

THE WHOLE CHILD DEVELOPMENT GUIDE

EDITION I

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The Whole Child Development Guide is grounded in recent research findings and has been developed by the LEGO Learning Institute in partnership with experts in the field.
Author: Prof. Edith Ackermann, Contributors: Dr. Dorothy Singer (The Learning Relevance Grid and The Complete Discovery System) and Dr. Aaron Falbel.
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Part 2.:

Babies 0 - 12 Months

Overview of Babies 0-12 Months

Me - Being Me

ME - USING MY BODY

Becoming Mobile. In the first year of their lives, radical changes take place in children's abilities to control their bodies and to monitor their actions. From lying on their backs to moving around, from being driven by reflexes to voluntarily controlling their movements, babies gain increasing mobility and autonomy. This in turn unlocks their power to act in the world and to get to know themselves as agents. Much of this development is taking place without any „teaching“ or direct guidance.



While we fully expect that healthy babies will greatly increase mobility during their first year of life, the process by which they accomplish this is nonetheless astonishing. Indeed, as Karmiloff-Smith notes, „The average human baby achieves in about twelve months what it took the human race millions years of evolution to accomplish: the ability to turn the skeletal structure upright and move about freely on two legs. Yet, unlike most other mammals, the human is born virtually helpless. Paradoxically, at birth babies hardly move at all and show very few signs of the efficient biped that they will eventually become“ (Karmiloff-Smith, 1994. p. 57).

In sum, becoming mobile and gaining dexterity are a baby's two most significant physical-motoric developmental tasks, and a great deal of an infant's energies goes into trying to make her body do what she wants it to do. As they come to control their bodies, babies also gain new windows into the world, which in turn fuel the urge for further expanding their experience. The cycle of self-directed learning has started.

ME – KNOWING MYSELF

From Being “Fused” to Recognizing “Me” in the Mirror. During their first year, human babies complete two major developmental tasks: They move from being at one with the world and totally dependent on their caregivers to acting on their own and at their own will.

Infants cannot reflect or verbalize on the nature of self. Thus, the most common and oldest technique used for gauging babies' self-understanding

is visual self-recognition. Researchers or parents closely observe babies' reactions (such as smiling, grabbing, babbling, or increased sucking on a pacifier) to their own mirror images, and to photos or videos of themselves. In the case of the mirror, the image-of-self one sees always moves in tandem to one's own physiological sensations of movements. With photos, this contingency doesn't exist, but with videos, it can or cannot exist, depending on whether the shots are "live" or not.

In addition to visual self-recognition, babies learn how to protect and comfort themselves, when in distress, or left alone, and how they act-out and express themselves, even in absence of a conscious self-regard. This primitive ability to take care of oneself marks an early step in the long process of identity formation.

Us – Growing Together



US - RELATING TO OTHERS

From Tuning In to Building a Relationship. During their first year, babies' ways of relating undergoes a true revolution: starting from a built-in ability to respond to the human voice and to recognize the features of a human face, babies become, over the course of 12 months, eager, active, and selective social partners. By the third month, they engage in pre-verbal conversations, or give-and-take games. By the eighth month, they become strongly attached to their primary caregivers. By their first birthday, this attachment manifests itself as genuine laughter, clowning, coyness, and various forms of what parents would call "mischief making" (Karmiloff-Smith, 1994. p. 208). In sum, from automatically tuning in, human infants have learned to build and sustain a relationship.

US - UNDERSTANDING OTHERS

Human Infants Are Born to Be Social. Early on, they respond to other people, engage in pre-verbal conversations, and partake in relational give-and-takes. There is a difference, however, between getting attuned to others, i.e. be a partner-in-relation, and showing empathy and understanding of how other people feel and think. It will take months before human babies develop a sense of others, and even longer before a child can put himself in other people's shoes, or minds.

A first manifestation of a baby's budding sense of other appears around the age of 8 months, when most infants become "attached" to the people who are constant in their lives and, by the same token, fearful of strangers. Early attachment and

strangers fear mark the beginnings of a child's ability to discriminate among people as individuals. That's when babies become picky about whom they give their favours to. That's also when babies start changing their own ways of being, and relating, depending on whom they have in front of them.

As they reach their first birthday, most babies have acquired a fairly rich repertoire of relational strategies that they put into practice in different ways with different people. This, in turn, teaches them a great deal about the idiosyncrasies of each relational partner (some are "feel good" folks while others make you tense, or bored. With some you get your way with smiles, and with others with cries). Once a baby knows how different individuals make her feel, it won't take too long before she also knows how each may feel, and feel for them.

For these reasons, Understanding Others is only explored in a broader sense covering the entire 0-12 months age period in the next section.

World – Making Sense of it All

WORLD – EXPLORING AND INVESTIGATING

From Visually Scanning to Hands-on Exploration. In their first year, children's explorations of the world are mostly "hands on" (or, more often, "mouths-on") and their knowledge is of a sensory-motor or action-oriented type. Yet, as they reach their first birthday, infants have elaborated several basic dimensions of reality, such as object permanence and a rudimentary grasp of space, time, and causality. These "understandings," needless to say, are still closely related to the infant's direct actions, to the movements of his arms, legs, fingers, and eyes.



At first, newborns scan the world through visual tracking, and they grasp or mouth whatever touches their hand or mouth. Before long, however, babies start mouthing and grabbing things deliberately, as if for the sake of exploration itself, using all their senses: seeing, smelling, hearing, tasting, touching. They do so relentlessly, which, in turn, enables them to learn a great deal about the world, as well as about their abilities to impact the world. In this sense, self-knowledge and knowledge about the world go hand in hand.

WORLD - SEEKING LOGIC

From "Feels Good" to Order and Coherence. During the first year, a child's logic is a logic-in-action. The first logical categories that babies



establish are based on how objects, including people, resist or yield to their explorations, and solicitations. In other words, the world is divided into feel-good objects and feel-bad objects: a very binary logic indeed! By the end of their first year, however, babies have come a long way in refining their logic-in-action: They have learned to engage in detours and to overcome obstacles, and they can interrupt an action and pursue it a later stage. All these achievements require some rudimentary form of “reversibility” and cannot be accounted for without reference to a minimum of thinking or logical reasoning.

To this day, researchers disagree on what babies know, let alone what they think, at different stages of their early development. And babies are not able to tell anyone! As will become apparent in what follows, there is much speculation about young babies’ reasoning or logical abilities. Whatever the claims may be, the question remains: How does a baby turn her exploratory activity into a conceptual representation, mental model, or knowledge structure that brings order and coherence to her understanding of the world?

Later in this Part, we shall look at how a baby’s “logico-mathematical” capabilities (to use Piaget’s term) evolve during the first year of his life. When do they appear? How does the child use them to bring order into a world too bewildering and complex to be grasped?

Creations – Realising Visions



CREATIONS – IMAGINING

Acting Without Thinking. During their first year, children’s ability to imagine, or envision alternatives in their minds, is practically nonexistent for the simple reason that babies, as far as we can tell, do not yet form symbolic representations of external reality, let alone think of things that don’t exist!

Instead, babies interact with people and objects in their environment in just the right way so as to maximize their learning: They do so in the here-and-now, in the immediacy of lived experience. They do not contemplate or think about things that are not right in front of them, again, as far as we can tell!

For this reason, Imagining is only covered in greater detail in the Babies age period 9-12 Months.

CREATIONS – ENACTING AND CREATING

“Say it with cries, bangs, smiles, and laughter.” Like imagination itself, creative expression sets in relatively late in an infant’s life. It takes the ability to speak and to think to be able to play out one’s fantasies. This being said, a close look into some early precursors of creative expression helps reveal how babies evolve from merely acting out to becoming actors, from cooing and babbling to becoming speakers, and from listening to becoming readers.



During the first six months of their lives, our artists in the crib express themselves in a rather direct fashion, through cries, bangs, smiles, and laughter. And their purpose, if any, remains mostly instrumental. In other words, young babies, up to the age of 6 months, are not really creative. Their primal screams need further elaboration to gain the status of “artistic expression.”

For this reason, Enacting and Creating is only covered in greater detail in the Babies age period commencing 6-9 Months.

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Babies - the First Twelve Months

0 – 3 Months

Me – Being Me

ME - USING MY BODY

Lying Down on the Job. Newborns spend most of their time sleeping and eating. Their mobility is quite limited at this stage. Their first movements are jerky, and their heads oversized in relation to the rest of their body, making it hard to sit up or even hold their head up to look around. Their bodies are flabby and in constant need to be held. From day one, however, newborns are also very active. They relentlessly try to get their bodies to do what they want, even if unconsciously, which lends them greater autonomy to act in the world, to relate to people, and to get to know themselves. How exactly does the exciting journey start for a newborn baby?



COMPETENCIES:

What does the 0-3 month-old baby naturally strive to learn?

Each and every action that babies engage in seems geared toward helping them grow. A newborn's natural tendency to randomly move legs and arms strengthens her muscles. Her initial reflex to turn the head toward a finger that strokes her cheek is essential for feeding. Her later attempts to deliberately lift her head gives her a new view on the world. Before you know it, a newborn's initial reflexes turn into increasingly flexible action-patterns, or habits, that become ever more differentiated. By the age of 3 months, our infant has learned to lift her head and to grab and reach out for things. She now actively attempts to roll over on her side! She is soon ready to sit.

MANIFESTATION:

What actions will the baby do to attain these competencies ?

From day one, newborns can follow objects with their eyes that cross their visual field, at first horizontally. They move their arms and legs, apparently randomly, and they grimace and scream when tense, in pain, or hungry.



By their third week, babies have “loosened” most of their initial reflexes, through intelligent practice. They now deliberately follow specific objects with their eyes, ignoring others. They look at their fingers and try to move them. They manually explore objects that are at an easy hand’s grasp.

By 10 to 12 weeks, babies engage in finger play, scratch at a quilt, grasp a rattle and shake it.

SUPPORT:

What can care-givers do to support or enhance this natural urge?

Provide babies with an interesting and varied visual field. Provide them with soft objects (blankets, quilts, stuffed toys) that they can explore with their fingers or their mouths. Babies like to be active: don’t leave them lying in one place for too long!

ME – KNOWING MYSELF

Self-absorbed Yet Self-less. At birth, infants are fused with their world and are at one with people: They cannot distinguish between self and other, nor can they appreciate or respect other people, or themselves, for who they are. At the same time, newborns come to the world endowed with a built-in reflex to protect themselves from inputs that are perceived as threatening. They close their eyes when objects come at them too close or too fast. They scream when hungry, in pain, frustrated, or uncomfortable, and they shut down altogether when over-stimulated. This built-in ability to regulate amounts of input, in transactions with people and with things, is a key to a child’s forming identity. Obviously, it will take much practice and support from caring others for such early protective reflexes to turn into effective self-preserving mechanisms.

COMPETENCIES:

What does a 0-3-month-old naturally strive to learn?

“From birth to 3 months, the initial organizing principle to appear in infants’ self-knowledge is an unlearned attraction to the images of other people and especially to the images of young babies. This attraction shows up with young infants’ fascination with mirror images, drawings, and pictures of faces, especially when the face is that of the self or of another young infant.” (Damon and Hart, 1982, p. 848).

At 3 months of age, most babies have learned to use their sucking reflex to comfort themselves, even when not hungry. They can “sing” to themselves, or modulate their voices, to release tension when left alone.

Around 3 months of age, babies start recognizing their mother's reflection in the mirror: the infant smiles, looks, and vocalizes at the mother's image as soon as it is presented.



MANIFESTATION:

What actions will the baby do to attain these competencies ?

The newborn will spontaneously suck on his hands or fingers. This doesn't necessarily mean he is hungry: he associates the sucking feeling with comfort. The baby will track moving objects with his eyes and focus on static ones, especially faces. The baby will soon associate his crying with the response of his care-giver.

SUPPORT:

What can care-givers do to support this natural development?

Comfort the baby when she is distressed, but also allow her to comfort herself by sucking on hands or fingers. Respond to your babies cries. Don't let her "cry herself out."

Us – Growing Together

US - RELATING TO OTHERS

Cuteness as a Survival Mechanism. At birth, human babies are entirely dependent upon other people to survive. Their ability to motivate others to care for them is one of the most crucial social skill with which babies are born. Clearly, a newborn's social needs and skills are unconscious. Yet as care-givers respond to their built-in "cuteness" and unself-conscious solicitations, babies are quick to learn that they can exploit their own cuteness. By their third month, they use communicative gestures, unique to our species, such as smiles and eyebrow flashes (i.e. if the mother raises her eyebrows, baby raises his eyebrows too!) to attract attention. As babies' first incidental smiles impact people around them, babies learn to produce genuine smiles of pleasure, and later, they modulate their smile to convey specific needs and wishes.



COMPETENCIES:

What does the 0–3-month-old naturally strive to learn?

At this stage, relating to others is much about controlling the quality and amount of care and stimulation needed to survive. Newborns come into the



world with a series of reflexes, such as shutting their eyes when someone gets too close too fast, smiling when they see a configuration that mimics a human face, or screaming when hungry, tense, uncomfortable, or sleepy. The baby's first pre-verbal "conversations," or turn-taking games, start early on, and it won't be long before the baby's tuning-in, at first automatic, turns into full-fledged social behaviour, which the baby increasingly controls.

MANIFESTATION:

What actions will the baby do to nurture these competencies ?

Practically at birth, newborns are able to imitate facial expressions, such as sticking out their tongues. Their first smiles appear as early as three weeks. Yet, true social smiles only appear at about six weeks.

After only a few days, newborns recognize their mother's voice and distinguish its pitch and tone from those of other people. Newborns are generally fascinated with human faces, and by two months of age they recognize the internal features of a familiar face: They start crying when mom puts on a hat or sunglasses! (Karmiloff-Smith, 1994).

Around six weeks, babies attentively watch their mother's face during nursing. And by eight weeks, they start responding to turn-taking games initiated by the adult.

By two to three months, babies make their first language-like sounds. They coo, i.e., modulate their voices, and they respond to people's cooing by cooing back.

SUPPORT:

What can caregivers do to support a child's natural interests and abilities?

Babies are pretty good at controlling amounts of input for optimal comfort in their social relations. Still, parents can help by making sure they provide "neither too much nor too little" stimulation. Most parents know very well, by watching their babies for cues, not to over or under-stimulate their babies and they know when to engage their babies in social games! They need only remember: it is never too early to initiate and encourage joyful turn-taking games.

US - UNDERSTANDING OTHERS (0-12 MONTHS)

From Mimicry to Understanding Intentions. "From birth, babies find themselves surrounded by people who can sympathize with others, are aware of themselves, share emotional bonds and, unlike other species,

know that other people have thoughts and memories different from their own. How does the baby acquire the mental skills that underlie this social understanding?" (Karmiloff-Smith, 1994. p. 201).



Between 0 and 9 months, the baby relates to others strictly through the self: others are seen and understood in terms of what they provide for the baby. Here is a baby's-eye view of her social world: "Mom provides me with food, warmth, and comfort. Mom and Dad come running whenever I cry. They change my diaper when I am wet. They pick me up and keep me entertained when I am bored. They talk to me and play games with me. Other people smile at me, make funny faces, and talk in high-pitched voices." The baby's view of the world is still highly egocentric, meaning that everything is mediated through the self. The baby emerges from this egocentricity only gradually.

"When they are just a few months old, babies already seem to be sensitive to other people's emotions. Not only do babies smile when her mother smiles at her, but she reacts to her angry expression by looking angry and upset herself. But it would be premature to conclude from this behaviour that babies know how their mothers are feeling in such circumstances. It will take long before they can put themselves in other people's shoes" (Karmiloff-Smith, 1994. p. 201) Much of a newborn's sense of others is based on reflexive imitation. As we noted earlier, a newborn baby will stick out her tongue if she sees her mother (or someone else) do this. Through imitation, babies come to feel the sensation of what they imitate, and thus build associations between muscular reactions and emotional expressions. Through this automatic tuning in, they can feel the moods of others, as if under their skin. This sort of mimicry can be seen as a precursor to empathy, even though, at this stage, the baby is not aware that others possess thoughts and feelings distinct from their own.

Around 8 months, however, things start changing as babies build their first attachments, which coincides with the beginnings of object permanence. That's when, as we have already noted, for a while at least, anyone unfamiliar is perceived as a threat. The world seems to be split between familiar people and other scary people who come and interrupt the baby's normal, familiar routines. Such interruptions are very upsetting to babies at this age. They seem to crave familiarity, routine, constancy, and repetition.

Then, at nine months, a significant breakthrough occurs: babies develop the capacity to sustain their attention on a shared topic. This hugely increases the baby's ability to monitor and understand other people's intentions and moods. Babies now deliberately search for the aim of a partner's gaze. In



other words, they seek to understand what the other wants, or is interested in. This newly emerging ability is manifested in many contexts.

COMPETENCIES:

What does the 0–12-months-old naturally strive to learn?

The baby is naturally attracted to others. He is interested in observing what others are doing, even if much of it seems bewildering. Even a hungry baby will stop nursing if someone new walks in the room, or if something interesting happens.

Early mimicry gradually gives way to observation and understanding. By the end of their first year, babies begin to understand that others have intentional states, which they can begin to relate to their own. Starting at 9 months, infants begin to understand the instructive intents of the mother's behaviour. For example, when the mother points from a peg to a hole into which the peg fits, 9-month-olds do not slavishly imitate her incomplete demonstration. Instead, they display their understanding of mothers' instructive intent by placing the peg in the hole (Bretherton and All, 1981. p. 55).

Nine-month-olds recognize and, to a certain extent, respect the mental states of others: they understand their expectations, needs, and wants. At this stage, babies actively explore how it feels to "deal with" different kinds of people, and they mediate their relations in new ways. Their newly acquired ability to sustain attention on a shared topic, and to deliberately search for the object of a partner's gaze, offers a new means to get to know others. In turn-taking games with an unfamiliar adult, 12-month-olds employ a whole variety of strategies for reviving interrupted reciprocal games: they know not just when it's the partner's turn, they also know what the partner wants, expects, and likes.

MANIFESTATION:

What actions will the baby do that nurture these competencies?

After a few days only, newborns will stick out their tongues at whoever does so. This reflex will eventually allow them to associate their own feelings and sensations with those of others. Newborn infants also move their limbs synchronously with a partner's speech rhythm, as if it needs to be "on the same wavelength" (Condon, 1979).

By 2 months, babies respond differently to a person who intends to speak to them and one who speaks to someone else (Dunn, 1988).

Shared reading of books, or pointing at objects in pictures, are often the first joint enterprises in which babies can share the objects of attention. Soon the baby learns to point at objects herself. Pointing represents an intentional state, or mental directedness. At first the baby simply copies such behaviour, but before long appropriates it as her own, thus acquiring her own intentional states.

SUPPORT:

What can care-givers do to support a baby's natural interests and abilities?

At eight or nine months, or even earlier, read books and look at pictures with your baby. Point to familiar objects and name them. Baby will spontaneously copy this behaviour, at firsts mechanically, but with increasing understanding and intent.

World – Making Sense of it All

WORLD – EXPLORING AND INVESTIGATING

See How it Feels. It is now established that, soon after birth, babies can see objects around them. Also, newborns know more about shape, size, and depth than earlier studies suggested. Along the same line, research indicates that after only a few days, babies apparently reach for objects located within their reach, as if they know that some objects are within arms length, while others are not. In spite of this amazing head start, the question still remains: how do babies interpret what they see, mouth, or grasp? And how do their early reflex behaviours, such as crying, sucking, or grabbing, turn into deliberate and efficient explorations, geared at understanding the world around them?



COMPETENCIES:

What does the 0–3-month-old naturally strive to learn?

It only takes a few days before infants actively scan objects with their eyes, especially objects that move. And as time goes by, babies scrutinize objects ever more selectively. As eye-hand coordination is achieved, two-month-olds start grabbing and shaking whatever they see, and they mouth whatever they grab. In so doing, they learn a great deal about the properties of the objects explored. They get a first “feel” for how different objects respond to their varying approaches.

By the third month, babies start to use their actions as a means to make things happen in the world, which, in turn, requires some rudimentary



understanding of cause and effect, as well as a primitive sense of time, or duration, as related to the satisfaction of needs and expectations.

MANIFESTATION:

What actions will the baby do to attain these competencies?

From 0-3 months, babies explore and gaze at objects for long periods of time. However, they do not yet realize that objects have a reality of their own. Objects are “points of contact” and are gauged, for the most part, according to whether or not they bring the baby pleasure.

Initially, a baby will only grasp a rattle if it is put into his hand. He does not yet know that he can reach out for it himself. This is something he must discover!

As they reach 4-7 weeks, babies actively grab whatever they see. At the same time, they also mouth, shake, and bang whatever they grab, thus “feeling” out the object’s qualities. They discover that different objects respond differently to their solicitations: a first subjective way of making distinctions, or categorizing by use.

In sum, even very young infants act as little scientists and engage in “experimentation.” Karmiloff-Smith describes how babies, at this stage, use crying in an experimental way to achieve the results they want, and to relate cause and effect:

“At roughly six to eight weeks of age, babies often pause between bouts of crying and quieten down for a moment as they try to attract attention. If they can’t hear their parents’ footsteps, they will cry a little more and pause again, until they have succeeded in getting what they want. Crying is the first outward sign that babies are gaining control and organising their world through intentional action.” (Karmiloff-Smith. 1994. p. 168–9)

SUPPORT:

What can care-givers do to support a baby’s natural interests and abilities?

Provide your baby with toys or object that will allow her to make useful distinctions, for example, between soft & hard, reachable & non-reachable, smooth & rough, etc.

Play with your baby by putting different objects his hand, or have him listen to and look at different sounds, colours and movements. Interesting

objects for 0–3-month-olds include mobiles, music boxes, rattles, and shakers, anything that allows infants to make enjoyable associations, say, between sound and movement, or to feel the differences between various textures.



In cultivating play routines in which they both learn, parent and child can jointly establish the meanings of different cries, smiles, grabs, or bites. Parents can help this “negotiation-in-action” by responding very consistently to certain variations of the baby’s actions and expressions.

WORLD - FINDING THE LOGIC

Logic of the Senses. Do newborn babies have a sense of depth? Do they distinguish between geometric forms, such as a circle, a square, or a triangle? Do they have a sense of quantities? Can they recognize a musical pattern beyond the individual sounds that make it? All these questions require some “computation” on the part of the baby to organize the world into logical categories, beyond what can be seen or done. Current baby-research, especially in the U.S., indicates that, indeed, very young babies know much more about logic, or mathematics, than earlier studies suggested.

COMPETENCIES:

What does the 0–3-month-old naturally strive to learn?

Studies bring evidence to the idea that soon after birth, babies perceive global configurations, or whole forms [Gestalt in German], and hear rhythmic patterns and melodies. Newborns also discriminate figures from background. (Mehler J., Dupoux, E.. 1994. p. 53-69)

In essence, from the moment they leave their mother’s womb, newborns show great sensibility to their acoustical environment. They perceive temporal rhythms and variations in incoming streams of sound, i.e. they group sounds into melodic patterns and rhythms. Babies also seem to have an innate sense of depth: a built-in logic that “computes” distances and angles to provide a 3-D vision—even if the infant herself will learn, in a formal sense, about angles and distances at a much later stage.

This being said, newborns don’t see the world as we do! Far from a logical arrangement of identifiable forms with defined contours, a newborn’s visual environment is more like a fuzzy maze of partially overlapping forms, none of them truly regular, or geometrically simple.



MANIFESTATION:

What actions will the baby do to attain these competencies?

Newborns turn their heads in the direction of sound inputs. This reflex disappears at around 2 months, to reappear at around 4 months under voluntary control. More impressive, newborns will gaze much longer at a simple pattern than at a plain surface. However, too much patterning tunes them out

To a 4-week-old baby, the dissociation of visual and auditory data is disturbing, showing that his perceptual space is already quite organized. What's more, four-week-old babies show signs of anxiety if they see their mother in one place while her voice comes from another location: Her voice should come from where she stands! This indeed is a rudimentary form of logical necessity.

After 4-7 weeks, babies perfect their manipulation techniques (they mouth and grab things) and apply them systematically to many different objects within their reach: a great way into making distinctions, or categorizing things by use.

SUPPORT:

What can care-givers do to support or enhance this natural urge?

Provide the baby with an interesting and stimulating milieu, but not over-stimulating. Babies get bored easily, but they also like constancy and repetition. A "simple but varied" environment is a good rule of thumb to guide parents and care-givers. Provide toys or objects with stark colour contrasts (or black-and-white) and textures, and rattles, shakers, and music boxes that make a variety of sounds. Don't overload the baby with objects. A few well-chosen ones will be sufficient.

Creations – Realising Visions



CREATIONS – IMAGINING

Imagining is only covered in greater detail in the Babies age period 9-12 Months.

CREATIONS – ENACTING AND CREATING

Enacting and Creating is only covered in greater detail in the Babies age period commencing 6-9 Months.

3 – 6 Months

Me – Being Me

ME - USING MY BODY

The Sitters. As babies start to roll on their side and kick their legs rhythmically (starting at 3 to 4 months), they are soon ready to sit. In Karmiloff-Smith's words: "The next step toward moving around independently comes at about four months when babies start to roll, first from side to back, and then from back to side (...) Most of their waking time is now spent moving their limbs and learning new rhythms. They gradually discover that they can make their legs do things for them – like remove covers or make a baby-chair bounce" (Karmiloff-Smith, 1994. p.65). From being an expert roller to becoming an unstable sitter surely requires further coordination and control, but it does not take much "developmental" time. At roughly 6 months, most babies can balance in a seated position, at least for short periods of time. As they free their hands when seated, babies also make huge progress in controlling their fine-motor skills: they start exploring things with both hands, which opens a whole wealth of possibilities.



COMPETENCIES:

What does the 3-6-month-old baby naturally strive to learn?

By the age of 6 months, babies reach out for their favourite objects, and they use both hands to explore them. When seated, they play with spoons and food, and they drop objects from their highchairs to see them fall. They bang objects against one another. This exploratory play with objects marks the beginnings of object-mediated tool-use.

The ability to sit gives the baby a whole new grasp on things. It puts her upright (at least from head to bottom) and it frees her hands. That's when the joy of banging and dropping objects from the highchair starts.

MANIFESTATION:

What actions will the baby do to attain these competencies?

At about 5 months, babies like to kick both legs simultaneously, like a frog, when held in the air, and they systematically exercise rolling and kicking, when lying on their backs. They do so for the sheer joy of it. At the same time, as they kick, they may notice that their legs push away a blanket. So



they start using their legs to push other things. Similarly, as they roll, they may land in unknown territory, so they start using rolling to go places. This ability to learn through “circular reaction” marks the beginning of purposive activities and means-ends coordination.

Through rolling, babies increase their mobility, which changes their stance in the world. As they roll off, babies also soon come to realize that they can use their rolling to get places: two exciting discoveries.

SUPPORT:

What can care-givers do to support this natural development?

Maintain a safe play area where the baby can roll around without banging into anything that might hurt them or cause damage. Let them play with soft objects that they can grasp, drop, hit, kick, roll over, or bump into.

ME – KNOWING MYSELF

Mirror Image as Playmate. Around 4 to 6 months, infants enter in a phase called playmates by Dixon (Dixon, 1957). The child is now fascinated by the fidelity or contingency of his mirror image, i.e. by the immediacy of its response to his own movements or expressions. According to Lewis and Brooks-Gunn this is an early form of self-knowledge through contingency clues. The essence of this ability is to understand that the self is the origin and cause of the moving image that the baby sees in the mirror, or on a TV screen (Lewis and Brooks-Gunn, 1979).

COMPETENCIES:

What does the 3-6-months -old naturally strive to learn?

At this stage, babies become interested in their mirror image, which they treat as an interacting peer (they do not “really” recognize it as being themselves). This lasts until about 6 months. This early form of self-recognition is entirely contingent upon the here and now, and doesn’t involve any sense of a stable identity over time.

The infant’s reaction to his mirror image is often indistinguishable from that when placed before another infant.

MANIFESTATION:

What actions will the infant do to attain these competencies?

The baby will try to interact with the “other baby” in the mirror. The baby will stare at faces and learn to respond to various nuances of expression (smiles, frowns, etc.) often copying them, perhaps unconsciously, on her own face.

SUPPORT:

What can care-givers do to support this natural development?

Play “contingency / non-contingency” games. Play smiling games, with your baby, in front of mirrors. Use mirrors to reflect the baby’s own face, another baby’s face, and mom’s face. See how the infants reacts

Us – Growing Together

US - RELATING TO OTHERS

Social Butterflies. Between 3 to 6 months, babies perfect the art of relating by taking increasing initiative in pre-verbal turn-taking games. It’s no longer just mom who directs the dance: the baby can now initiate and sustain the game. Also, starting at about 4 months, babies can use their own emotional states, such as smiling and crying, as a means to communicate their needs and wants and, more impressive, as a bonding technique for the mere sake of bonding. At this stage, babies recognize their primary care-givers in the sense that they seem most comfortable and happy when with them. Yet, they remain “social butterflies” in that they tend to distribute their favours to anyone who knows how to engage them. They have not yet built a solid enough sense of self, or other, to be picky and selective.



COMPETENCIES:

What does the 3-6 month-old naturally strive to learn?

At this stage, any occasion to get the cycle of pre-verbal dialogue going is welcomed by the baby. And, provided the partner is a “good dancer,” almost anyone is good enough to “dance” with! As adults coo or smile at the babies, the latter become immediately and actively engaged. Babies also become better at initiating and modulating their smiles or coos for the mere sake of triggering and sustaining an enjoyable exchange.

MANIFESTATION:

What actions will the baby do to attain these competencies?



At this stage, babies are particularly responsive to any forms of “Motherese”—the name given to the high pitched, sing-song manner in which mothers often talk to their babies (Karmiloff-Smith, 1994. p. 136). They actively sustain pre-verbal conversations, or turn-taking games. Their smiling and cooing moves from involuntary to voluntary forms of expression or attention-getting behaviour: “Play with me!” “I’m bored!”, just as crying is used to get other forms of attention: “Change my diaper!” “I’m hungry!” “I’m overtired!”.

SUPPORT:

What can care-givers do to support this natural development?

Babies’ openness to socialize is at its peak during feeding, bathing, and changing. So that’s the time to play! They respond with smiles and giggles to any physical contact game such as tickles, blowing on or kissing the baby’s tummy, bouncing, or making silly faces, and as before, they shut off or cry when over-stimulated. Since, at this stage, babies are particularly responsive to Motherese, it is a good idea to use this highly modulated way of speaking, even though it will be many months before the baby will be able to talk back to you.

Us - UNDERSTANDING OTHERS

See Us – Understanding Others (0-12 Months) in the previous Babies age period 0-3 months.

World – Making Sense of it All



WORLD – EXPLORING AND INVESTIGATING

Manipulate to Discriminate. This stage marks a turning point in a baby’s practical understanding of the world. As babies perfect their visual scanning and manipulation techniques, the objects submitted to their scrutiny start to exhibit some reality beyond immediate perception. More impressive, by the end of this stage, babies can anticipate the trajectory of a falling object, provided the child himself drops it. As babies themselves become more mobile and start to roll, they change their stance in the world, and space itself becomes organized. Finally, as babies perfect their fine-motor skills, they refine their “feel” for new objects’ properties and enrich their bag of tricks to make interesting things happen.

By the end of this stage, the infant’s sense of reality still remains subjective and action driven. Yet, babies have acquired a rudimentary notion of cause

and effect, and objects start to be defined in terms of how they are affected by a child's solicitations (object as Gegenstand, in German).



COMPETENCIES:

What does the 3–6-month-old naturally strive to learn?

Until recently, researchers thought that babies between 3 and 6 months of age could not possibly conceive of anything beyond “here and now,” or the immediately visible and tangible. This meant that even very early forms of object permanence were out of the question at this age. More recent studies, however, suggest that early forms of anticipation, memory, and object permanence may already exist at this age.

Between 3 and 6 months, babies perfect their manipulations of objects by visually exploring whatever they hold in their hands and by “feeling out” whatever they see and grab. Their explorations become more directed. They are also more “creative.” For example, by varying the distances and angles of things, by bringing them closer to their eyes, turning them around, and moving them from side to side, babies discover many “hidden” object properties, such as size constancy (i.e., the notion that objects don’t change size when moved closer or farther away, even though they look bigger or smaller).

Three to six-month-olds cannot yet infer from their actions how objects may impact one another, independent of their own action on them. In other words, their notion of cause and effect is still egocentric and restricted to their immediate experience.

MANIFESTATION:

What actions will the baby do to attain these competencies?

According to recent studies, babies as young as 4 months of age show surprise when a moving object, like a train-engine, passes through a toy-tunnel placed on a track (which in the child’s eyes is perceived as an obstruction).

Even more surprising, babies apparently look astonished when things start to “behave” like pets or people, i.e., when inanimate objects initiate a movement “on their own,” or when they leave their natural course, which, in a baby’s eyes, means go straight and do not accelerate or change direction.

What we know for certain is that five-month-olds squeal with delight when, sitting in their high chair, they watch Mom take some of their toys, hide



them and say “all gone,” and then, make them reappear again, showing the beginnings of an appreciation for object permanence. We refer to this as “object-mediated peek-a-boo.”

By the end of this stage, babies visually follow moving objects that leave their visual field, and they anticipate the trajectory of objects that they themselves drop, by looking at where they will land.

SUPPORT:

What can care-givers do to support this natural development?

As a way of preparing children to grasp the hidden properties of objects, such as size constancy and object permanence, parents can play “all gone” and other versions of object-mediated peek-a-boo. To keep things interesting, vary the numbers and qualities of toys that one makes appear and disappear.

More generally, let your child be active. Encourage her to become mobile—carry her around, if need be—and be patient as she experiments with dropping, throwing, and banging objects. Playful exploration in everyday situations is a child’s natural science “laboratory.” It is her experimental arena. Her knowledge of the world will follow automatically.

WORLD - SEEKING LOGIC

From Size Constancy to Quantity. Four to six-month-old babies display visual size constancy. The logic behind this apparently trivial ability resides in the fact that what the baby knows of the object, namely that it is the same, overrides what he sees, namely, that it appears different as his view of the object zooms in and out. The baby’s mind corrects the perceptual changes that occur by imposing some principle of “invariance.”

Experimental findings also suggest that, at this stage, some basic “understanding” of quantities—a feel for numbers and durations—may be present at a very young age. Not an easy thing to see in babies’ everyday behaviour!

COMPETENCIES:

What does the 3–6-month-old naturally strive to learn?

Babies as young as 4 months of age seem to have a rudimentary sense of “two-ness” versus “three-ness.” Here is how scientists bring evidence to this claim: “Babies of three to four months were shown an image of three



different toys which flashed up on a screen – say, a teddy, a ball, and a cube. The image then changed, and babies were next shown three new toys - say, a cup, a spoon, and a bottle. The image kept changing, revealing each time a new set of three different toys. The babies' interest gradually waned, and they paid less and less attention to the image. They became bored. At one point, however, the image changed in a new way. Instead of showing a set of three toys, it now showed only two toys. The babies suddenly looked for much longer - they seemed to be reacting to something new." (Kamiloff-Smith, 1994. p. 173).

Many experiments of this kind have been undertaken, all indicating that three to four-month-olds' sense of numbers, at least up to number three, may be quite sophisticated.

In one experiment, children are placed in front of two screens arranged side by side. Each screen shows a small number of toys: two or three. When babies hear two drumbeats, they automatically look at the screen showing two toys. When they hear three drumbeats, they look at the screen showing three toys. Researchers infer from this experiment that four-month-old babies have some primitive understanding of the cardinality of small quantities like "twos" or "threes." (The cardinality of a number refers to the amount represented by the number, as opposed to, say, the order.)

MANIFESTATION:

What actions will the baby do to attain these competencies?

Three-month-old infants can discriminate high and low pitches when hearing a melody, and they are ever more sensitive to auditory and visual patterns. They see the forest beyond the trees! Babies exhibit their understanding, or appreciation, through persistent gazes and high interest in anything patterned and ordered.

At this stage, babies are mesmerized by choreographed light-and-sound effects as appear in "Baby Mozart" or through watching a musical animation on TV. The appeal here resides in the synchronization of streams of sounds and images, moving in tandem.

Not much can be said about "infant mathematicians", except that music and geometric patterns share some underlying mathematical structure, namely, a physical or auditory embodiment of number, which babies can both sense and make sense of.



SUPPORT:

What can care-givers do to support this natural development?

At this age, babies distinguish between different shades, shapes, and sounds, and they enjoy emergent forms, or “gestalts”, like rhythms, melodies, and visual patterns. As in the previous stage, provide a rich and varied environment of toys and objects with stark colour contrasts (or black-and-white), varied textures, and rich patterns.

Even such “pacifiers” as “Baby Mozart” can be beneficial at this stage. The idea is obviously not to turn your baby into a musical genius, but to offer a well-choreographed sound-and-light show (with streams of music and images “dancing” together).

Most important, keep your baby active by offering a rich set of simple “manipulatives,” toys or everyday objects to play with in a safe and comforting ambience.

Creations – Realising Visions



CREATIONS – IMAGINING

Imagining is only covered in greater detail in the Babies age period 9-12 Months.

CREATIONS – ENACTING AND CREATING

Enacting and Creating is only covered in greater detail in the Babies age period commencing 6-9 Months.

6 – 9 Months

Me – Being Me

ME - USING MY BODY

The Crawlers. Crawling is another milestone in a baby's journey to becoming mobile. However, unlike sitting, crawling is highly individualistic. Babies start crawling at different ages, and they do so in many different ways. And some don't crawl at all! "Strategies for crawling often arise by chance. During the process of trying to sit, babies may overtilt by mistake and use their hands to break the fall. They may then suddenly find themselves in a crawling position. This is obviously not a voluntary act and, still without the strength actually to crawl, the baby's legs remain entangled and trapped underneath her body" (Karmiloff-Smith, 1994. p.73).



The benefits of learning to crawl are that babies no longer depend upon adults to move them places, or to bring their favourite toys to them. They can go places by themselves. Yet, greater mobility also brings about new challenges. "As the baby moves alone towards an object, she has to hold a goal in mind for longer than when she was immobile and things were brought to her" (Karmiloff-Smith, 1994. p. 75). In other words, as they become increasingly mobile, babies have to build stable references in the changing visual scene, so that they can keep track of where they go and where they come from.

COMPETENCIES:

What does a 6-9- month-old baby naturally strive to learn?

At 6 months, babies reach out for objects, and use two hands to explore them. As their mobility increases, babies seem to become better at keeping in mind a goal while engaging in detours, and at mapping their territory.

At 8 or 9 months, most babies have developed the strength to stay on all fours without falling. The challenge is now to move forward. And once that's achieved, through much practice, a whole array new opportunities open up for our four-legged "nomad".

One major developmental milestone that comes with a baby's increased mobility is the beginning of what researchers call "object permanency",



i.e. the realisation that out of sight is not gone forever. That's also when babies become anxious, for the first time, if approached by strangers. Object permanency and fear of strangers go hand in hand. Babies can only miss their mothers or care-givers, and thus fear strangers, once they understand that Mommy is still around but not in the immediate vicinity. Both have deep implications in all aspects of a baby's life.

MANIFESTATION:

What actions will the baby do to attain these competencies?

The kicking behaviour increases as the baby's leg muscles strengthen, so that eventually he can use his legs to push himself forward—the beginning of crawling.

As babies become more skilful at mapping their terrain, they develop a sense that objects “stay put” and can be returned to; the beginning of object permanency.

SUPPORT:

What can care-givers do to support or enhance this natural development?

Although object-permanency starts only at about 8 months, and evolves till 10 to 13 months, it is important to engage babies in peek-a-boo types of games even earlier. This prepares the infant, emotionally and cognitively, to realize that things come and go: a step-by-step preparation to help babies build trust in an object's ability to come back once it has left. The baby will let you know when she is ready for peek-a-boo.

ME – KNOWING MYSELF

The “Who dat do dat when I do dat?” Phase. At this stage, which Dixon calls “Who dat do dat when I do dat?,” infants move beyond self-recognition as the origin of paired causes and effects in the world. They begin to construct a sense of self as a permanent object, with enduring qualities. “In this manner the permanence of the self is realized and becomes an important organizing principle for the infants' knowledge of both self-as-subject and self-as-object” (Damon and Hart, 1982. p. 848)

COMPETENCIES:

What does the 6-9-month-old naturally strive to learn?

Beginning at about 7 months, the infant relates the mirror image to himself by repeating simple actions: e.g. opening the mouth while gazing in the mirror.

At around 8 months of age, the infant starts to distinguish between her mirror-image and that of another infant, whose face appears in the mirror. Interestingly, the baby now prefers to interact with the image of the other rather than that of the self. The fascination, in other words, is no longer just with the cause-and-effect action of her own body's movements, but with social interaction and play. Nine-month-olds recognize "live" TV images of themselves, provided the image moves along with the self, suggesting that self-recognition per se is still contingency bound. Starting at 8-9 months, the baby starts building object permanency and becomes afraid of strangers and bewildered by her own mirror image.



MANIFESTATION:

What actions will the baby do to attain these competencies?

The infant becomes much more playful and interactive at this stage. He plays with objects, with his mirror image, and, to a limited extent, with other infants. Cause and effect relationship becomes established through "contingency games": e.g. dropping objects from his highchair.

SUPPORT:

What can care-givers do to support this natural development?

Provide opportunities for mirror play and for group activities with other infants. Bear in mind that, at about 8 months, the baby may start to be timid of strangers. This is entirely natural and is no cause for concern.

Us – Growing Together

US - RELATING TO OTHERS

Becoming Attached. Between six to nine months, a big change occurs in a baby's social life as, for the first time, she becomes securely attached to the few people who are constant in her life. Becoming attached is a major breakthrough in a child's life, and like most breakthroughs, it comes with its share of hardships and thrills. On the negative side, a sudden fear of strangers and a terror of being abandoned emerges. On the positive side, for the first time, the child builds a safe base from which to explore the world. "Paradoxically, the more the baby is attached, the more free she feels to explore the social and physical worlds" (Karmiloff-Smith, 1994. p. 205.)



COMPETENCIES:

What does the 6–9-month-old naturally strive to learn?



At this stage, babies are caught in a relational bind. For the first time, they feel a sense of longing because, in their mind, others continue to exist, even if absent. At the same time, their “trust” that others will survive separation and come back is not solid yet. They cling onto their primary care-givers, they fear being picked up by strangers, or being left unattended even for a few seconds. During this phase, babies also perfect their communicative skills with the selected few to whom they give their favours. Their repertoire of relational tools becomes more diversified using smiles, giggles, coos, facial expressions, and babbling etc.

MANIFESTATION:

What actions will the baby do to attain these competencies?

Eight months mark the beginning of a momentary fear of strangers and the accompanying “clinging” to familiars. There may be much crying, at this stage, when family members or friends try to pick up or cuddle the child!

Babies enrich their communicative vocabulary and gesture and smiling games become more nuanced. Babies also narrow down their babbling sounds to noises that are more tuneful, and in the realm of their native mother tongues: ba, do, ma, oo, ga, da. They can signal what they want using nonsense words, and they enrich their pre-verbal conversational skills.

SUPPORT:

What can care-givers do to support this natural development?

Any variations on peek-a-boo that the child may enjoy are excellent at this stage. They help domesticate the child’s uncertainties about object permanence. “The deep structure of peek-a-boo is the controlled disappearance and reappearance of an object or a person” (Bruner, 1983. p. 46). And kids love it, as if they knew that this is a safe enactment of the “gone/back again, gone/back again” scenario. Early forms of peek-a-boo games are direct. They don’t involve objects but rather partner’s face or body. Later forms may involve objects that go away and come back again, such as the Jack-in-the-box toy.

US - UNDERSTANDING OTHERS

See Us – Understanding Others (0-12 Months) in the previous Babies age period 0-3 months.

World – Making Sense of it All



WORLD – EXPLORING AND INVESTIGATING

A Sense of Reality Beyond “See and Grab”. This stage marks the beginnings of object permanence and causality proper, and, with it, a growing ability to predict how actions unfold in time and space. The baby now constructs a sense of reality that transcends his immediate sensory input of seeing things and grabbing (or mouthing) them. Eight to nine-month-old babies are able to figure out how objects behave and impact one another, independent of the baby’s direct action on them. These newly acquired abilities are an important breakthrough in a child’s budding sense of reality, and will develop more fully between 9 and 12 months.

COMPETENCIES:

What does the 6–9-month-old naturally strive to learn?

This stage is characterized by the appearance of three new competences, which represent considerable progress in the practical foundation of the object concept and, consequently, in a child’s practical sense of how objects exist and relate, in both time and space.

First, there is visual anticipation of rapid movements, or trajectories, and prediction of future “landing” positions of different kinds of moving objects. The child now anticipates that an object’s movement will continue even though she is unable to see it.

A second novelty is the possibility to interrupt an action and to pursue or resume it at a later time or place, without an external trigger, and provided the lapse of time is not too long.

Lastly, the child now recognizes partially hidden objects by reconstructing an invisible whole from the part that is visible.

MANIFESTATION:

What actions will the baby do to attain these competencies?

At this stage, infants will visually follow the trajectory of objects, even if the objects are dropped or launched by someone else. They anticipate its landing point.

If a baby plays with a toy and accidentally drops it, he will look for it—at least for a little while. And if the toy reappears, he will grab it and continue his play.



Six to nine-month-olds do not yet actively search for objects that have vanished for a longer period of time. They are still easily distracted and “forget” about objects they haven’t seen for a while.

If presented with a toy that is then entirely covered with a cloth, babies, at this stage, lose interest rapidly. Yet, if only a small portion of the object remains visible, the child will go for it! At this age, babies will try hard to grab a toy that sits outside of their playpen. They will pass their arm through the bars, and pull the toy to the edge of the playpen. They will not always succeed to twist the object and get it through the bars, but they will try.

More than in the previous stage, infants look astonished if an inert toy suddenly moves, changes direction, accelerates, or interrupts its course. At this stage, babies start to cringe at the sight of animated wind-up toys.

SUPPORT:

What can care-givers do to support this natural development?

Let them play, drop things, make a mess! Seat them comfortably and encourage them to use both hands to explore their toys, as well as everyday objects, such as spoons, pots, pans, etc. Let them roll off and come back, again and again, to teach them that the world is a stable place and their movements are reversible. Engage your baby in give-and-take activities, and peek-a-boo. Cultivate play rituals with very defined action sequences, like sing-songs, to sharpen their sense of time and rhythm.

WORLD - SEEKING LOGIC

From Quantity to Baby Arithmetic. Recent research findings suggest that 6 month-old babies have a rudimentary sense of arithmetic. They apparently know that two is more than one and that three is more than two, and, amazingly, that one plus two is the same as three!

Starting at about 8 months, babies develop the notion of object permanence. The logical aspect of this resides in the fact that the child imposes a principle of “continued existence”, or identity, beyond what is actually perceptible – ‘The object “has” to exist even if I don’t see it because, so far, it has responded reliably’.

COMPETENCIES:

What does the 6–9-month-old naturally strive to learn?

Children's abilities to categorize, order, and quantify further expands at this stage.



In a recent study, 6-month-olds showed surprise when a small number of objects, that had been added, one by one, into a box, say $1+1+1$, did not correspond to the expected total 3. More impressive, the babies also showed surprise when some objects were removed, say 2, from the box that contained 4, and the remaining total violated the expectation 2.

Here's how one experiment was conducted. The babies watched as a toy was placed on a table in front of them. A screen was then put in front of the toy, so that the babies could no longer see it. The babies then watched as a hand placed a second toy behind the screen. The screen was then removed. Apparently, babies showed surprise when, using a clever trick, the number of toys showing up at the end was not 2 but 1! Their expectation that $1+1 = 2$ had been violated. The babies also showed surprise when $2+1$ did not result in the expected 3. A similar procedure was used for subtraction, and babies showed surprise when say, $3 - 1$ did not yield the expected result of 2. (Karmiloff-Smith, 1994. p. 174)

In sum, 6-month-old babies have a very primitive sense of adding and subtracting, as long as the total number of elements doesn't exceed 3.

MANIFESTATION:

What actions will the baby do to attain these competencies?

As babies realize that out of sight is not out of mind, they display a fear of strangers, an increased fascination with peek-a-boo, and, starting around 9 months, a growing trust that the object they long for will eventually reappear. Object permanence further develops between 9 and 12 months.

Children's abilities to categorize, order, and foresee the outcome of an action appear in the "drilling" quality of their manipulations, sometimes referred to as "circular reactions" ie. the child repeats an action that leads to a pleasant outcome. At first she may discover the action accidentally. She then uses her action as a means to produce the desired effect, this time on purpose, and can re-initiate the action at a later point in time. Circular reactions enable and mark the beginnings of intentional behaviour and, with it, the ability to coordinate means and ends.

As the baby starts to solve simple problems, like getting a toy through the bars of a playpen, he needs to keep his goal in mind while twisting the toy.



This requires an ability to conceptualise a reverse order: The goal comes first, and the means come afterward (unlike the natural order of simple trial-and-error, which proceeds step by step).

SUPPORT:

What can care-givers do to support this natural development?

Caregivers naturally play counting games with babies, for example, at feeding time: “Now three are left... now two left... now one... all gone!” This game, played over and over, helps the baby understand quantity and primitive arithmetic operations. Note well that adults need not make any special effort to “teach” babies about numbers. Real life provides ample opportunities—eating, getting dressed, even diaper changes!—for babies to learn about this without explicit instruction.

Creations – Realising Visions



CREATIONS – IMAGINING

Refer to the Babies age period 9-12 Months.

CREATIONS – ENACTING AND CREATING (6-12 MONTHS)

Creative expression sets in as soon as infants move beyond instrumentality and start to modulate their voices, gestures, or bangings, for the sake of producing some “dramatic” effect (e.g., achieving variations around pitch, movement, or rhythm) merely for the sake of doing so. This behaviour appears at about 6 months, and evolves during the second half of a baby’s first year to reach a peak somewhere between 9 and 12 months. By the time the baby reaches his first birthday, we will find him carefully turning the pages of a book as he “reads” all by himself.

COMPETENCIES:

What does the 6–12-month-old naturally strive to learn?

In the first 6 months, babies refine their coos, their cries, and their smiles in the light of care-givers’ responses and, through circular reaction, they enlarge their expressive vocabulary. As they become more successful at getting what they want through specific types of calls, they will naturally start using those as a means to meet their ends. That’s when intentional behaviour sets in.

Four to six-month-old babies can recognize familiar objects, such as a rattle or a bottle, on a photograph or a drawing. Yet, they respond to

pictures of things as if it were the real thing. So, for example, a five-month-old baby may scratch the image, pinch a small object, and bring it to her mouth. It has been shown that a baby's realization, through manipulating, that a photo or a colour drawing of an object, or person, do not carry all the properties of the object represented, such as temperature, dimensionality, or texture, is an important milestone in a baby's journey toward understanding the types of symbolic representation inherent in literacy.



In the second six months, a baby's intentional communication and expressive vocabulary further evolve, especially as adults interpret infants' earlier goal-driven actions and vocalizations as intentions to communicate. So for example, if an infant squeaks and vocalizes as he tries to reach an object, his mother responds as if the infant's behaviour were communicative (even if it's not). Based on this assumption, she will talk back to the baby and help him get a toy (or whatever the baby seems to want). This, in turn, helps the baby improve his communicative intents and further enriches his own expressive vocabulary. A key breakthrough occurs when babies start to make eye contact with their audience while they reach out for an object, or when they point at an object to bring their audience's attention in the same direction.

Research by Beilin and others shows that six to twelve-month-old children, when presented with pictures of objects, continue to scratch, grasp, smell, and look behind pictured surfaces. Yet, unlike younger babies, six to twelve-month-olds actively explore different printed surfaces, such as paper, cardboard, cloth, as if they wanted to grasp their properties as media. It is hard to tell if babies, at this age, understand the differences between a picture, or a photo, and the thing represented. What is clear is that they scrutinize pictures of things in a way that's different from the way they explore the things themselves.

In sum, during their first year, infants perfect the art of smiling cooing, and crying to assert greater control over their audiences. They produce new sounds, gestures, and mimic facial expressions, thus improving their expressive repertoire. After 6–8 months of age, they make eye contact to keep their audiences alert while they engage in various actions. As they approach their first birthday, babies are capable of selective listening, communicative pointing, and compliance with simple requests. They know how to recognize objects in photos and pictures, and they happily respond when asked to perform simple verbal commands, like “wave goodbye.” Most important,



they point at things as a means of focusing other people's attention. As soon as this shared pointing sets in, the baby is developmentally ready to become a speaker, a performer, as well as on the path to becoming a reader.

MANIFESTATION:

What actions will the baby do to attain these competencies?

First six months: By four to five months of age, infants start to smile and coo as a means to attract attention.

Five to six-month-old infants recognize 2-D pictorial representations of familiar 3-D objects, like a rattle or a bottle. Such 2-D representations can take the form of photographs, simple colour drawings, or, in 3-D, holograms. Babies especially like photographs of themselves, of other babies, and of animals although, at this age, they do not really recognize themselves in a photo.

As they reach their sixth month, infants reflect a full repertoire of emotions in their vocalizations, including pleasure, anger, and surprise (Owens, 1984). They discriminate the sounds of human speech, and they babble: ma, pa, da. They recognize images of things, say, in a picture book, and point at them. In their sixth month, they are ready to start performing instead of acting out, and to start reading in its most primitive form.

Last six months: Babies at this age won't speak much, yet they understand far more than they can speak!

Ten to 12-month-olds like to play out variations around their voices and motions. Lots of nonsense chattering, at this age, that grows ever more sophisticated and expressive.

As babies approach their first birthday, they will still speak baby talk, but with intonations and emphases that resemble adult speech, sometimes called "shaped babbling" or scribble-talk. At this age, for example, we find quite sophisticated mimicry of adult behaviour over the phone, like pressing the "on" button on a cordless telephone and talking into it. Babies also start talking or babbling to one another, and they become increasingly attentive to adults' speech.

At the end of this period, most babies play naming and pointing games. They utter their first real words, and, simultaneously, start to "read" their first picture books! Children will turn the pages of a book, lift the flaps in

a picture with a precise pincer grasp, and point to correct images, as Mom mentions the “ducky”, or the “doggy” in the story. She recognizes objects in pictures or photos as related to objects in the environment (bed, for example, in the picture and correlates this with the bed in the house).



SUPPORT:

What can caregivers do to support this natural development?

In recent years, psychologists have discovered that the first steps in learning to read actually begin around 9 months of age, when infants start to understand spoken language and point to things they wish other people to pay attention to. So, as soon as your baby shows interest, read simple picture books with your baby. And play while you read.

Try this: Hold your baby comfortably in your lap and turn the pages of a sturdy book (or board book) that has large, simple pictures. Point to different objects in a picture and name them for the child: “Here’s a doll. It’s just like your doll.” As soon as he is ready, your baby will LOVE to point at the picture of the cat you are talking about. However, it is best not to turn this little game into a baby ‘quiz’: “Where’s the dog? Point to the dog... Good! Now, where’s the chicken?” This can put your child off and it takes away from the enjoyment of genuinely sharing a story. Children enjoy naming things, to be sure, but they don’t necessarily like to be quizzed about it.

Obviously, children also like to play these kinds of “pointing” and “naming” games with objects other than pictures in a book.. Yet as long as the book remains the culturally dominant vehicle for literacy, it is a good idea to use picture books as play props for such games.

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Author: Prof. Edith Ackermann, Contributors: Dr. Dorothy Singer (The Learning Relevance Grid and The Complete Discovery System) and Dr. Aaron Falbel.
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9 – 12 Months

Me – Being Me

ME - USING MY BODY

The Walkers. At 9 months, babies are fast and efficiently crawlers. Yet, their drive to get up on their feet is relentless. Any vertical support will do to pull them up on their feet. At first, babies learn to stand up, clinging on their support. Then, they venture their first steps, always along a support (this is known as “cruising”). Once babies are expert cruisers, it will still take a while before they start walking on their own, be it only for a few steps. As in the case of crawling, the onset of cruising and walking may appear at different ages in different children. Most babies take their first steps at about one year of age. Yet, “bottom shufflers”, for example, can be notoriously late walkers, sometimes as late as 30 months.



COMPETENCIES:

What does the 9-12-month-old baby naturally strive to learn?

The baby learns to pull herself up by holding onto something. The baby learns to cruise, or take a few tentative steps while still holding onto something for support, at first with both hands, and then with one hand. Eventually, the baby learns to let go of the support and walk on her own, becoming a self-propelled biped.

MANIFESTATION:

What actions will the baby do to attain these competencies ?

Exercise, exercise, exercise: up, down, climb, fall. At first, babies have a hard time un-clutching themselves from a wall. They climb up and they are stuck. Eventually, they learn to walk sidewise along a wall or a sofa, only to get stuck when it ends.

Finally, they learn to cruise along a support sidewise, holding it with just one hand.

SUPPORT:

What can care-givers do to support or enhance this natural development ?



Spread a large, soft carpet or mat on the floor to cushion the baby's fall. Remove or apply padding to table edges or other hard objects that may cause injury. Let the baby fall and get up and try again, but let him fall safely.

Fence off stairways, ledges, radiators and other potential hazards, or at the very least watch your baby carefully around such places.

ME – KNOWING MYSELF

The Withdrawal. Starting at 8 months, and lasting till 12 months, babies withdraw and express weariness with their mirror image. They may cry or turn away from their own reflection. This coincides, again, with the beginnings of object permanency and fear of strangers. The child is now working out the distinctions between self, familiar others, and unfamiliar others. Permanence of objects begins at about 8 months and evolves till 10 to 13 months, when the infant can search for a hidden object.

COMPETENCIES:

What does the 9-12-month-old naturally strive to learn?

Recognition of facial features is well established. The baby experiences an increased desire for social interaction (which the mirror image does not really provide).

MANIFESTATION:

What actions will the child do to attain these competencies?

Peek-a-boo and other alternance games strengthens the desire for social interaction beyond mirror play. The crawling/cruising infant expresses an increased interest in playing with objects: pots, pans, shoes, etc. that he comes across in his newfound mobility. The appearance of object permanency aids in navigation, yet also makes the infant fearful of loss of care-givers and clings to Mom or Dad when strangers appear.

SUPPORT:

What can care-givers do to support this natural development?

Respond to the increased desire for interaction: PLAY with your baby. Read simple stories with pictures (board books, etc.).

Us – Growing Together



US - RELATING TO OTHERS

Building Trust. Once “securely attached,” babies are now ready to open up again, and to explore some of the trade-offs of being with Mom versus being with others-than-Mom. They venture into “seducing” selected strangers, but always with Mom hovering in the background. At the same time, they also become increasingly better communicators: They refine their babbles, and they can now use their gaze to direct another person’s attention. More important, they can follow other people’s gazes. This opens up a whole new set of possibilities in relating to and interacting with others.

COMPETENCIES:

What does the 9–12-month-old naturally strive to learn?

Learning to use and interpret eye gaze is a major breakthrough in a child’s communicative / relational skills. It marks the beginnings of shared focus of attention, and shared pointing, so important in a child’s social and linguistic development. They can now look at where a finger points, and not just at the finger itself. By the end of their first year, most babies use pointing to draw the attention of others to something—“Look at that!”—and not just instrumentally, as earlier pointing principally meant “Give me that!”

MANIFESTATION:

What actions will the baby do to attain these competencies?

The child, at this age, loves to engage others when securely held in the security of her mom’s arms. However, when left alone, she is still rather insecure.

The child stares and points at things she wants and, more impressive, she also stares and points at things she wants other people to see. She points for the mere pleasure of sharing what she sees and likes.

Concurrently, babies nonsense chatter becomes more nuanced and more understandable. Their babbles now consist of sounds that exist in the language they hear. Babies also modulate the intonation of their baby-talk when they ask a question or when they expect a response.

SUPPORT:

What can care-givers do to support this natural development?



Continue peek-a-boo variants, involving the appearance and disappearance of objects of joint focus. Dad can hide objects behind a cloth and have them reappear. He can vary the time of disappearance and punctuate each appearance / disappearance with words. Such games also provide an opportunity for distributing attention over an ordered sequence of events.

US - UNDERSTANDING OTHERS

See Us – Understanding Others (0-12 Months) in the previous Babies age period 0-3 months.

World – Making Sense of it All



WORLD – EXPLORING AND INVESTIGATING

Making Things Exist Beyond the Here-and-Now. From nine to twelve months, intentional behaviour evolves even further, and the child, now a crawler, engages in many detours to reach a goal, while keeping the goal in mind, provided, again, the time lapse is not too long! The baby also succeeds in executing a whole sequence of actions to achieve a task, sometimes referred to as “means-ends coordination.”

Engaging in detours, removing an obstacle, or putting on your socks before your shoes when getting dressed seem like obvious things to do. Not so for young babies. All require a grasp of intricate spatial, temporal, and causal properties of objects, and relationships among these properties. Just think of what it takes to remove an obstacle: You’ve got to realize that the object sits in front of the goal (spatially), that it is blocking the passage or obstructing some motion, and it must be removed before the goal can be attained.

In sum, babies, at this stage, consolidate their grasp of object permanence, again, the notion that things continue to exist even when out of sight, and they combine it with a growing sense of spatial constancy, the notion that things remain the same even if seen as different from different angles, and with a growing sense of time, the notion of orderly increments, as they unfold, through motion.

COMPETENCIES:

What does the 9–12-month-old naturally strive to learn?

Beyond understanding that things continue to exist when out of sight, the novelty, at this stage, is the realization that an object’s shape itself can

remain unchanged, or invariant, even if it appears different from different viewpoints, angles, or perspectives.



Babies now systematically explore objects with both hands: they bring them close, bang them against each other, and they turn them around. These two-handed manipulations are a key to the previously mentioned discovery that many objects, at least solids, remain the same even if they look different from different angles.

As the babies start moving about, they themselves can get closer or move away from objects, and traverse around them, thus discovering that, again, the object remains the same even though many visual changes have taken place. In moving around objects and turning objects around in their hands, babies learn what comes before what.

MANIFESTATION:

What actions will the baby do to attain these competencies?

Starting at 9 months, children can remove a cushion to uncover a hidden object. In an observation of his son Laurent, 9 months, Piaget notes that when an object is entirely hidden, Laurent pulls the obstacle, hesitantly, but as soon as one end of the object appears he lifts the cushion with one hand and extricates the object with the other.

Around the same age, infants start to foresee the outcomes of other people's actions, and invent clever means to avoid unpleasant consequences. So Laurent, 9 months, when fed out of a bowl, the contents of which he usually doesn't like (e.g. soup), grimaces and closes his mouth. When fed out of a glass, the content of which he usually likes (e.g. juice), he opens his mouth, squeaks, and reaches.

Babies at this age start to reach for an object they desire and crawl places to actually get them!

SUPPORT:

What can care-givers do to support this natural development?

The baby's increased mobility allows them to explore more objects, to reach more things, and grasp them. Let the baby explore things, but remove ahead of times object that may be fragile, that may topple over, or that could cause injury. In other words, don't thwart the baby's explorations, which are



necessary if he is to develop the concepts outlined above, but make those exploration as safe as possible.

Object-mediated peek-a-boo games are still a delight, as is trying to chase and catch the pull-toy on a string.

WORLD - SEEKING LOGIC

Order, Class, and Reversibility. From nine to twelve months, babies consolidate their grasp of object permanence, the logic of which, as mentioned before, resides in the fact that the child imposes a principle of “continued existence,” beyond what is actually perceptible.

Babies also engage in detours when solving a problem, and they can overcome obstacles—all of which require a sense of order, of classes, and of “reversibility”—a practical understanding that some things can be undone, and achieved in any old order, while others can’t!

Around the first year, babies start to walk, and their logic-in-action will grow even further. As they speak their first words, their “logico-mathematical” skills will become more apparent through their uses of words, even if the words they use are still non-sense words.

COMPETENCES:

What does the 9–12-month-old naturally strive to learn?

Perhaps the most remarkable breakthrough at this stage is that, babies, around 9–10 months, not only develop a rudimentary sense of quantities, but they can express it.

MANIFESTATION:

What actions will the baby do to attain these competencies?

In an observation of his son Laurent, then about 10 months, Piaget notes: “I say papa to him, he replies pa pa or ba ba. When I say papa papa, he replies apapa or bababa. When I say papapapapap he replies papapapapap. There exists a global sense of number of syllables: the quantity corresponding to 2 is in any case distinguished from 3,4,5.”

At nine months, babies combine objects in an active way (bring 2 spoons together, bring 2 blocks together).

SUPPORT:

What can caregivers do to support this natural development?

Parents often count steps, or mark a rhythm as they walk down the staircase with their babies. They also count fingers, toes, and recite finger play sing-songs. Obviously at this stage, the baby will not understand what the counting sing-songs stand for, but she will enjoy their rhythm. Later, she will learn about matching order of recitation, order of events counted, and the action of passing through in a certain order.

Let the baby play with blocks or objects of different sizes, colours, forms, to exercise the baby's ability to sort and categorise objects.

Creations – Realising Visions

CREATIONS – IMAGINING (9-12 MONTHS)

No think just act! One may argue that, at a practical level, babies can act out of the box or creatively as soon as they exhibit the abilities to invent new means to reach a goal and to generate variations on an action. Both abilities appear at around 9 months of age. Yet, to think out of the box or envision what could be requires, in addition, that a child forms internal representations of reality as well as possesses an ability to evoke absent and nonexistent situations. This capacity appears no earlier than 12 months, and becomes obvious, i.e. more easily observable, at around 18 months.



COMPETENCIES:

What does the 0–1-year-old naturally strive to learn?

In other areas of development, signs of the drive to learn are obvious in the baby's actual behaviour, for example, in learning to walk, talk, or use tools. But thinking goes on inside the head! So there's not much to see. Although current research seems to indicate that there is much more going on in a baby's head that developmental psychologists had previously assumed. We have still little access to it, and no ways to make it visible.

For Piaget, one of a baby's major intellectual accomplishments is the onset of goal-oriented behaviour. This occurs in the last quarter of the first year, when infants begin to keep in mind a goal while engaging in a detour, and when they "invent" new means to meet their ends (sensory-motor stage 4). While this is an important breakthrough, the first creative explorations



appear around 10 to 12 months, as babies start to play around with their own voices and motions. At this age, infants spend much time alone, modulating their vocalizations and pacing the movements of their arms and legs. They do so over and over, for the mere sake of modulating and pacing.

More impressive still, by the time they reach their first birthday, many babies start laughing warm-heartedly at odd behaviours of grownups, such as waddling like a penguin, crawling on the floor, or sucking the baby's bottle —as if the babies knew this is an unusual, incongruous thing for an adult to do! Again, if these same behaviours were exhibited by a stranger, or in an unsafe or non-relaxed context, babies would be quick to switch from laughter to a bitter cry.

Needless to say, all these very early inventions-in-action are precursors to a child's later ability to imagine, or think out of the box.

MANIFESTATION:

What actions will the child do to attain these competencies?

Between 9 to 12 months, babies invent many clever tricks to get a hold of a toy that is out of reach, including pulling its support, using a stick, and even pushing open Mom's hands to get her to grab the toy! Also, at this age, babies like to uncover hidden objects and to peek under curtains to see what's behind. They enjoy peek-a-boo, pleasant surprises, and wacky variations in turn-taking games. They also laugh, as we have seen, when Mom starts meowing, like a cat or waddling like a penguin.

Ten to twelve-month-olds start engaging in playful variations around their own voices that grow from hums, squeals, and bellows to repetitive, often melodic, strings of syllables: da.ti.di. da.da.da.di.do.da.di.do.da. And they often accompany the vocalizations with rhythmic movements. The fun consists of keeping a beat and changing the rhythm: a very early version of a child as a musician.

By one year, a child gives his first big laughs at a familiar person's odd behaviours. He "knows" the person is only kidding.

SUPPORT:

What can care-givers do to support this natural development?

Creative exploration involves trying more than one thing, more than one way. At this age, babies appreciate, and learn a great deal from, their care-giver's offerings of variations around shared activities. Again, parents are usually very good at making their babies giggle by proposing all kinds of enjoyable surprises around simple give-and-take games. And lo and behold, the child will take initiative and produce her own variation.



Parents should also show their appreciation when the child, playing alone, invents some clever or novel way of doing things.

CREATIONS – ENACTING AND CREATING

Refer to the Babies age period 6-9 Months.

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