged and nested by size (and which will involve young toddlers' brains appropriately) include pans, bowls, boxes, lids, and cans. Children will also show an interest in peg boards. You can buy (or construct) them with varying size pegs, just make sure they are large enough for him to put in by himself: large pegs with large holes are advised. In any case, get your child physically involved in such activities. Unless the child can manipulate the objects which are representing the hierarchies, such as in nesting, he will not profit cognitively from the concepts underlying hierarchical relationships.

The associations formed from classes, similarities and differences, hierarchies, and sensorimotor experiences all help the child to form concepts.

IV. Concepts Concepts allow us to understand and reason about categories of information in faster and more streamlined means. Concepts can be subdivided into those that involve space or location, those that pertain to quantity, those that relate to time, and those that provide general categorical frameworks.

Space/Location

You have already encountered in this book some of the terms for spatial referents. Here is a more complete list:

behind	beside	next to	between	on top
front	under	back of	on the side	below
further	closer	distant	inside	outside
around	above	left	right	low
high	half way	off	on	through
bottom	up	down	here	there
from	together	near	over	forward
backward	coming	corner	to	going
middle	center	edge	apart	separate

These concepts have to be learned as independent from whatever object is being referenced. That is, the child has to come to understand that “in front of you” is referential for a location in space and has to do with him only inasmuch as it describes a location at that point in time. In fact, “in front of you” can reference the same information as “in front of me” if you are facing your child. Suffice it to say that all concepts are abstractions and are not readily grasped by the young toddler. In our language we add to the confusion by using these words in other ways as

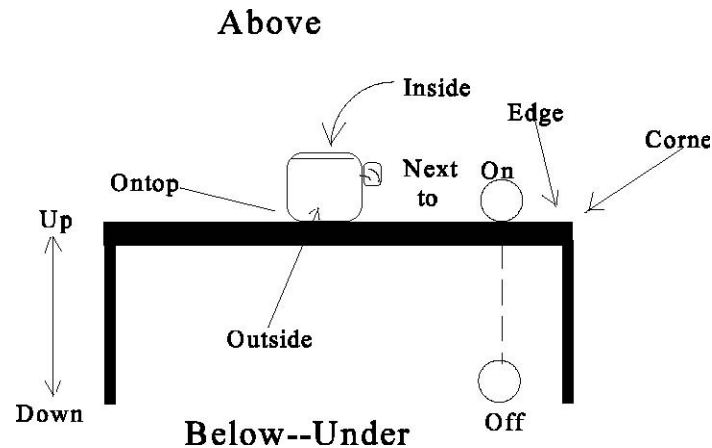
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well. We will say that a book is “on” the table and at the same time state that a light is “on”. We use the word “right” to refer both to a direction and to correctness.

While there are naturalistic (referring to your typical course of actions) occurring opportunities to use these terms daily, you can help more if you use created motor activities. For instance, you can begin to teach “under” by crawling under a table and encouraging your child to do the same. But since “under” has no intrinsic relationship to a table, you will also have to have him go under other objects, to put objects under other objects, or even to have objects go under him (you could put him down on all fours and roll a car under him, for instance). Once he seems to understand “under” you can proceed to “on top” and then to

“inside” and “outside”, again using a movement-manipulation approach. You will likely need to revisit all the spatial concepts you introduce, as your child is still in a stage of formative language development.

Of course, over the next few years you will find many opportunities to expand your child’s understanding of spatial concepts. Consider the drawing below:



1

These spatial arrangements are part of most every environment, both within and outside the home.

Quantity

Long before the child understands the difference between the quantities one and

two, he learns such concepts as “more” and “less”. There are many other such concepts in this category. Here is a list you can work with in helping your child develop a basis of understanding for math:

more	less	many	few	some
none	one	a lot	big	little
full	empty	light	heavy	shallow
deep	short	tall	narrow	wide
same	equal	half	most	least
as many	less than	more than	all	the rest
pair	any	almost	every	zero
several	enough	piece	portion	nothing

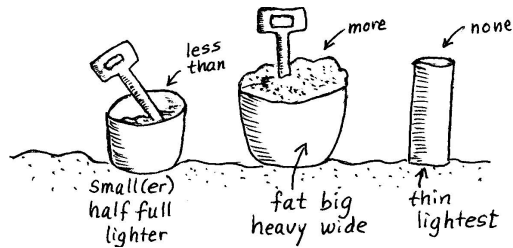
Inasmuch as these words also relate to abstractions (that is, they bear no built-in relationships to objects or events) the child needs multiple exposures in many contexts with many objects before he will “see” the separateness. You can select any objects. Choose those spoons again, for example. Starting with 10 spoons, put them all in front of you. Say “I have all the spoons. You don’t have any spoons.” Place all the spoons in front of him and say “Now you have all the spoons next to you. I don’t have any spoons” (you can use a sign for “none” too). Then state “Please give me some spoons”. You can continue these types of give-and-take, eventually putting the spoons back with the statement

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“I don’t have any spoons any more and you don’t have any spoons either”.

If you go to the beach (or to a sandbox in your backyard), take along three containers, one thin, one small, and one large. As you play, put differing amounts of sand into the containers. Then you have opportunity to talk about quantity.

Here are some possible words to consider:



Time

Time is a difficult concept for children to grasp. Even as adults we rely on a clock and routines to cue us about time. The young toddler lives in the present. Realize that when you use such words as “earlier” or “later”, you are not speaking about the present. But *when* exactly the present becomes the past or the future becomes the present is indistinct. When we say “soon” to a child we are speaking of some point in the near future. But when does the present end and the future begin? It may be useful to give your child some referents, such as “when the music stops we will go outside” or “when I turn off the water it will be time to get in the bathtub”. You can also use a timer. Here are some

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words you might want to work into your routines and conversation with concrete referents:

soon	later	earlier	before	after
now	evening	morning	afternoon	then
yesterday	today	tomorrow	minute	hour
second	long	short	brief	instant
day	month	year	week	past
future	fast	slow	beginning	end
go	stop	tonight	last night	day
sometimes	never	always	next	first

Other Concept Categories

The child learns that creatures with 4 legs, ears, eyes, etc. are not all the same. He learns to

differentiate them with such terms as “cats” and “dogs”. But we have various levels of categorization: while we group some creatures as dogs and others as cats, we also refer to them both as animals; we call certain spherical objects balls and certain cubes as blocks, but we also may call them toys. These differing terminologies, which make sense to us, can be confusing to young toddlers.

Being able to unite multiple time and event sequences and to recognize them as parts of larger patterns enables two types of needed cognitive abilities, predicting/anticipating occurrences and planning. These abilities in turn can be a product of two types of thinking, inferences and deductions. Induction involves conclusions that are not based on an irrefutable premise but flow from circumstantial probabilities. For instance, seeing the table set, one might conclude that dinner is about to occur. Deduction is an if-then process that uses only

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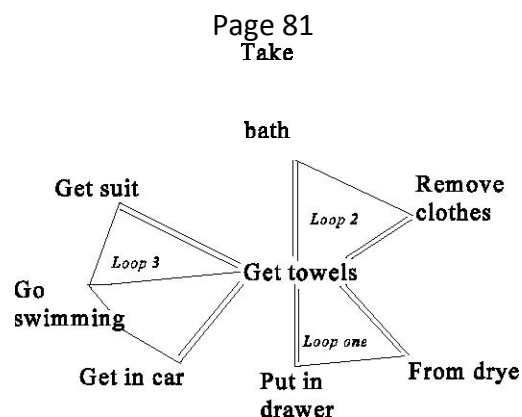
the correctness of a premise to draw a conclusion. For instance, if you believe that all four legged creatures are cats, when you see a four legged animal you then refer to it as a cat (note that the logic here is correct but the premise is not). When you verbalize aloud your thinking process, you bring to the child's attention what you consider as important and what strategies you employ in your reasoning.

I. **Predictions**  Children want to be able to predict what is about to happen in their environment. Not only do they have a cognitive interest, it reduces their stress. But to be able to predict requires that they distinguish relevant sequences and relate those sequences meaningfully. What courses of action have been associated with the sequences they have been a part of or have witnessed? Consider the following situation: mom collected towels and now we get into the car. What does that mean is about to happen?

Let's say that the child has had multiple experiences with towels and multiple

experiences getting into the car. Sometimes when the towels are collected, it is time to put them in the washer; sometimes it is to fold them and put them in a drawer; sometimes it is to go swimming. Getting into the car is generally associated with going somewhere. So in order to predict what is about to happen with towel collection plus getting into the car, the child relies on already established networks.

These networks are graphed on the next page.



In this example, the child draws from 3 sequenced linkages, here referred to as loops. Depending on the information available he will be led down one or another path of associations. In this case, the information leads him to the path of going swimming.

Time to get towels + Go somewhere in car=?

Answer: we are likely going to the pool

Being able to call upon one's history of relevant experiences is a crucial factor in such anticipations. Here is another example, using the child's "talking circuits": *Mom (or Dad) is removing my pants. Given I am on the changing table it's likely that a diaper change is about to occur. But given I am in the bedroom, I might be getting changed to go on an outing. No, the water in the bathroom is running, so a bath is likely.* The child uses available information to make an inference as to what is likely to happen.

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As was mentioned earlier, events are networked both in time and space. When two events co-occur, the brain takes note. When the events cooccur frequently, a neural pattern is developed wherein the appearance of one event leads to the expectation of the second. When sequences are linked, meaning that neural patterns have developed which mirror the sequence, then one event causes the expectation that the next event followed by the next event followed by the next event, etc will occur. Where in the sequence this process begins depends on what sensory input is received or what part of the chain may be activated through some other association. You can bring the elements of these sequences into greater awareness for your child by calling his attention to them. For instance, in the "readying for a bath" sequence, you can verbalize what you have done that was salient to the routine (eg., you got out a change of clothes), what you are doing now, and what will be happening. This discussion is related to planning, wherein the child considers what he must do to succeed in some future endeavor.

2. Planning ♦ Rueven Feurstein, Israeli psychologist, speaks about "elaboration" of information, involving establishing relevance, knowing what to do or what is being sought, planning steps, and looking for relationships. You have been helping

your child now for several months to attend to relevancies and you have modeled sequences and how you look for relationships. With your child's increased receptive language base, you can, as noted above, "talk through" planning steps you make in routine endeavors. If the routine directly involves your child, so much the better. Here is a more specific example: you probably go through a certain set of steps in dressing your child, preparing to feed him, arranging for some play activity or outing, and so forth. You can say aloud "it's time to eat....now what do we need to do? ... well, first we

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have to get out what we will eat today.....let's look in the refrigerator/ pantry..... how about some _____?..... okay, next I will pick you up and help you in your chair....now here is your bib can you help by leaning forward?I will get you some juice from the pantry.....now you are ready to eat!" This discussion allows the child's neural networks to establish a pattern of relationships that will assist him in planning what he would need to do to get a meal for himself. It will be a while before he has that need, but it is the planning process that is learned as well, and many such events provide the basis for adaptive skills and self-independence.

Here is another example, this time less related to self-help skills. Say you are considering planting some flowers in your yard. Keeping your child near you, comment on what you intend to do, acquire those tools you need (all the while verbalizing why what you are getting is important and what will be done), then go to that section of the yard and begin your planting. Knowing what you are going to do in advance allows you to describe your planning and decision process. Carrying out the actions then links language with the motor movements, locations, and actual deed.

We can, at this point, summarize what is part of the thinking process. Thinking involves an organized awareness of one's environment or the ideas in question, and with that awareness a noticing of essential details and/or relationships

among the bits or patterns of information; it entails the associating of this input with one's existing body of information so as to make personal sense of the issue at hand [this association process may result in expanded understanding and/or it may lead to some type of reasoning, whether through induction or deduction]; and finally it

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may include some decision, reflecting a judgment or prediction alone or some action as well. This last component forms the foundation for OUTPUT.



Output, referring to individual expression or production, is not readily identifiable from processing efforts during this age span. That is, the child is learning about what affects what, and his knowing what he does or says that has an impact is as important as making a comment or producing a work. Once he has more of a feel for relating internal states to specific requests or actions, it can be said that he is indeed beginning to focus on his role as an agent. There will also be requests of him to follow certain rules that he may not want to comply with. Behavior is an “output” too, and your calling attention to behavior you do not want him to engage in focuses on this aspect of output. As was mentioned earlier, it is worth your while to model behavior you want from him as much as possible, to not put him in situations (such as being alone with some prized and fragile item of yours) where the probability of his behaving in ways you don't want increases, to be proactive in arranging his environment to keep him occupied with activities that do sponsor his growth and development, and to pick and choose when you are going to enforce some rule. Power plays are not helpful for you or your child. Mix your enforcements with distractions when you have to apply them.

The most obvious potential constructive output from children in the 1318 month old range, in terms of expressed capabilities, involves language. And there is a lot you can do.

Expressive Language

Most children will use a number of single words during this period. Children learn their first words “mostly for variable phenomenon-salient activities or objects that change or move--and not for things that remain constant” (Akhtar, Carpenter, and Tomasello, 1996). Why is this so? Kellman (1993) posits that “....information carried by motion has, in principle, greater power to specify properties of objects, space, and events than purely spatial (static) information...[and] perceptual systems are specially adapted to utilize such information”. It would seem, then, that if you want to child to attend to and possibly label an object, then moving it about can be useful.

Perhaps more important than the actual production of language is the act of communication as a form of *interaction*. Communication does not have to be only a linguistic act. When a child stretches his arms above his head in a gesture to request to be picked up, he is communicating. Communication can take the form of a request, but it can also be a means of having a mutual understanding about an object or event. “Nonverbal” interactions can serve this communication function quite well during the teen months, and anecdotal and research data suggest that encouraging such interactions can enhance both social and cognitive skills.

Interestingly, nonverbal interactions have also been found to promote the development of language. On the face of it, helping children to learn signs would seem to slow their learning of spoken language, as they would be able to get their points across without having to speak. But research suggests the reverse is actually true. The use of signs, gestures, and expressions appears to help the child assimilate and organize

information relating to communication. In one recent study, Erkerman and Didow (1996), found that nonverbal imitation was a factor in toddlers’ mastery of coordinated language-action behaviors, such as telling others what to do,

protesting others' behavior, suggesting or negotiating a play activity, and responding to what others say to them.

You can sponsor your child's learning and use of signs and gestures. One book, *Baby Signs* (Acredolo and Goodwyn,1996), presents numerous ideas on expanding infants' and toddlers' use of meaningful gestures through case studies. Indeed, there is considerable evidence that children in the 8-18 month old age range can learn and use signs/gestures appropriately. It is likely that your child is already using some type of gesture with intent, such as waving good-bye on exit. If you think about those types of communications that would help you and your child the most, you can logically distinguish two categories: requesting and commenting. Here are some ideas as to typically what requests young children can/might make:

- To have more of something
- To go outside (for a ride, dig in garden, etc)
- To have something to eat
- To have something to drink
- To play with some particular object (book, computer, etc)
- To be changed (this may happen before the end of this period)
- To smell something
- To hear some music/engage in fingerplays
- To play ball (or something else) with you
- To take a bath (or play in water)

In deciding what type of gesture you want to promote, realize that any easily made movement or hand configuration will suffice. American Sign Language books offer some ideas, for instance the putting together and separating of the closed fingers of each hand in front of the body to indicate "more". You could modify that sign to be the hands simply coming together 2-3 times in front of the body. In any case, you can devise what you want. Simply use the sign when you say the word, then engage in the action; next motor his arm movements as you say the word and take the action. So if you were teaching him to use a finger

motion towards the window if he wanted to go outside, you would first model the motion as you say the word “outside” in the phrase “let’s go outside”. Then you would escort him outside. Then next time you would motor his arm through the sequence as you said “let’s go outside”. You could be more specific, of course. For instance, if you wanted to give him the chance to indicate what he wanted to do outside you just create the sign. If he likes going around the block in the stroller, you could have him make two fists and a pushing away motion. If he likes to dig in the dirt, teach a digging motion with his hand.

Although at 17 months Jonna was saying few individual words, she showed that she was able to sign words with verbal prompts. Here she goes through one sequence she picked up quickly:



“I” “Love” “You”

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Gestures/signs can also be used to make a comment as a means of sharing feelings or thoughts. What is your child showing an interest in now? Here are some ideas for commentaries your child might sign:

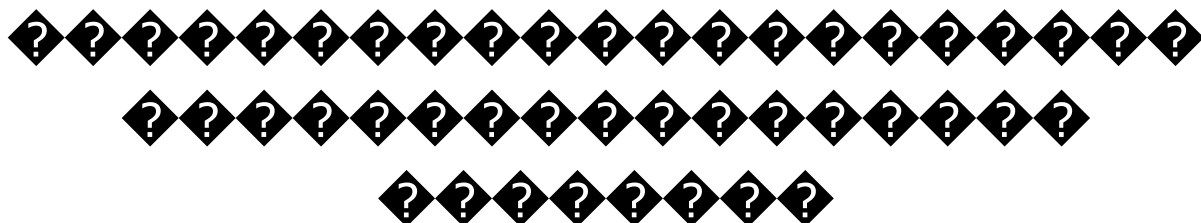
Dog (and/or cat and other animals in your home) Flowers It smells good I’m full I’m finished

There is another way to assist your child to express himself. You can take pictures of objects the child might request (such as his stroller), laminate the pictures, then teach him that when he gives you the picture, it will be treated as a request. One way of helping him learn this process is to sit down with him on the floor

with the picture and a small item he definitely would want just then (let's say a certain cracker). Show him the picture of the cracker and label it for him. Give the picture to him. Then show him the cracker and request that he give you the picture. If the cracker distracts him, put it behind your back, hold out your other hand and request the picture with the words "give me the picture of the cracker". When he does so, take it and give him the cracker immediately. If he does not give you the picture, take it from his grasp, saying "you are giving me the picture of the cracker" and give him the cracker. Repeat the process by giving him back the picture and securing another cracker. After you have used this process with a few other items, he will get the idea. You can attach velcro to the backs of the pictures and put them onto a flannel board that is accessible to your child. If he later makes a request you can't honor (for instance if he wants to go in the stroller but you cannot go at that moment) he may get

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upset at you. In those cases, after your explanation, you may want to distract him with some other activity, in essence saying "I can't do this or that with you now, but here is something else you might be interested in". You could also use a timer, saying "when the timer goes off, we will _____".



As your child gains experiences from his own ventures and your demonstrations, you should observe that he alerts to and remembers an ever widening array of patterns, whether they be auditory, visual, tactile, or some combination of sensory input. You should notice that he can wait for something to happen. You should notice that he will be able to make a choice when given alternatives.

Of increasing interest to the 18-30 month old toddler are means-ends actions, with attention to outcomes and productions. While at a younger age your child was interested in opening a door to first gain the experience of the opening process (as in studying the hinge motion), he will proceed to open a door to go out or come in or to get at something. The action becomes a means to an end. He will take a remote control and instead of exploring its properties, he will use it to change channels on the TV. He will take off the lid to a jar to get something inside. And, yes, he will begin acting in a certain way to get a reaction from someone. These activities and behavioral tendencies are discussed more fully in the third book in this series.

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What you have been and are doing with your child sets the stage for increasing his sophistication of thought and action. Over the next year, you will want him to develop more specifically the capacity to:

- 1 (1) ask a relevant question (younger children do not “naturally” learn to ask questions: they need modeling and encouragement).
- 2 (2) engage in an effective search process: one needs to have both the experiential basis (meaning neurological links for the content being addressed) and the knowledge of strategy to reason effectively about relationships. The two types of knowledge have to both be nourished.
- 3 (3) make a decision that takes into account more and more relevant factors (such as possibilities in combinations and effects). Young children are typically swayed by singular characteristics in situations. It is difficult for them to consider two aspects simultaneously, particularly if one varies with the other. Piaget’s famous experiments on conservation showed clearly that when children below age 7 are shown two glasses with liquid in them, they will state that the glass with the most liquid in it is the one in which the liquid rises the highest in the glass. They do not regard the width of the glasses as important. Volume involves two variables, but social situations often involve many factors, all but one of which is usually ignored by the preschool and younger child. Getting young children to pay attention to inconsistencies is thus very difficult, as they have to focus on two or more variables that cannot co-exist logically. As a parent you have the power to influence what your child is exposed to in the environment, to mold the

manner in which he seeks information, and to shape the extent to which he becomes an independent decision maker.

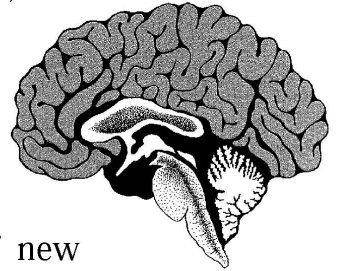
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Part Two:

Chapter Five

The Development of the Brain from 8 to 18 Months

Those who are studying and researching the brain come from a variety of fields, including neuroscience, medicine, biology, biophysics, chemistry, anatomy, computer science, and psychology. As a group these researchers are significantly expanding our understanding of how the brain develops and functions. The use of new technology, such as PET scans and MRI imaging, has permitted a view of what brain areas react to what types of stimulation and how areas mature. Electron microscopes, which have allowed us to peer at cells at 20,000 the magnification of the human eye, reveal how nerve cell structures develop and communicate. And sophisticated computer programs are generating analyses of electrochemical changes in learning.



The Rise in Interest in Early Brain Development

Advances in knowledge are being published at a rapid rate. Articles and presentations have appeared in popular magazines, on television shows,



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and in newspapers throughout the United States. Here are a few such listings:

Parent's Magazine, Fall 1994: A lengthy article surveying research makes the comment "An avalanche of scientific evidence now suggests that between birth and 3 years---and especially the first 6 months of life--the brain undergoes its most critical stage of development".

The Brain: The Universe Within, Fall 1994: A multi-part video released by the Discovery Channel and narrated by biologist David Suzuki provides a wealth of information on how the brain works. Among other comments, Suzuki points out that it is the neuron's connections with one another that are the basis for thinking, and that these connections are created in the early years of life. He states:

"The brain is not a static, hard-wired piece of machinery as once thought. It is a dynamic creation that constantly shapes and reshapes itself. Our genes supply the parameters. They lay down a foundation of sorts. But in large measure, the neural connections, the basis of all brain activity, are modeled by the things we encounter in the outside world. The environment physically changes our brain"

PRIMETIME LIVE (NBC), Spring 1995: Diane Sawyer presents her second segment on the "window of opportunity" that parents have in helping to shape the brains of their babies. She interviews top professionals in the field, and each attests to the importance of the early years in brain development. In her conversation with Dr. Michael Phelps, the co-inventor of the PET scan, she paraphrases her understanding of his explanations with the following commentary:

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"These developmental years are not just a chance to educate, they are actually your obligation to form a brain, and if you miss the opportunity, you have missed it forever."

Newsweek, February 1996: Writer Sharon Begley, summarizing statements from several neurologists in her article, "Your Child's Brain", notes: "Children whose neural circuits are not stimulated before kindergarten are never going to be what they could have been." In this article the "window of opportunity" is also discussed, with a graph that shows how abilities in the areas of emotional control, vision, vocabulary, language, and math/logic have their critical periods within the first two years.

San Francisco Examiner, February 1996: In an article entitled "Education of Babies Shown to Boost IQs", writer David Perlman reports on presentations at the American Association for the Advancement of Science. He states that "the advocates of strong environmental influences showed just how effectively the brain's cellular structure and performance can be improved with techniques ranging from random play to purposeful training".

The Reader's Digest, October 1996: An article "You Can Raise Your Child's IQ" reports on the work of Janellen Huttenlocher, Gordon Shaw, and Craig Ramey, again emphasizing the importance of the environment in shaping the brain in the early months and years.

The Los Angeles Times, October 1996: Science writer Robert Lee Hotz presents a 4 part series on "The Brain: A Work in Progress", discussing the "explosion of knowledge" about the brain via photos, graphs, and

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quotes from researchers in the field. He writes: "The brain is so hungry for stimulation that, with proper stimulation early enough in life, scientists can raise a disadvantaged child's IQ 30 points, cut the risk of some forms of mental retardation in half and correct common learning disabilities such as dyslexia".

Time Magazine, February 1997: J. Madeline Nash presents a Special Report on "How A Baby's Mind Develops", explaining how the wiring of vision, feelings, language, and movement are all heavily influenced by the experiences children have before their third birthday.

Newsweek, Spring/Summer 1997 Special Edition: Entitled "Your Child", this publication provides 28 articles covering 5 topic headings, all concerned with the development of children between the ages of birth and three. Among many comments on the importance of experience is this quote: "Babies are born into this world with their brain primed to learn. But they cannot do it alone".

The White House Conference on Early Childhood Development, April 1997: Hosted by Hillary Clinton, this meeting brought together many major figures in the field of neuroscience and education, all focused on how plans can be developed to change the course of our policies and practices with infants and toddlers.

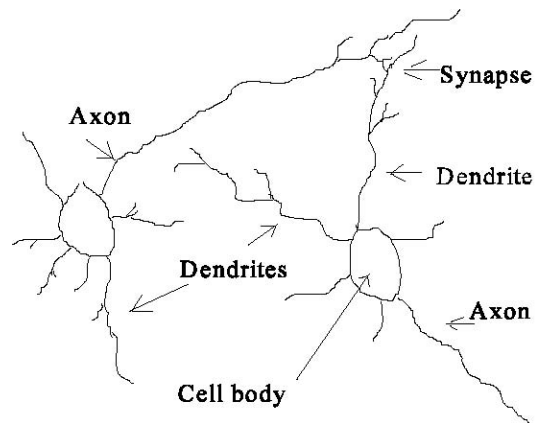
In sum, the reports from journalists point to new and valuable information about the brain and the importance of the first three years of life.

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So what are these findings or discoveries about the brain? Let's review some of the details.

In a report sponsored by the Carnegie Foundation in 1994 (Meeting the Needs of Our Youngest Children), five "key" research findings were highlighted. These findings, the authors note, "should inform our nation's efforts to provide our youngest children with a healthy start". The points, with added elaboration, include the following:

◆ **Brain development in the first year of life is more rapid and extensive than once thought.** In the brain of your child there reside in excess of 100 billion nerve cells. The cells operate by linking up with thousands of other cells in a sophisticated communication network. Each nerve cell contains a cell body, a set of extending fibers called dendrites that receive information from other neurons, and one longer fiber that transmits



information to other neurons called an axon. Fibers from one nerve cell never actually touch others to make connections;

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instead, they communicate through the release of chemicals, called neurotransmitters, that bridge a small gap to send “messages” to other cells. The site of this chemical communication is called a synapse. The axons extend outward to make connections with the dendrites (and cell bodies) of other neurons, which in reality is a means of encoding experiences the child has. It seems as if the nervous system is programmed to encode nearly every type of event the infant and toddler encounters. Some of those events are indeed related to what he will need to know to adapt later. Others are merely chance events or not related to adaptation. I am reminded of a computer program recently that promised to remove unwanted/unused software programs on my machine. At one point in its operation it notified me that it had encountered a number of “orphan files” that had no relation to larger programs and was “probably just taking up space”. Undoubtedly there are coded experiences the infant has that are of little relevance to the real “programs of life” and just take up space as well.

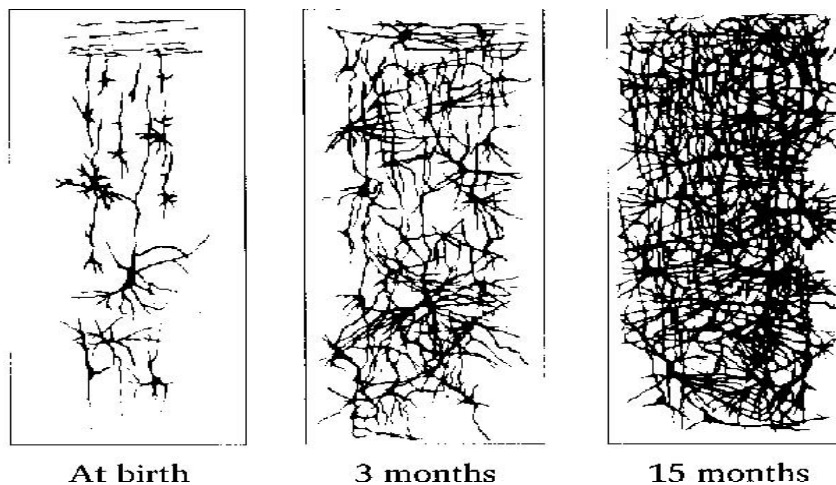
It can be said that the “wiring diagram” of the nerve connections in the brain constitute a reflection of the associations encountered in the child’s environment.

By the end of the second year of life, the architecture of the neuronal structure is largely in place. Indeed, brain imaging studies indicate that in the course of the first two years, millions upon millions of physical connections are established among these 100 billion nerve cells in the brain. Some scientists believe that each neuron can link up to as many as 50,000 other neurons. Such numbers of interconnections, would, as you might think, create a literal forest of activity. Incredible

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complexity is just what is seen under the microscope. Although some of these connections will not persist into adulthood, the “construction” process proceeds furiously into the second year of life, as the brain “takes off on its own” as David Suzuki states. The drawing below gives a clear representation of the rapid and dense growth of brain tissue.

DRAWING OF THE RELATIVE INCREASE IN NEURONAL CONNECTIONS BIRTH TO 15 MONTHS



The brain is more active, more energized during this time than at any other in life, illustrating the flurry of activity present in this foundation and organization effort.

◆ **Brain development is much more influenced by environmental factors than**

once thought. The “traditional” line of reasoning has been that the brain matures based on a preset design and environment has little impact unless the conditions are

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drastic. Now we know that almost *all* these millions of nerve connections occur as a result of experiences after birth. All children who are not markedly deprived of stimulation will develop these nerve networks in their brains. Such a process conforms to our genetic programming. But it must be understood that the human brain exists to promote our *adaptability* and ultimately our *survivability*. The method mother nature uses to help us adapt is to have the brain structure itself in accordance to the environment encountered. A child raised in an environment that provides information relevant to adaptation will develop a useful brain architecture for that type of environment. A child who is raised in a chaotic, unpredictable, and uninformative environment will develop a brain architecture that will be far less helpful in mainstream adaptation.

Actually, chaotic, stressful environments are being shown to have negative impact on brain development regardless of other variables. One reason for such poor development has to do with the brain chemistry that is produced and “set” during the early years.

David Suzuki, on the video series *The Brain: The Universe Within*, notes

“Early experience plays a vital role in brain chemistry. Just as neural networks form in response to how we grow up, so are the levels of neurotransmitters set in part by our upbringing.”

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The nerve cells communicate with one another through these

neurochemicals, or neurotransmitters, as they are known. Stress has the effect of causing the body to release another set of chemicals, which in response to threat diverts glucose to the muscles for a “flight or fight” reaction. But in the infant and toddler, the diversion of glucose away from the brain disrupts brain activity and the development of functional connections among the nerve cells.

Our neurochemistry is also apparently affected by the type of emotional settings in which we are raised. Nash (1997) reports on the research of Geraldine Dawson, who found that interchanges between depressed mothers and their infants actually produced brain activity in the infants that resembled the depression of their mothers. An infant who is raised amidst depression may well develop a greater sensitivity to sadness, whereas an infant raised in a cheerful home may develop a greater propensity to optimism. Dr. Bruce Perry of Baylor College of Medicine addresses this issue (see Newsweek, 1997) by noting that if a traumatized child lives with fear and stress, “then the neurochemical response to fear and stress become the most powerful architects of the brain”.

These levels of brain chemistry may additionally be responsible for the differences seen in the extent to which youngsters seek or avoid stimulation in grade school. The body’s production of cortisol in situations of high stress apparently increases activity in that part of the brain responsible for vigilance and arousal. Given an environment in which high levels of stimulation are constantly present, the brain may reduce its internal firing patterns

in order to establish a chemical balance. When a child with such history enters school and is expected to focus his attention on one source of stimulation (such as attending to what the teacher is saying or to complete an assignment), he may find that his brain “pushes” him to act and to seek external stimulation.

Experiences then affect most profoundly the type of brain our children develop. Hotz (1996) makes this observation: .

"we are not born with a fixed intelligence....
which experiences a child has determines whether
the child grows up to be intelligent or dull, fearful
or self-assured, articulate or tongue-tied".

◆ **The influence of early environment on brain development lasts a long time.**

Overcoming the effects of early environments has been shown to be very difficult. For instance, In studies reviewed by authors of the Carnegie Report, children raised in non responsive environments showed cognitive deficits of "substantial magnitude" by 18 months which were not felt to be reversible.

In another study, researchers Campbell and Ramey reportedly followed two groups of "inner-city" children over a period of 15 years. One group had been exposed to toys and playmates in their early life while the other group was not given extra stimulation outside the home environment. They found that the positive effects of the early stimulation continued to have a measurable impact even after 12 years. This long lasting effect is understandable if indeed it is the basic physical structure of the brain

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that is affected by early stimulation.

◆ **The environment affects not only the number of communication networks among neurons but the efficiency of the connections as well.** The child in the first two years of life has more brain cells and develops more connections among those cells than he will ever need. However, an "overwired" brain is not an efficient brain. Thus, certain neurons and connections are eliminated. It may be that this "pruning" occurs when connections do not prove to be useful or have few ties with other neurons. At this point in time we don't have sufficient knowledge to understand absolutely why such widespread elimination occurs. But we can guess. Berthenthal (1987) presents the most likely case:

“What determines the survival of synaptic connections is the principal of use: those synapses activated by sensory or motor experiences survive; the remainder are lost through disuse”

The brain thus uses information received from sensory experiences to design its neural architecture and subsequently uses that structure for understanding and operating on the world.

The notion of "efficiency" has a physiological basis in the brain. PET scans have shown that those individuals who are most competent on certain tasks have brains that use the least amount of energy when engaged in those tasks. In addition, it has been noted that the brains of less intelligent persons have many "extraneous" firings of circuitry, suggesting that other neural networks are being engaged that do not contribute to the solution of a particular task. "Smarter people", notes neurobiologist

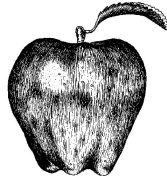
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Charles Stevens, “may in fact have a greater number of neural networks more intricately woven together. And recall of any one part seems to summon up a whole web of information” (quoted in Psychology Today, 1992).

To this list of what has been learned about the brain, two additional “discoveries” can be added, in particular for purposes of proposing strategies for helping young toddlers.

◆ **Information about objects, events, and situations is assembled as coherent wholes from various component elements which are stored in many different parts of the brain.** As researcher Antonio Damasio states (1996): "Our knowledge is built on bits and pieces of many aspects of a given thing--shape, color, movement, taste---those things are not going to be laid down in one single place". This finding of widespread and diversified repositories of information means that children need to

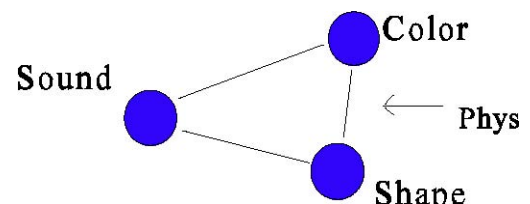
experience objects, events, and situations from a variety of perspectives and sensory inputs. As a further exposition of this point, consider one's



knowledge about any particular object, for example an apple. When shown a picture of an apple in a book, the parts of the visual image related to color will be stored in one location of the brain and the shape of the image will be stored in another location. If an adult voices the sound of the word "apple" when the picture is shown, parts of that sound will be stored in yet another location. With repeated pairing of the sound and image, there develops a corresponding linkage among the nerve sites that are housing the bits of information. When that

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linkage does indeed physically occur, the child will associate the sound with the image and the image with the sound (or parts of that sound: as discussed, sound discrimination and sequencing are complex tasks that take time to develop). Graphically, the following type of connections are made:

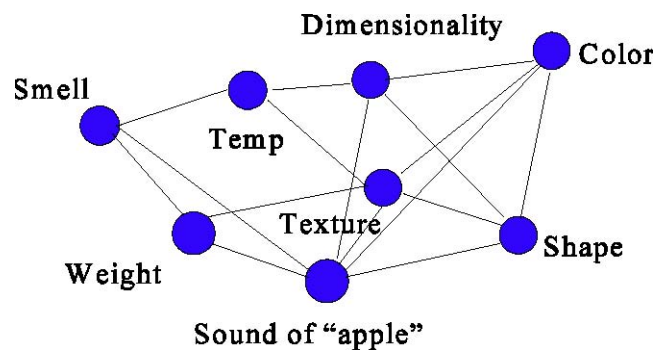


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Handed a real apple (on a "field trip" to the kitchen, for instance) the child has the added opportunity to study the object in 3 dimensions, to notice the weight/texture/ roundness, to gain feedback about the apple's temperature, to smell it----and to know where in the house apples are normally found. Each of

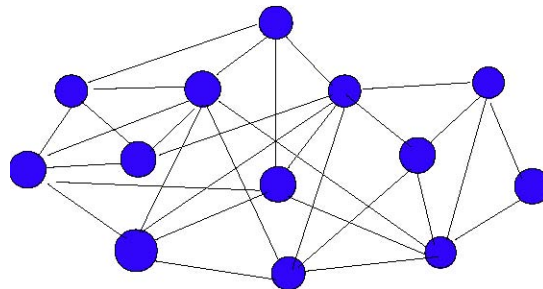
these types of learning occurs not in a oneexperience encounter, but in repeated experiences that allow for a physical linking among the nerve cells.

Then we might have this type of system:



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With opportunities to explore the apple's properties further, the child can gain other sensory-motor information, finding that it can roll, that it has a different feel when tossed than a lighter object, that it has a stem which can be twisted/bent/ removed, that it will not fit entirely into one's mouth, that it is capable of being bitten (and that if bitten, that it crunches and that the fruit can be juicy), that it will fit into a shoe/hat/bag, that it will bounce somewhat if dropped from a height, and so forth. Then we might have this network:



The brain establishes neural links, then, that reflect this expanding knowledge base. Given appropriate experiences, the child will eventually have connections that reflect all the sensorymotor understandings of the apple, where it is found (not only the kitchen but in grocery stores and on trees), how it is used, what possible uses there might be for it, and other associated linkages (for instance, that there are many types of apples). Further enrichment may include information about events related to apples (such as apple bobbing), sayings (such as "an apple a day..."), and stories (such as Johnny Appleseed and William Tell). Then add to these learnings a wealth of personal experiences with

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apples in varying locations with differing people under a range of conditions, and the complexity of the associated network--just the apple network-- becomes astounding!

Now consider how many objects and experiences your child can encounter in his local environment.....

◆ The ability to understand the passage of time and the location of objects in space may be built into the physical organization of the brain.

Robert Sylwester (1995) makes this point in his book A Celebration of Neurons. He writes:

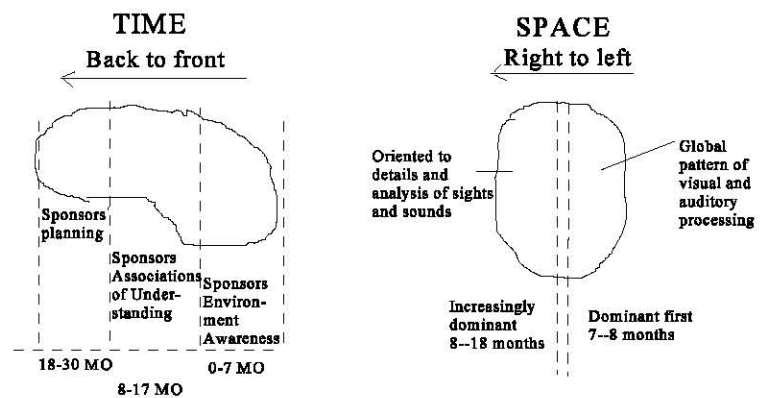
"The problems we confront in life contain important temporal, spatial, and personal elements----the when and where of the problem, and how it affects us and others. Consequently, our brain (and especially our cortex) evolved to effectively process the temporal and spatial factors in the problems we confront."

More specifically, the sense of space is addressed along the left-right axis and time is processed along the back-to-front axis. The right hemisphere, which seems to be dominant in the first 7-8 months of life, attends to and associates the gross visual and auditory patterns in the environment and how they interrelate. There is a focus not on details but on the whole

sweep of incoming data, particularly what moves, what changes, and what has high contour density. During this time, the structures at the back of the brain, those that control sensory-motor coordination and visualization, are also active, generating an associational network that sponsors environmental awareness and lays down a foundation of memories. During the 8 to 18 month period there

is development in the left hemisphere and “cross modal” (ie., among senses) associations among structures at the back and

DEVELOPMENTAL SEQUENCE FOR TIME AND SPACE



center of the brain. The left hemisphere specializes in the analysis of patterns, discriminating fine points of sounds/sight, and giving attention to position in space. The organizational development of the brain during this time frame aids in attending to temporality and sequences. As these structures begin to become active, the beginning-to-be-well-known "window of opportunity" is opened, wherein opportunities for discriminating sounds, engaging in more extended, experimental cause-effect activities, and exploring many types of relationships are seized and information encoded. Again, it is at this time that your child needs your interactions and your environmental engineering the most.

The Neuronal Network: The Basis For Thought

More can be said about these “types of relationships”, and in the process

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The Neuronal Network: The Basis For Thought

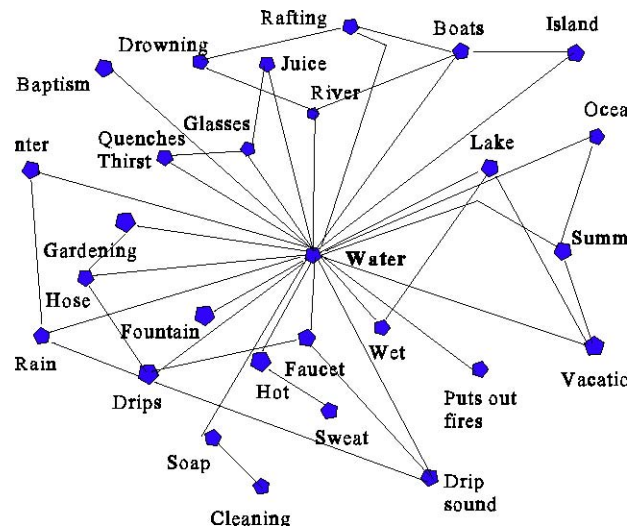
More can be said about these “types of relationships”, and in the process

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unify what is happening in the outside world with what is happening in the inside world of the brain. The physical linkages established by the neurons in the brain reflect associations that we have made among what we have seen, heard, felt, tasted, or smelled. The associations can represent any of a number of types of

relationships. Consider this hypothetical network of associations among a few neurons (realize these proposed relationships are based on one element of any event/object/ abstraction/location/time frame).

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In this example, linkages with “water” take on a number of relationships. They include similarities (juice, sweat), location (fountains, rivers), correlations (drowning, vacations), time (winter, summer), whole-parts (drips), abstractions (baptism), containment (glasses), support (boats), cause-effect (puts out fires, quenches thirst), hierarchies (size: lake, ocean), cross-modal (drip sound, wetness feel), and various functional--and personal--associations (soap/cleaning, gardening, island, rafting, etc).

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But how is it that the brain differentiates among these various types of associations or relationships? There may well be an interplay between the brain’s innate organization for time and space and the experiences of what goes with or causes/is caused by what else in the environment. It is well known that as adults we use what is called an “heuristic” approach to making decisions or problem solving. This approach is also known as a rule-of-thumb approach, meaning that we generally attend to a limited set of data and use what has worked for us in the past in order to make quick judgments and decisions.

For example, in deciding one morning what it is that you might wear, it is possible that you might consider a full range of factors, including the weather, what clothes are clean/presentable, what you thought has served you well in the past, where you are going, and so forth. But more likely some thought or circumstance will dominate your perceptions. In this clothes scenario, the fact that it is raining outside might take conscious precedence. Your notice of the rain then engages a network of associations related to previous rain experiences. What you then consider for selection will be compared with prior experiences with rain and clothes and a “best fit” with previously established neural networks will be attempted.

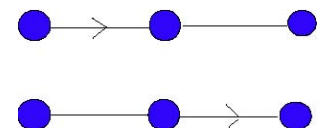
This “best fit” model may well be used in a variety of situations, whether they involve decisions having to do with time, similarities, or even cause and effect. As

another example, suppose you are driving down the street and come upon an intersection. The light turns yellow. You probably have enough time to get into and through the intersection before the light turns red, but what you actually do will depend on what real-life and observed (as in TV, movies, other's described stories)

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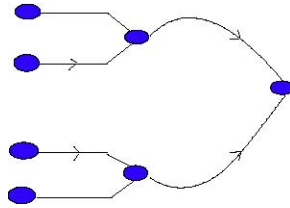
experiences come to mind---that is, what "neural networks" are engaged. Given attention to a police car waiting for the light to turn green in the other direction, you likely will tap into associations having to do with possibly running a red light and the actions taken by police officers. And your behavior will be affected accordingly.

The connections, or circuits, established among the nerve cells can develop with a variety of wiring schemes, depending on the types of relationships associated. In the book *Mind and Brain* (1993), some of the simple wiring patterns are illustrated. These patterns are important for muscle actions as well as for thinking. One such circuit is referred to as a parallel connection, wherein messages are relayed from one neuron to another in somewhat of a linear fashion.



A second type of circuit is called a convergent system. In this model, various forms of information would lead to some specific firing. After collecting certain information, you are led to some conclusion. For instance, if you were told that you had to do a task which involved using soap and water, a sponge, and a car, you would likely conclude you were to wash a car.

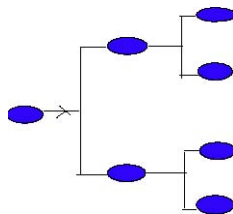
Here is the pattern:



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We also have connective networks that are divergent in nature. In this case, you are told you need to wash the car and you have to determine what you will need--just the opposite of what is involved in the convergent diagram. For years in our school systems we have focused on convergent thinking, the notion that for every question or problem there is but one correct answer. The questions “how many ways can you think of that _____?”, “what can we use a _____ for in more constructive ways?”, and “what would you like to do tonight?” all require divergent thinking. It is obvious that even though such thinking mode is not stressed in school it is yet an important neuronal construction. You will find ideas for helping your child to develop such networking in Chapters Three and Four.

The diagram for divergent networks is as follows:

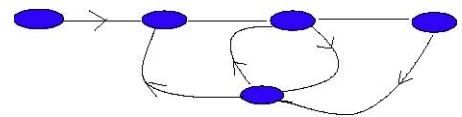


A fourth type of connection is called a reverberating circuit. In this diagram, information is kept “alive” by virtue of the fact that there is a continued firing pattern. When a particular nerve cell is activated, it in turn activates the same

cell or cells that served to activate it. Such a circuit is seen as responsible for short-term memory, and for Francis Crick (1994), even the basis for consciousness. On the next page is one type of reverberating circuit:

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Here a neuronal set in the last part of the chain activates another neural set that in turn starts part of the “chain” over again



You assist your child to develop these varying types of connections by engaging him in such tasks as asking him to remember where he put his bedtime book, to practice learning to climb onto a structure, or to find a lid to go on a jar.



What Children Need to Learn- and Why

Now that we know that the young child is seeking information in order to structure his brain, we are ready for two key questions: “what information should we be providing?” and “how can we best provide it?” In this chapter, the first question will be addressed, using what is known as a "task analysis" approach. This method looks at the underlying skills and abilities needed to succeed in everyday tasks/roles, such as excelling as a student and being successful on a job. Chapter Seven integrates the discussion of the brain and this chapter to formulate a helping model, which was used as the basis for the specific suggestions for intellectual development found in Part One.

Being aware of what types of skills and abilities are valuable to develop brings clarity, focus, and energy to interaction and guidance. These needed knowledge types and abilities can be divided into the following categories:

- 1 Language Skills
- 2 Self-Sufficiency Skills
- 3 Social Skills
- 4 The Ability to Make Sense of Situations/Events/Ideas, to Reason about Them, and to Make Constructive Decisions
- 5 Knowledge of Science, Math, History, etc (important facts)

The subject matter of this book concerns intellectual functioning, and thus the majority of discussion will focus on categories 4 and 5 above [though all five categories are interrelated with one another].

At the younger ages, children's competency is usually gauged by how skilled they are in the first 3 categories listed above: language, selfsufficiency, and social skills. In the later years, extending into adulthood, competency is also discriminated by the last two categories, thinking and knowledge. Ironically, while one's capacity to acquire these intellectual abilities seems highly impacted by events in the early years, the intellectual growth of infants and toddlers has received little attention historically. Making sure that toddlers and preschoolers develop basic human capabilities---walking, talking, being able to transact with others, eat independently, etc.---continues to be emphasized in popular literature and child care programs **even though all children who are not disabled will acquire such skills through maturation and minimal practice/ opportunity.** In other words, the development of these skills is not generally at risk. What is at risk, and subject to tremendous variability, are the abilities to perceive, conceptualize, understand, reason, associate, and judge.

There has been an longstanding assumption by caretakers in the United States that "intellectual" areas of focus are best held off until a child is in school, as such prevents children from being children or learning "naturally". The new research on emerging brain development questions this assumption. Dr Harry Chugani, Pediatric Neurologist at Wayne State University notes that

"This attitude of letting children be children is only half-true. I believe you should let children

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play, but you should also take advantage of a period of opportunity, set by mother nature, which we are not all capitalizing on. I think that is a mistake" (1994).

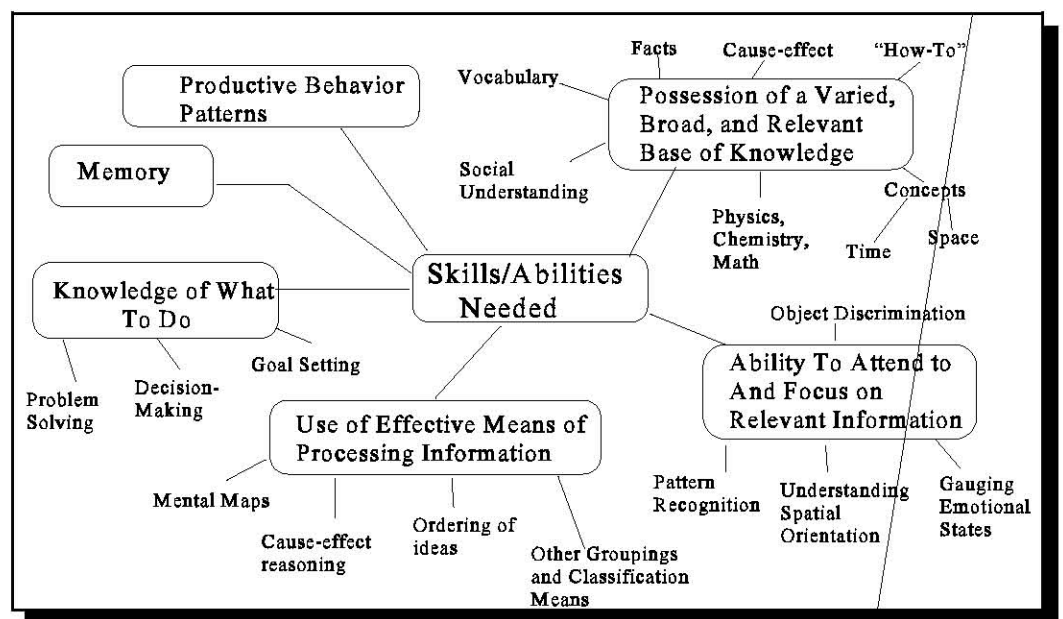
There is also a widespread belief that any interactions with young children that

involve their intelligence must also involve pushing them to excel. But the action of "pushing" a child is a process issue, not a content issue. Children can be pushed or pressured into learning any type of material, whether it be nursery rhymes, the names of farm animals, how to wash one's hands, or where toys go after being used. As discussed in the previous chapter, stress is very harmful to the developing brain, and no content is so valuable that it should be forced on an uninterested or unready child. In your interactions with your child, your approach should be

- 1 (1) to notice the extent to which your child shows an interest in what you are making available [if the child is neurologically ready for the experience, he will be interested]
- 2 (2) to follow your child's lead in his selected activities, as his brain does direct his body to seek experiences of value [in fact, it may be said that your primary job is to engineer the environment as to make available those items/experiences of greatest potential interest to him]
- 3 (3) to have fun with your child---children at this age are fun to be around, and if you find you are not having much fun (or that your child doesn't appear to be having fun most of the time), then maybe there are too many other demands in your life and you are not able to make the relationship between you and your child a priority. Ideally, your spouse

should make this relationship a threesome, wherein all of you can enjoy the daily learnings that occur.

By the time your child enters school, he will be expected to have learned skills and knowledge in all the categories listed earlier: he will be expected to speak and understand language, to know how to dress/eat/toilet/wash himself independently, to have acquired certain social skills, to be able to reason and make basic decisions, and to even have an experienced-based understanding of science and math. It is the intent of this book to help you educate/prepare your child to be an efficient, productive kindergarten thinker who has a solid understanding of how the world works. Such thinking ability is composed of a set of competencies. Here is a graphical outline of the these types of skills/abilities you need to be consciously aware of to help your child:



The next few pages present a linear and expanded version of these skills and abilities:

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The next few pages present a linear and expanded version of these skills and abilities:

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- 1 **◆ Possession of a varied, broad, and relevant base of knowledge**
- 2 **◆ Ability to attend to and focus on information of importance to adaptation**
- 3 **◆ Use of effective means of processing and/or elaborating on that information**

- 4 ◆ Knowledge of what to do constructively/adaptively with the processed information
- 5 ◆ Remembering information that has been or might be useful
- 6 ◆ Knowledge and use of certain productive behavioral patterns

Here now is a look at each area.

◆ POSSESSION OF A VARIED, BROAD, AND RELEVANT BASE OF KNOWLEDGE.

What knowledge children acquire in the years before school of course varies with what experiences and information is made available to them. While there are many common experiences children share, due in part to commonalities shared by parents living in close quarters and exposure to the same news, TV shows, movies, advertisements, and so forth, there are yet wide differences in children's *social behavior, vocabularies, range of facts about objects/situations/ persons, concept understanding, and "how-to" knowledge.*

One way to address, remember, and later use the nature of these differences for daily activities with your child is to utilize those famous detective set of guidelines: "who", "what", "when", "where", and "how".

The "who" in this case relates to social understanding. Some children are exposed to a wide range of social situations and others are not. Some children experience more negative than positive social

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associations. In any case, social understanding is gleaned from observing others and participating in interactions with them.

The "what" is an immense area and relates to object properties, classifications, relevancies, as well as relationships. One example of this area is heard in the question "what is that?" when a defining name is being requested. Learning labels for objects in the home and environment is important for reasoning, conversation, and memory, yet many school age children cannot give names to objects they see or interact with daily. While it is true that children come to

understand and produce language without any formal instruction, they do not learn how to grasp a speaker's central idea in a flow of conversation or to produce sentences that convey their thoughts accurately without extensive appropriate experiences.

Another type of "what" concerns facts about objects, situations/events, and people. Such knowledge provides a base for associating, understanding, and reasoning about issues.

Some of the facts we encounter are valuable in these processes, others are not. Young children learn from their own experiences, from direct guidance (and there is a continuum of "directiveness" in this area), and from watching others. By engineering your child's environment, you increase the likelihood that the experiences he encounters or observes contribute to his useful repository of information.

The "why" is an issue of cause and effect. As Carey notes in his book Conceptual Changes in Childhood (1985), children seem to naturally link events causally. He states "human beings are theory builders; from

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the beginning we construct explanatory structures that help us find the deeper reality underlying surface chaos". That children make errors in linking perceptions to events is well known. Such errors, in fact, are at the heart of Piaget's observations and theories. You can assist your child greatly in this area, even before he can verbally understand your statements of cause and effect in the environment. Experiences and staged demonstrations can add significantly to his base of understanding. Then when similar situations are encountered he will have a fund of knowledge to use to process the new situation and what to do.

Both "when" and "where" are learnings that by preschool age begin to be organized as concepts. The acquisition of concepts related to time, space---and quantity-- organizes and streamlines thinking and contributes to the effectiveness

of one's encounters. Knowing, for instance, that time is organized by a past, present, and future with agreed upon terms such as "before", "now", and "later" is of great importance in relating to events, sharing communications, planning actions, and so forth. The "where" of things has its own set of concepts as well, with such words as "in", "behind", "under", "on top", and "below".

Last, but not least, we come to the "how" category, which addresses procedures, processes, strategies, and means. "How-to" knowledge is particularly important for young children. Examples of this category include such adaptive skills as knowing how to use certain objects functionally (pencils/ crayons, books, utensils, balls, toilets, drawers, etc.), knowing what standard types of problem solving behaviors are productive (eg., what to do when hungry, when a door is locked, when it is raining outside), and knowing what is expected in common social

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situations (as in sharing toys, following rules, and taking turns).

Before leaving this section on knowledge, let me present more discussion on the experiential basis for learning physics, chemistry, and math that was spoken of earlier. First, physics and chemistry. The infant already has a sense of expectations about the natural laws of this word (as noted in the first book in this series). But there is much more to be learned through direct involvement. The child learns about physics and chemistry when he experiences objects that

- can be squished (such as soft food between one's fingers)
- are solid and don't change when grabbed or fisted
- support other objects
- can become falling objects under certain conditions
- can/cannot be lifted, moved, or toppled
- change in state (as ice cream when it melts)
- fit or do not fit into containers (size and space continuum)
- make meaningful sounds
- float or sink

These are only **some** examples. There is much more that does not involve objects per se, such as the effects of water, air, heat/cold, light and dark, andwell, you

get the idea.

In the area of math, some important concepts young children begin to learn include "many", "some", "few", and "none". Long before they can count, children know what "more" means quantitatively, and soon they learn what "more than" and "less than" mean. Children find pleasure in matching by height (as in constructing a tower) or by length (as in lining up cars).

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◆ **ABILITY TO ATTEND TO AND FOCUS ON RELEVANT INFORMATION:** Our senses provide us with more information about the environment than we can absorb at any one time. Although infants are not able to filter out what is and isn't important to hear, see, feel, and so forth, by the time they are 8 months old they have learned which sensory inputs are meaningful to them and which ones are not. The act of making sensory information meaningful is referred to as **perception**. Some perception seems to occur with minimal environmental experience, meaning that it is maturation that is primarily needed for the ability to develop. For instance, children's awareness of depth perception does not appear to rely on any specific experiences. Most perception, however, is experience dependent. During the first few years of life, and certainly during the time frame addressed by this book, children's understanding of the world is heavily influenced by their perceptions. Young toddlers are constantly trying to make sense of their surroundings. If the sensory information that is made available is useful data for later problem-solving and if it is clearly discernible (meaning that there are not too many competing stimuli), your child will create a stronger base of understanding and neurological linkages. Here are some of the perceptual abilities that young children need to develop to be successful in school and to adapt well in life:

- 1 discriminating varying types of objects: such includes not only the objects' geometric shapes and forms but such characteristics as flexibility, weight, color, noise-producing qualities, and movement tendencies.
- 2 recognizing common patterns, constancies, and regularities: these include noting how an accumulation of leaves form the design of a tree (whole-part relationships); how when a faucet

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handle is turned, water streams out (cause-effect relationships); and how a certain set of behaviors means that someone is about to give another a hug (social/cultural understandings). The ability to recognize patterns forms the basis for noting inconsistencies and discrepancies and is a foundation for reasoning about expectancies and probabilities.

1 understanding spatial orientations: knowing that a cup sits on top a table, that one's left ear and left leg are on the same side of one's body but in upper and lower parts, and that an object can be upside down or backwards and remain the same object are all learning that takes lots of quality and repeat experiences. But such learning is crucial to many judgments.

2 gauging how others feel: children are not born with an immediate, sensitive appreciation of emotional states, whether it be their own or others. As their social experiences widen, they are afforded more opportunities to gain an awareness of the range and meaning of these states and to differentiate other's emotional states from their own.

❖ USE OF EFFECTIVE MEANS OF PROCESSING AND/OR ELABORATING ON THAT INFORMATION: There are several types of processing of information, all related to the establishment of meaning. First the child defines and organizes the data he receives. This organization is based on the use of learned associations and is the basis for conceptualizing, reasoning, and planning. Young children need to develop a number of types of functional associations: *mental maps* of where things are located, *cause-effect relationships* and other

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sequencings, ordered relationships, and various set groupings and other classification schemes.

Mental maps are those spatial-organizational representations of where objects can be found and by what means one can arrive at those locations. For instance, once the child has taken a towel out of a certain cupboard a few times, he learns the how and where of securing a towel. Research suggests that adults effortlessly remember the space and time aspects of events and locations. But in the early

years, the relative relevancy of events or objects is not yet established, meaning that direct guidance from adults can be helpful.

The human brain appears to be innately inclined to notice and remember events which occur together in time or in sequence and assign them **cause-effect** relationships. Although adults understand that two events can co-occur but not be casually related, young children are very prone to assume that all associations reflect cause and effects. For instance, in seeing a candle flame suddenly go out just as daddy enters the home, a youngster is likely to conclude that it was daddy that caused the event, not having attended to the burst of wind that accompanied his arrival. Marvin Minsky (1996) makes this point from a neurological framework:

"I postulate that our brains are genetically predisposed to compel us to try to assign some cause or purpose to every change - including ones that occur inside our brains. This is because the mechanisms (called trans-frames) that are used for representing change are built automatically to assign a cause by default if no explicit one is provided"
(Net: www.leaderu.com/truth/2truth03.html)

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Ordered relationships, or hierarchies, refer to those groupings in which priority is given to some attribute of the objects. For instance, several blocks of differing size can be grouped by ascending or descending size.

Other associational arrangements are called for in other situations. For instance, objects can be matched on the basis of any number of common characteristics. Knowing multiple properties of objects allows a child to respond to a request to list as many things as he can think of that are brown or that start with a certain sound or that can be eaten or that live in trees, and so forth. Such knowledge also permits understanding of such questions as "how are a car and a boat alike?"

Being able to elaborate on information means the child can relate to a fund of

associated ideas, events, or objects. Such facility can be promoted as a style of reasoning and communicating and will affect the child's orientation to and perception of language and sensory stimuli.

◆ KNOWLEDGE OF WHAT TO DO CONSTRUCTIVELY AND ADAPTIVELY WITH THE PROCESSED INFORMATION: For the young child who has limited experiences from which to draw, the question as to what actions produce the most favorable results is only answered from two sources: direct experience with guidance and direct experience without guidance. Trial and error is useful for exploring object properties, but a poor method for learning about cause and effect. When young children have adults who model adaptive behavior and problem solving methodologies in the context of normal day-to-day

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events, their competency levels are greatly enhanced. The type of thinking in this category relates to the broad range of idea generation and decision making, such as setting goals, making plans, and predicting outcomes.

1 **◆ REMEMBERING INFORMATION THAT HAS BEEN OR MIGHT BE USEFUL:** Memory plays an ever increasing role in the child's ability to effectively deal with the world. As more and more experiences accrue, a means of making sense and storing what is relevant about these experiences becomes necessary. We have multiple memory "systems", but all rely on associative networks. Some types of memory include knowing what you were last doing, where objects are stored/found, how to do something, what order some event occurs, and who you've seen before. You can assist your child to develop a strong memory by knowing and using recent insights into how the brain stores information. In these beginning months, those structures in the brain that process "how-to" learning are most operative and not structures that handle facts or verbal data. So it makes sense to engage the child in sensorimotor activities and tie other learning (such as the names of objects) into these activities. In addition, all the properties of an event or object are stored in differing parts of the brain, meaning that repetition and differential exposure can help immensely.

2 **◆ ENACTMENT OF CERTAIN PRODUCTIVE BEHAVIORAL PATTERNS:**

Learning those behaviors that favor adaptation in key environments can be most helpful. As in the area of intelligence, you can have a direct affect on your child's development of behavioral characteristics. Being persistent, not being easily dissuaded by failure, being open to trying new approaches, showing self-control, being

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cooperative at key times, and having confidence are all factors that affect performance. It is important to encourage and support these behaviors as they are related to successful adaptation. Let's take a closer look at this whole arena.

Behavior and Personality Factors

Success requires more than intellectual abilities. Your child needs to develop certain beliefs and behavior patterns to allow his intelligence to be realized productively. In this section, "personality characteristics" are viewed as internal beliefs and "behaviors" are considered as the external manifestations of those beliefs. The ideas presented in this section extend beyond the particular age range of this book, but they are presented nonetheless because some personality traits and behavioral tendencies are already being shaped in the second year of life.

Internal: Personality Characteristics Children develop their self-image from feedback they receive about their behavior and their personal characteristics (such as the color of their hair or eyes, body proportions, etc). You want to reflect back to your child comments that will encourage the belief that

- 1 ❖ no problem is inherently difficult; with further information, change in focus/ strategy/perspective, or persistence, any problem can be solved
- 2 ❖ "failure" is a term related to situations, not people; it reflects a temporary state of affairs and only means that another approach or more information/practice is needed
- 3 ❖ your child is an important and valuable person and his ideas

are worthwhile

◆ your child can control his feelings and his thoughts

External: Behavior Characteristics Young children are very influenced by what they see others do. In order to encourage constructive, productive behavior you need to model the behaviors listed below. Telling your child “you have to take turns” is not nearly as effective as having the child view (and later participate in), arranged situations wherein several older persons are taking turns (and verbalizing what they are doing in that regard). Other behaviors should be treated accordingly, with modeling and verbalizations followed by the child’s similar enactments.

- 1 ◆ persistence----staying with a task even though it is difficult or requires many steps
- 2 ◆ taking turns---this is a social skill prized by preschool and kindergarten teachers
- 3 ◆ following someone's directions
- 4 ◆ paying attention
- 5 ◆ using social amenities, such as "please" and "thank you"
- 6 ◆ helpfulness and cooperation
- 7 ◆ resourcefulness and self-direction
- 8 ◆ assertiveness

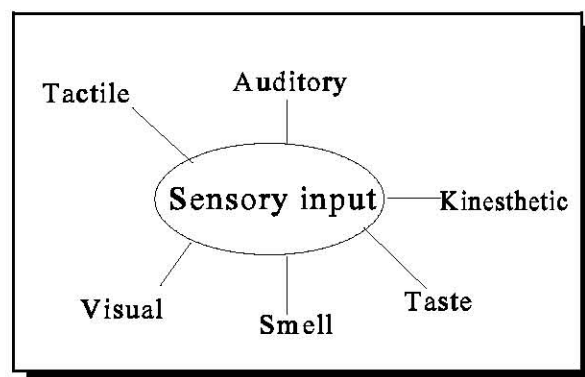
Chapter Seven

A Model of Cognitive Functioning

Combining information about brain development with the analysis of what children need to learn, a helping model can be suggested. This model is also referred herein as a cognitive model, inasmuch as it addresses the key factors involved in the knowing/learning process. There are four levels to this model: sensory input, awareness/perception, processing, and output. One other element is also included, which is often lacking in other models, that of knowledge. Using this model can be of assistance in planning the most appropriate experiences for young toddlers. Here is first a brief look at each level, which will be followed by a composite view and further descriptions.

Sensory Input: Level One

This level of the model involves the integrity of the senses: it takes experience outside the womb to refine the ability to accurately “input” information. In the first 7 months, the infant’s sensory receptors become functional and then are refined with





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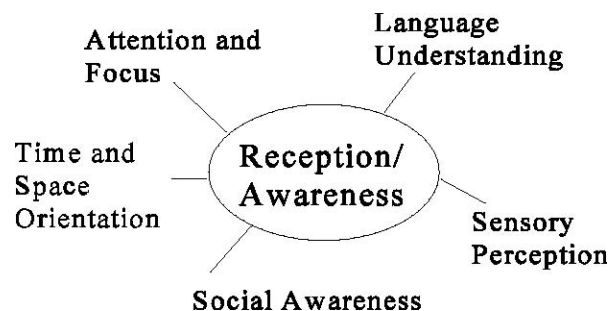
Sensory Input: Level One This level of the model involves the integrity of the senses: it takes experience outside the womb to refine the ability to accurately “input” information. In the first 7 months, the infant’s sensory receptors become functional and then are refined with

experiences. But before the end of that period an increasing awareness of the environment has begun to emerge, bringing with it a sense of

meaning about the world. This awareness is seen in the infant's ability to distinguish moveable fuzz on the carpet, the sound of his mother's voice from that of a neighbor, and one food from another before he has taken a bite. Thus, while at 8 months the infant's senses are not as well developed as an adult's, his visual/auditory/ tactile/ and smell receptors and neurological associations are sufficiently adept and sensory input should no longer be the primary focus of attention for stimulation. In Book One, *What Stimulation Your Baby Needs to Become Smart*, there are many activities recommended for sensory development. In Chapter Five of this text you will find other suggestions for enhancing your child's sensory awareness of his environment.

Reception/Awareness: Level Two:

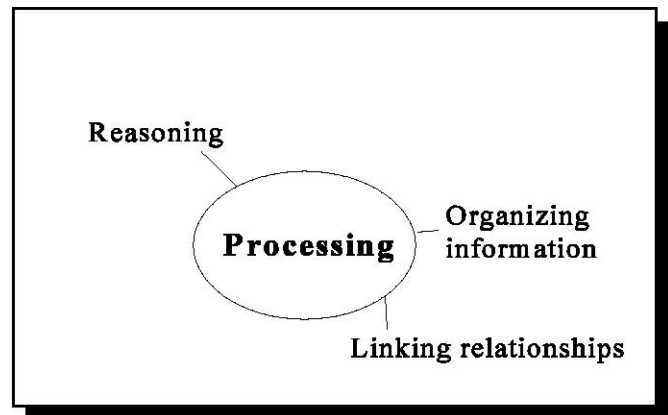
This level of the model is the predominant area of development during the 8-12 month span. Awareness involves the areas of language, perception, emotions, attention, and time and space. Here is a graphical display of this level:



The model affords not only information as to what the components are of the

various levels of cognition, but also serves as a diagnostic tool to determine what types of activities would be most helpful for your child, depending on his stage of development. If you notice, for instance, that your child appears to be more socially aware and is understanding certain words you use, then he probably is entering this phase of increased interest and need for activities that sponsor his environmental awareness.

Processing [Thinking]: Level Three Though processing of information in the ways described in this model begin before 12 months, the focus of development is concentrated from



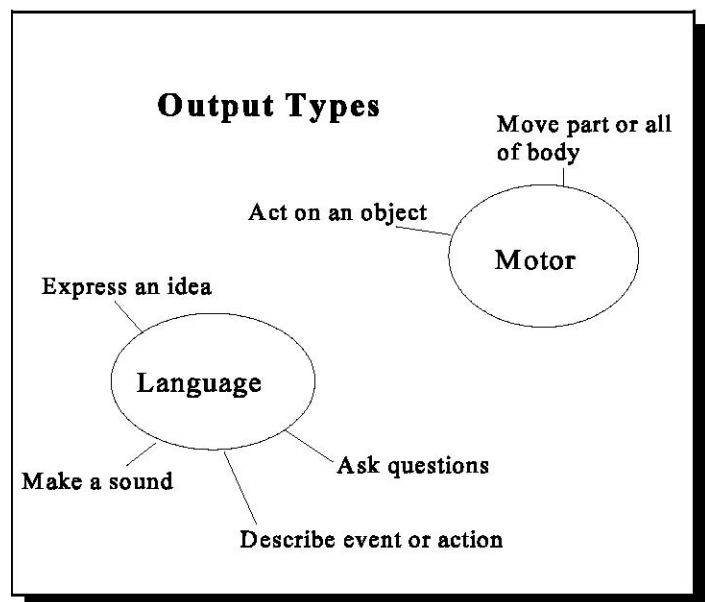
the 12th month onward. During the period covered by this book, the child is primed to learn how to process information. He will, at some point, show more attention to constancies and regularities; he will attempt to link relationships among the sensory and verbal information made available to him; and he will, by virtue of organizing what is meaningful, begin to reason.

What an infant and toddler “gets out” of any experience is influenced by a variety of factors, some of which you do not control directly. If your child is still needing a preponderance of sensory stimulation opportunities and you are providing him activities to encourage his understanding of categories, it will be only you that

learns about categories. He will take in information about the color, size, shape, etc. of the objects. You have to be sensitive as to what his level of development is, realizing that foundations are vitally important and getting to the “next stage” quickly may leave gaps in his understanding and neurological structuring.

Output: Level Four Output has to do with a motor action and/or language response. It is “what we do” with the information we have received and reasoned with. As a level of the cognitive model, the usefulness of output is continually

being refined and improved. During the 8-18 month age range, output is inexact and not necessarily based on “processing” of information. It is more likely, for instance, to be a function of the emotional system or the appearance of output which is really manipulation/experimentation at the processing level. As one example, the

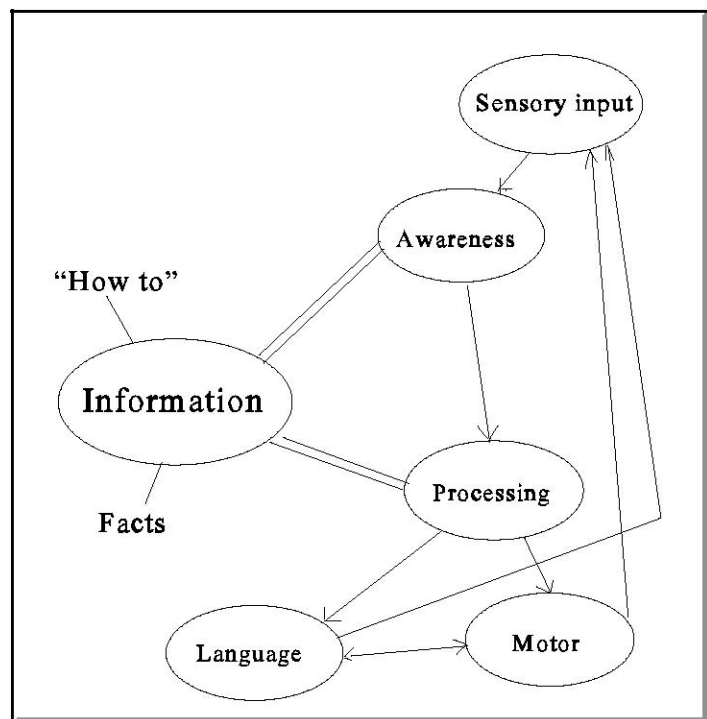


child’s dropping of items off a high chair may not be intentional output but part of

a means by which he can increase his information as to what happens in the process of the dropping. For the majority of children in the age range covered by this book, output will not be of critical importance. Expressive language through signs is discussed in Chapter Four, but other types of output are more valuable a focus for the older child.

Knowledge Knowledge develops as a byproduct internally from the awareness and processing levels of cognition. This knowledge is stored in a variety of locations in the brain, depending on the areas of reception. There are two types of knowledge, as

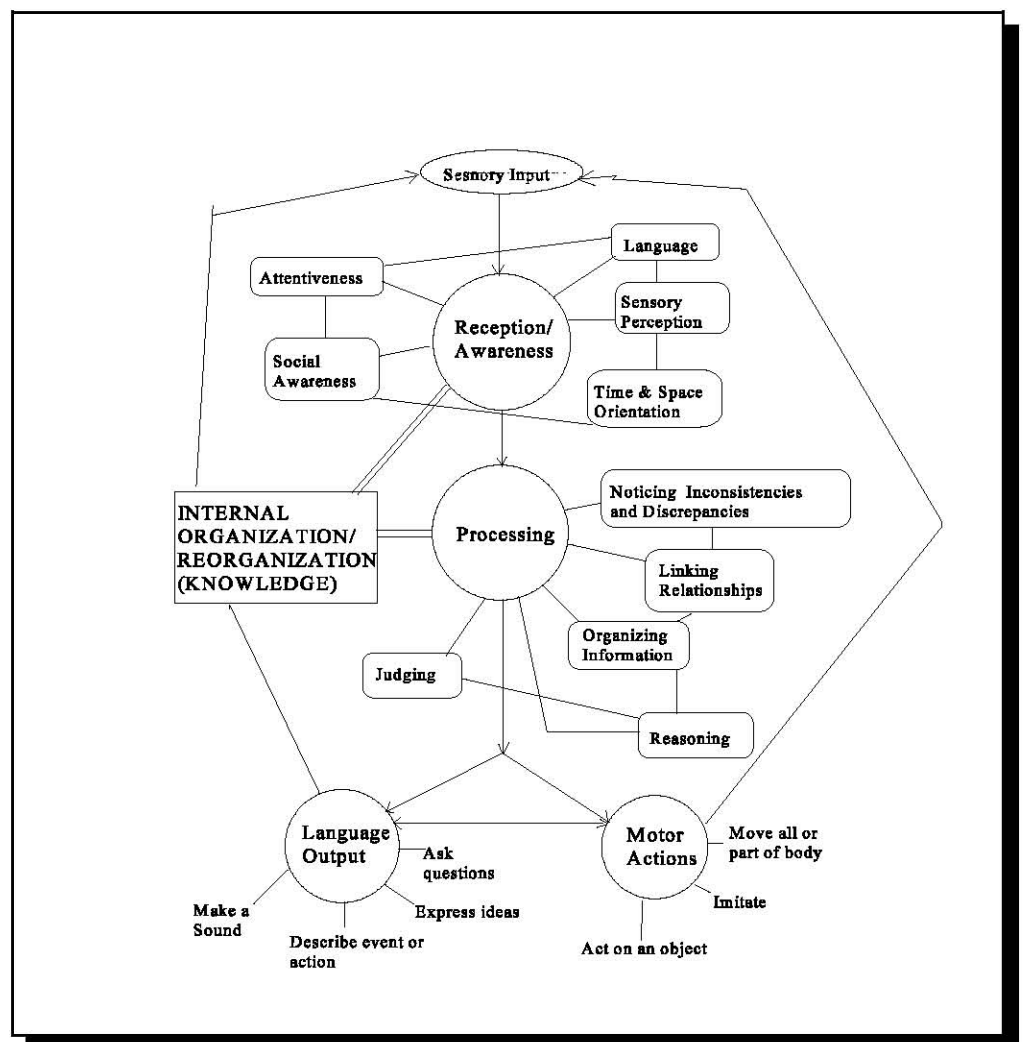
has been mentioned. One type is “how-to” knowledge and is developed through sensory and motor input. The other type is factual knowledge, which may have sensory referents but is often more language based and abstract. This knowledge comes from awareness and processing information (as shown on the chart to the right) and will continually be reorganized as new



experiences arise.

As you might guess, knowledge is not a part of the sequencing of solving problems at any *particular* level. We gain knowledge and use knowledge at any point, whether it be when we first receive information, when we interpret it, when we associate it, or even when we take action or verbalize.

Here is a view of the model in its entirety:



Brain Construction Chapter Seven

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Four levels of dealing with information have been described: Sensory Input, Reception/Awareness, Processing, and Output. Another way of describing these

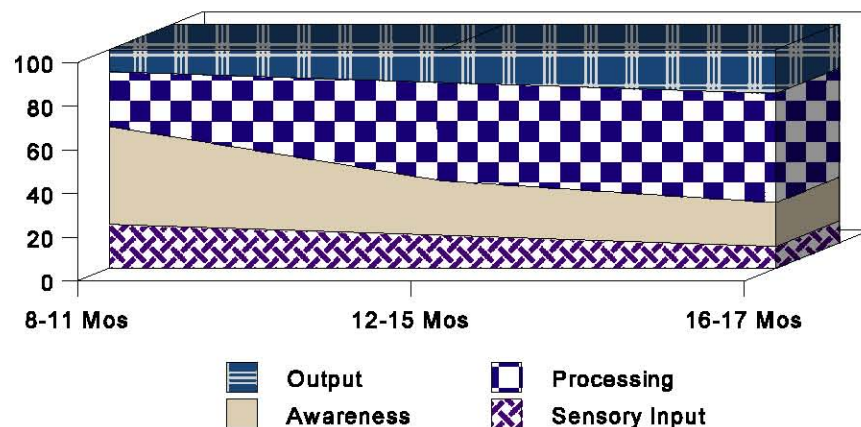
areas would be *Refining & Coordinating the Senses, Noticing Important Information about the Environment, Learning How to Deal with Information*, and then *Learning What Can be Done with the Information*.

While the child during the 8-18 month old age range will benefit from activities at each of the 4 levels, differing emphases need to be kept in mind in accordance with his developing neurology. The child from ages 8 to 12 months has a greater need for more activities relating to sensory refinement and environmental “findings” than the 13-18 month old. Once he has had such experiences and explored at length, he will show a progressively heightened interest in experimenting with objects and other elements of the environment, as he investigates their properties and relationships. Output, such as in creating a drawing [children in the teen months do like to scribble, but they are fascinated by the process of putting the marks on objects more than they are in being “artistic”] does not dramatically increase during these months nearly as much as it will over the following year. Few children speak at length during these months either, in part because they don’t yet have the interest in language as a production. But there is the added complication of learning the many types of sound constructions and their sequencings. There is some evidence that teaching a child how to *sign or gesture* meaningfully for requests can increase his communicative output, and such is discussed in Chapter Four.

While a gradual shifting of the types of stimulation of interest to your child will occur during this 8 to 18 month age range, realize that he will continue to receive value from experiences that provide him an integrated view of the world.

The figure below illustrates the trend from the need for sensory and exploratory activities/experiences to experimental opportunities:

Changes in Interest in Activities by Age



Language and Thought

For years developmental psychologists have debated whether language precedes thought or is molded by thought. Is it necessary to encourage your child to learn words in order to optimize his thinking ability? Research studies which have sought to address this question collectively point to the interactive nature of language and thought. That is, language affects thought and thought affects language. Andrew Meltzoff (1988) and his associates found, for instance, that language follows cognitive growth in one series of investigations. He reports that

Brain Construction Chapter Seven

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the understanding of object permanence precedes the use of the words "all gone", that understanding the concept of means-ends facilitates the use of words relating to success and failure, and that understanding categorization lays the

foundation for naming. In later studies, Meltzoff (1993) found evidence that language development and input also influences patterns of cognitive growth. In an interesting recent crosscultural study (Gopnik, Choi, and Baumberger, 1996) Korean mothers were noted to verbally focus on actions [as opposed to American mothers' concentration on naming and categorization], resulting in their children attending more to means-ends and success-failure situations. The investigator observed that "differences in the kinds of information children get make a difference in the kinds of problems they attempt to solve and the kinds of solutions they consider..." So there seems to be a reciprocal, symbiotic relationship between language and thought.



It is precisely during the 8 to 18 month age range that children develop functional receptive language ability. That is to say that they learn to associate specific sounds to objects beginning at about 8 months and over the following 10 months become able to associate strings of sounds with a complexity of meanings. But the task is formidable. Initially there is an association with the tone of the sound and its meaning--such as a firm "no" being a threatening sound. That is simplistic compared to learning that sounds relate to specific symbols, events, or ideas. As that part of the brain that distinguishes sounds matures, so does the

ability to discriminate the sequential difference between "iiiiooo" and "oooiii" or "cast" and "cats". Even inflection carries different meanings. Consider the sentence "I will walk with you". If the first word, "I", is emphasized, there is the suggestion that no one else will do the accompanying. If the word "will" is emphasized, the impression is one of establishing certainty. Emphasizing "walk" narrows what is being agreed to, "with" assures the closeness, and "you"

emphasizes that a choice is being made. We have words that convey descriptions, provide labels, indicate actions, and define effects. Knowing how each is being used requires other words and often a context. Note the different usages in these sentences: "this is called a microphone" (labeling), "the dog jumped over the fence" (action), "you have too many toys in here (quantity, and perhaps an inferential request for some action), "tomorrow we will go to the park" (time). Looking at the complexity involved, it is amazing that functional receptiveness of language is achieved in only 10 months. As will be noted in the next section, it is because the brain is "primed" to establish language associations during this period that it does happen so quickly.

All normally developing children learn to understand language and to talk. But as you certainly know, people vary greatly in their language aptitude. Being able to understand, reason with, and express words proficiently are skills in high demand both in school and in professional jobs. Possessing an expansive vocabulary fund and language fluency facilitates one's thinking and decision-making abilities.

There are a number of factors that influence how linguistically capable your child will become. They include how much language he hears, how much language is directed to him, how much the language serves

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to "capture" the moment, and how much the adult illustrates the use of language to "mediate" events in the environment. Researchers Betty Hart and Todd Risley (1995), in their book *Meaningful Differences in the Everyday Experiences of Young American Children*, report on their extensive work in preschool intervention the past 30 years. Among other lines of inquiry, they sought to determine what early experiences make a difference in later language skills. They found that the amount, type, and style of language-based interactions that occur when a child is **1-2 years of age** are significantly predictive of language abilities at age 3 and of language abilities and academic performance by age 9. You likely noticed an emphasis on language in the activities listed in Part One of this book. This study is part of that justification.

Parents sometimes express concern that their child is not talking at 18, 20, 22, or even 24 months. If your child seems to be understanding all that you say, there is generally little reason to be worried. However, the basis for such delay may vary significantly from child to child. If a hearing disability has been ruled out (and this is something you should undertake before 8 months of age if you suspect your child is not hearing well), the most critical time to assess for expressive language *disorder* is between 24 and 30 months. If your child has not been saying but a few words and then does not make rapid advances in expression in the 24-26 month time period, you should consult a speech and language specialist immediately.

It is true that expressive language follows receptive understanding. But even when a child understands well, he may not speak, or only speak single words on occasion. There are several possible reasons for this limited speech.

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- 1 (1) Often a single word does the job well (saying "cookie" is just as effective as saying "want cookie"). One couple's example of how the need to be more specific prompted their child at 16 months to put two words together makes this point. In a restaurant, their son said "cup" as he pointed at the table, indicating he wanted a drink. But offered the glass in front of him, he turned aside, again pointing to the table. Getting only stares, he finally said "dada cup"--and when he received that glass, it was apparent that was what he had wanted. Having the need for clarity sponsored his first 2 word utterance.
- 2 (2) The parent is already sensitive to what the child wants and anticipates the need, eliminating the necessity to be more specific.
- 3 (3) Two words put together, when not a request, are likely a commentary of some kind. A protesting commentary can already be readily given without words (through gestures or tone). And since the child before 18 months really has limited experiences, he likely has little yet to say.

The use of a second word generally conveys more complexity of meaning, such as "daddy shoe" meaning "there is daddy's shoe" and often reflects cognitive growth. In the process of listening, "sizing up" a situation, and formulating a verbal response, many associative brain networks are needed. The time during the teen months may well afford this enlistment and routing process, leading to

what we see in adults as an apparent ability to carry on casual conversations without pauses for thinking.

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More specifically, while our adult verbalizations may appear to occur at the same time we are thinking, it must be that our thoughts occur *prior* to our expressing them, even if we are speaking at a rapid fire rate. When we have a thought to convey verbally, we do not have to think of the separate words we are going to employ--the thought seems to create the means by which to express itself (though second language instruction often diverts from this naturalistic path and has students translate word for word).

Point of emphasis: A lag in receptive language during the second year of life is not common and should not be ignored.

Appendix

Two Topics of Importance

Important Topic #1: Academic Readiness

The skills that your child needs to learn for “kindergarten readiness” are simplistic compared to those addressed in the last section. For instance, most teachers expect children, by age 4 years, 9 months, to know their colors, their full name/age/ address; to discriminate among the basic shapes of a circle/square/ triangle/square; to be able to hold a pencil correctly; and to rote count to 10. Most children can acquire all of these skills by age 3. But pushing your child “to be ready” or be advanced is an attitude that in the long run will not be advantageous to him. It is much more helpful if you provide the types of experiences that help him adapt to his present environment. Pushing is a counterproductive strategy. Your child needs to develop a solid neural base of understanding about important links and concepts at this age. This doesn’t mean that you cannot introduce ideas about science, letters, history, math, and the like now. Just don’t do so in a testing, formal manner. This book is written with this “give the child information in a form and level he can use” orientation. You might be interested in information that shows that average progression of skills that are commonly regarded as important for school. The information in this section represents a compilation of several developmental and diagnostic charts.

First, there is of course, academics itself. Three subareas will be considered: writing, math, and reading. The period from 7 months through 18 months provides opportunities for practicing pre-writing skills.

7 Months.....	plays with objects in varying ways
8 Months.....	picks up/releases objects at will
9 Months	imitates motor movements
	uses pincher grasp (thumb & forefinger)
12 Months.....	makes marks with crayon
14 Months.....	scribbles with demonstration
18 Months.....	scribbles spontaneously

If your child is advancing more rapidly, then there is more for you to look at: 28 Months..... imitates circular, vertical, and horizontal lines 30 Months..... holds pencil with thumb/forefinger imitates cross 36 Months..... copies a circle

By 48 months most children exhibit a hand preference and by 54 months can copy a square.

In the area of Math, you likely recall the discussion concerning the concepts of “many”, “none” and the like. As these concepts are abstractions, most children do not learn “one” and “some” until about 28 months, though they know the term “more” much earlier. Most children do not rote count until they are about 42 months of age. Realize that knowing how to count to five is different from understanding that five represents a quantity of something.

Pre-reading skills begin with the child’s increasing ability to attend to one source of stimulation in his first year of life. Here are other milestones for most children:

12 months..... shows interest in pictures
in books briefly
18 months..... turns pages in a book

24 months..... turns pages singly



You also might be interested in knowing what the common ages are for the development of certain communicative skills.

9 months	responds to name with head turn, smile
12 months.....	uses gestures to indicate “yes”, “no”, “want”
14 months	follows directions with object & action
18 months	indicates preference if given option
	uses first name of siblings, kin
24 months.....	uses first name for self
	when hungry asks for food
28 months	asks questions beginning with “why” and “where”
30 months	says full name, answers “who” questions
36 months.....	talks about pictures in books
	identifies objects by use, uses pronouns
42 months.....	can relate main part of a story
	understands “not”

Next, you might want to know the order of development of certain cognitive functions, such as knowledge, concepts, strategies, and memory.

Knowledge

12 months..... recognizes inverted objects
uses objects functionally 18
months..... knows where
objects are normally kept,
points to pictures named 24
months..... names simple
pictures matches 2 colors
30 months..... understands
use of money understands
whole-part relationships (as
in "show me the tip of your
finger") 33 months.....
points to self in photo 36
months..... knows if boy or
girl points to blue or red on
request 42 months.....
names all colors
understands function of
objects like clocks 48
months..... knows most
body parts knows what to
do in many personal
situations 54 months.....
names common coins
knows age last year, this
year, & next year

Concepts 9 months..... understands object permanence 12 months..... emerging awareness of “back”, “top”, and “front” 14 months..... understands roundness 24 months understands “in”, “on”, “off” 28 months..... understands size differences knows “one” and “some” 30 months..... understands descriptive terms like “big”, “wet”, “little” 36 months..... half know “smallest”, “missing”, “tallest”, “full”, “many”, “across”, “full”, “longest” 42 months..... know “all”, “backwards”, “lowest”, “middle”, and “both” 48 months understands simple verbal analogies (eg., “shoes go on your feet, hats go on your ____”)

Strategies 9 months..... anticipates routines from cues 14 months..... overcomes simple obstacles 24 months..... anticipates actions of objects 28 months..... groups objects by size or color or shape 30 months..... shows beginning caution of stairs, animals 36 months..... uses dramatization in play 42 months..... understands sequences and endings 48 months..... classifies objects by category

You likely recognize many of these listed skills/abilities as a part of the focuses of this book with the 8--18 month old child. If you attend to helping your child to notice and organize what is relevant about the environment and give him a

modeling of how you process what you see, hear, etc., you will find him developing these abilities at an earlier age and with more depth and understanding.

Memory

12 months.....searches for objects placed out of sight

18 months.....relates to objects out of sight

24 months.....remembers where he put object last

28 months.....initiates actions from memory

30 months..... repeats 2 numbers

36 months..... repeats 5 word sentence

names missing object from group of three

42 months.....imitates a motor sequence of 3 actions

54 months.....names days of week in sequence

These listings of typical milestones should also assist you in providing the types of experiences that will assure you that your child is learning “the basics”.

Important Topic #2: Having Fun

It is appropriate to end this book with a focus on enjoying the interactions you have with your child. Everything you do with your child should be fun. You will undoubtedly find certain special activities that you take particular pleasure in, something specific to your relationship. Here are some interactive “games” that most children in the 8 to 18 month range like.

The first one I call **bulldozer**. It is played on the floor, with your child lying down. You simply act like a bulldozer, gently rolling him over with your head, from back to stomach, then stomach to back. He will laugh and laugh.

Chase is a game children start liking as soon as they can crawl. It is as much fun crawling in this “I’m going to get you” game as walking. Whether the child is crawling or walking, however, it is more fun for the adult to be crawling and at the child’s eye level.

Hide and seek is a great game for children ages 6 months through middle childhood. At the 8 to 18 month old age, children will still need some modeling and guidance as to what exactly to do or where to look. If you have not been playing hide and seek yet with them, then have an assistant hide as you carry or accompany your child in the role of the “seekers”. When you reach the stage where your child is looking for you, make sure you offer several voice cues so he can find you. Children delight just as much finding you with cues as not.

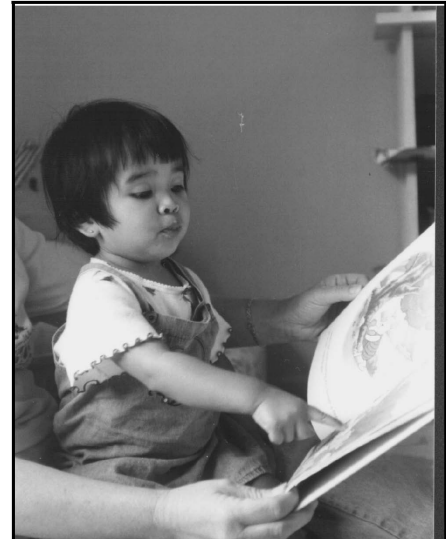
The always enjoyed **peek-a-boo** can be played with many variations, from the use of differing coverings to peeking around corners. Your child will initiate covering his head or peeking at you at some point, showing how much he likes the interaction.

The aforementioned **fingerplay** songs are well liked as interaction games. You both engage in a similar activity with symbolic meaning.

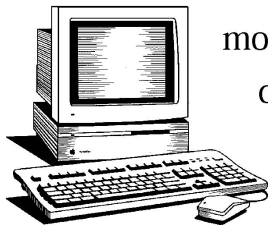
Looking at a **picture book** together, while not a game, is a way to enjoy moments with a teen month child. Your child may well develop a favorite book that he will

want to have “read” over and over. At first you will find his attention span short and he may want to spend but a couple of seconds on any given page. The best procedure is not to read what is printed but rather to point to the pictures and make comments. Eventually he will want to look at everything on every page, but that will often take months in coming. Follow his lead. You and he can get far more from using the books as a vehicle for interaction than as a teaching mechanism now. Those books that have buttons that play a sound or music will be entertaining to the 13-18 month old; and of course, it will be he that pushes the buttons.

Toward the end of this age range, from 16-18 months, many children will be able to understand the use of a computer. If you can locate a small one that your child can manipulate, he will begin to appreciate the relationship between the moving of the mouse and the movement of the cursor. If it has one button that is easily pushed, you likely can teach him the clicking process using some of the very entertaining multimedia software available on the market. By the time he is 24 months, and certainly by 30 months, he will operate these programs by himself.



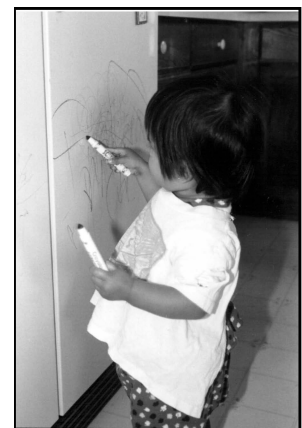
Jonna loves to look at books



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walking over uneven terrain. You can put together some blankets and towels and scatter them over the floor in various heights to create an interesting walk. Outside you likely will find uneven terrain in a local park. He will try to engage hills and mounds that are beyond his balance capability, so supervise him closely. Taking his hand and walking him around can be fun because he gets such a kick out of the experience.

There are various types of art experiences that children will love. You can put a “painting” bib on them, stand them in front of your refrigerator, and offer them washable marking pens to use in creating pictures. You can model the use of different colors, the making of various types of scribbles (up/down marks, circular marks, side to side strokes), and various ways of holding the markers. In any case, drawing/coloring/ painting is fun if it is seen as a way of creative exploration.



At 16 months Jonna shows her color choices on the refig

Finger painting is also an experience that some children find to be recreational. Others may not want to get their hands coated with paint. Since this can be just for fun, let them decide. “Foot” painting can be more fun than even finger painting. Put some large sheets of paper out on your driveway, coat your child’s feet with watercolor paint (applied with a brush), and let him walk around.

*Brain Under Construction**Appendix*

Then there is music. You may find that during this age span your child will show a definite reaction to music. Below Jonna is caught dancing using her own moves. For young children dancing lessons are not needed!!! You can certainly try a variety of music types, from classical



to jazz, rock to country. If you have a CD player with multiple track capability, you can give him the opportunity to select what he wants to hear or dance to. Of course, initially he will just want to push the buttons. But with some guidance from you, he will learn and use this independence of choice to make his selections.



In whatever you do, take advantage of how much fun a child is between the ages of 8 months and 18 months. The world is new and exciting and you are the guide. If you are both having fun, the chances are that the type of brain structure your child is developing will be hardy and optimistic. Not bad qualities.

For comments on this book, write the author in care of the publisher, or use the e-mail address WStaso@aol.com..

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