

Bodies in Motion

by Maria Segal and Amy Freshwater



Recent advancements in brain imaging technology have expanded our understandings about the astoundingly rapid growth of neural pathways and synapses that happens during the first three years of life. Staying informed about new views on brain development has been of great interest to the early childhood community, since these views help to accentuate the importance of the early years in a child's life. In a previous article we argued that with the 'secure base' of an attentive, responsive caretaker, the very young child can focus on taking in and exploring the world around her. To enable the caretaker to focus on her direct interactions with the child, the infant-toddler environment, should first be organized to make the caretaker's work as easy as possible (www.communityplaythings.com/resources/articles/2010/organizing-editing-and-inspiring).

In this article we want to suggest that a particular focus on movement, through the scientific 'lens,' offers a fresh perspective in regards to how the design of the environment impacts the developing child. In a provocative TED talk, British neuroscientist Daniel Wopert suggests that we should be asking ourselves not "how does the brain function?" but "why?" According to Wopert, the only reason we have brains is to perform adaptable and complex movement. He argues that **how we move** is the primary evolutionary advantage that our brains offer us. In effect, organisms with brains use movement to minimize negative

consequences. His work, therefore, focuses on what is involved with body movement. According to the Bayesian Inference theory, our brains effectively integrate what we perceive through sensory feedback, with what we believe based on prior knowledge, to perform sophisticated functions. We simultaneously gauge our timing, force, paths of motion, coordinating multiple body parts, all in relation to moving elements in our environment. Moreover, our abilities are fluidly adapting and being fine-tuned to improve the accuracy of our movements. To underscore how complex this combination of processes is, Wopert points out that computers and robots can solve highly-complex problems using simple algorithms, but they cannot both perceive and act with anything near the complexity, fluidity, and grace of an organism with a brain.

What the human brain can accomplish in regards to the coordination of movement, is a particularly inspiring notion in relation to infants and toddlers. If this is the period in which the child is transforming from barely being aware that her hands are part of her body, to being able to perform complex tasks, using tools beyond her body, and affecting the environment around her, then we no longer need to wonder why the typically developing young child is so active and what is going on as she repeats patterns of movement with earnestness, and joy. She is building up experiences, essentially practicing how to use her body to meet her needs, to explore, to help others. As adults, perhaps we take our healthy body's movement for granted. Perhaps we perceive so much of its work as effortless because our own brains function effectively enough that we are unaware of the complexity of processes involved.



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through the use of teacher language. As a teacher educator, Dr. Freshwater fosters and builds strong community relationships with administrators and teachers in public schools in her region, placing university students in classrooms and observing them as they work with young children.

Mr. Wopert calls himself a 'movement chauvinist.' He knows and studies how the brain is performing/processing all kinds of efforts/information through all five senses, but he sees the brain's coordination and use of sensory input as happening **in the service of movement**. Based on Wopert's assertions we can infer that the rapid brain expansion during infancy is largely related to the development of the child's sense of their body and her ability to move. So, we

ask, how would a 'movement chauvinist' envision a space where a developing child will spend almost her entire day? To better understand where the very young child is as she begins the complex process of **moving** in the world, the 'movement chauvinist' would probably begin by investigating what is known about infant brain development, and then would make inferences about the planned environment based on observing what infants and toddlers use to support their growth.

He would learn that **2-6 month olds** are primarily visual learners, but they learn through tactile, kinesthetic, and auditory experiences as well. Initially peripheral vision is well-developed in newborns, but holistic visual acuity with improved focus, depth perception, and visual adjustments to distance develop quickly. Infants see in color. After spending some time observing infants, the chauvinist might notice that babies love watching faces and having interactions with adults and other children. In fact, babies will watch faces for great lengths of time, can maintain eye contact, and will use different strategies (like smiling, looking away, then looking back at a face again) to get people to pay attention to them. They are able to focus on objects that occur naturally in their environments.

After observing and researching, the movement chauvinist might conclude that babies do not need their caregivers to purchase expensive objects (like black and white mobiles) for them to look at. What is ordinary to adults is eye-catching, stimulating, and fascinating to infants. Adults who care for infants can provide plenty of 'face time' and can offer items in the environment that move slowly and change, allowing for unlimited focus and attention. Although babies need interesting things to look at, the environment should be kept simple. Many of the loving touches that adults provide for 2-6 month old infants teach them what they need to know about movement. Walking and holding a baby, swaying with a baby, gently bouncing a baby and patting her teaches babies about balance, rhythm, and offers her the effects of changing position in space. In addition, allowing infants to freely lie on cushioned surfaces enhances tactile experiences and fosters 'movement practice' that helps babies understand their environment and the relationship of their bodies within it. From birth, babies actively work to strengthen their muscles, raise their heads, push themselves up with their arms, and stretch their backs. They turn

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their heads toward voices, interesting objects to look at, and music. All of these movements and others strengthen their bodies so that more sophisticated, complex movements, such as walking and skipping, become possible.

A movement chauvinist might conclude that even very little babies are movement savvy. He might be in awe of how infants become more and more determined and intentional in their movement capabilities . . . they will grow, get where they want to go (sometimes in unconventional ways, such as rolling their bodies or just pulling themselves along with their arms instead of crawling), and grab what they want to reach. The chauvinist might then infer that two to six month olds need safe, cushioned surfaces where they can lie quietly and observe their world and the people around them. They need to be able to stretch and turn their heads, look up through tree branches at the sky and the clouds, and have safe objects within their reach, so that they can practice moving their bodies, reaching, grasping, and putting objects in their mouths.

Between **6 and 12 months old**, the circuitry in the brain is building myelination, which fosters more refined motor movements. Cushioning and soft pathways are essential, because motor skills are building and infants are able to locomote. For this age group, anything that encourages peek-a-boo and other face games provides opportunity for movement and exploration. Babies have been observed kissing their own faces in mirrors that hang on the wall at their level. Cut-outs and places to hide objects for object permanence games motivate babies to crawl and search.

Emerging walkers can be hesitant and awkward when they first start out. Being in an environment that provides sturdy surfaces to walk on, pull up on, and hang onto are essential for movement and confidence-building. Little ones need to be able to sit up, push up, move, fall down, and get back up, both indoors and out. Babies will climb, pull up and stand, creep, crawl, crazy crawl, stretch and reach, scoot and roll. They grasp objects voluntarily, and hang onto them and carry them around.

The baby's environment can begin to change to include interesting materials for touching, smelling, and mouthing. Activities that involve more multi-sensory exploration will also require movement on the part of the child to participate.

Our movement chauvinist might be a little shocked at how fast babies grow and how quickly they can move once they've had the chance to practice. Between **12 and 18 months**, toddlers are able to explore more as a result of their ability to refine their movements. Safety in the environment becomes a more serious concern. Safe fall space becomes more essential as children begin to toddle and walk, bump heads on furniture, and fall.

Imagine what happens in a baby's brain when she is finally able to stand up and walk! She sees the entire world from a different perspective! She gains more understanding of the world by having sensory experiences. One year olds are fascinated by real objects and tools. They know that pulling a string on a toy will make the toy 'come' to them. They need to be allowed safe exploration and experimentation — and they will experiment with objects repeatedly (and into infinity!). They know what's interesting and adults need to observe them to figure it out. They need to be challenged with materials, but the materials still need to be natural and *not* 'overloaded.' Suggestions for playthings from the zerotothree.org website include: buckets, baskets, and tubs to fill, carry, and dump; nesting materials; real cooking utensils, pots and pans; blocks, puzzles; sensory materials like water, dirt, mud, and sand. Anything that's played with outside can be brought inside, and vice-versa.

By now, based on his observations alone, our movement chauvinist can tell us that brain and intellectual development occur as a result of exploration and hands-on, real experiences that little children have. Repetitious movements are significant and form a base for adaptation and evolution.

Enticing sensory experiences provide toddlers with plenty of gross- and fine-movement practice and the multi-sensory association areas of the brain are developing rapidly between **18 and 24 months**.

Music boosts memory, facilitates auditory learning, and inspires movement as well. Toddlers enjoy dancing and moving to music, and they can clap hands together and sing and play to music. Our movement chauvinist would say that this is *not* a time to restrict children's movements, keeping them in confined spaces such as high chairs and playpens. As the neural circuits in their brains become more coordinated, their muscles grow stronger and toddlers feel more competent and fearless! Safely arranged spaces contribute to refined coordination and movement; toddlers gain physical confidence in themselves. They climb on stairs, chairs, stepladders, tables, and countertops. They run and trot, jump,

balance and fall. Their movements become more elegant as they pick up tiny objects with their thumbs and index fingers, carry heavy objects around, shovel, sift and pour dirt and sand, and dump things out. They still need safe challenges for explorations and experiments in their environments, both inside and out, and safe fall spaces so that they can pick themselves up and keep going instead of being hurt.

Toddlers are old enough to make their own choices about what is fascinating to them and they willingly show adults what they care about. Sometimes their interests are very different from what adults believe their interests should be, but staying close to toddlers and being vigilant for their safety is the key to allowing them to explore and learn.

By focusing on the critical nature of emergent movement in the young child, teachers and parents can realize that they don't need to create an environment with a lot of fancy equipment, specialized educational videos, or demanding pre-reading/pre-writing curricula to 'stimulate' more brain development. Allowing the child to take in the world through her moving body, by having safe places to wiggle, dig, scoot, and jump, both inside and outside, will provide her a lot of the developmental learning and brain stimulation that she needs. The barriers we adults impose on children in an effort to keep them safe are probably the biggest challenges that we face in this regard. All of the sophisticated movements that human beings are able to perform, from virtuoso musicians, provocative artists, competitive athletes, to the everyday cooking, driving, and caring for one another — all of it begins with the very small person setting out to conquer her universe.



Specific Physical Environment Opportunities

2–6 months

Key themes: child communicates and gets her needs met through responsive caretaker, so the well-being of the caretaker is important: if the caretaker is happy, comfortable, and feels respected she will be better able to focus on the child; support direct interaction with caring adult, including parent and teacher

- Ensure that environment is comfortable, peaceful, and well organized for caretaker so she can focus on the child.
- Provide lots of natural light and views to outside for best sense of well being for everyone.
- Provide options with artificial lighting to dim and zone the room; have different light levels in different areas, accent lights, and provide some warm temperature lighting (2400–2800 Kelvin).
- Design comfortable places to sit and hold child near a window, feed child, space to walk around with child.
- Separate walking space for adults from space for babies to lie on soft surface.
- Make it easy to take babies outside; provide storage space for buggies in convenient location.
- Make it easy to clean objects that babies mouth; provide either dishwashers or sanitizers in the classroom or in a nearby location so teachers are not taken away from babies to do their cleanup.
- Provide adequate space for parent to feel comfortable in room; offer space to store car seat in or near room, a place to sit down and take off shoes or put on booties and talk with caregiver.

6–12 months

Key themes: child beginning to get sense that she can get things and do things for herself; this is dependent on being able to move, practice pulling up and cruising, and arousing her curiosity

- Conveniently locate storage for manipulatives so things can be put away; keep out fewer items depending on ages of children present and their individual interests.
- Offer visual games with faces: mirrors on wall, pull-up furniture; also in toys, furniture, and manipulatives offer peek-a-boo objects with cut-outs and places to 'hide' (object-permanence involves a lot of movement and coordination).
- Install easy-to-clean flooring, coved wall base, drains in floor, nearby sink for quick wipe up.
- Provide direct access to outdoors from classroom so that smaller groups of babies can go outside with caretaker when they are awake and maintain staff-child ratios on baby's sleep schedule.
- Install poured rubber unitary, resilient outdoor surface that is safe for crawling and falling down; small hills and a variety of textured surfaces offer challenges and help infant explore balance.
- Build in visual stimulation of nature and landscape, both outside and from inside looking through windows; make window sills low enough for babies lying on ground or sitting up to look out so they can experience that the natural environment is complex, weather and light conditions are always changing, leaves and grasses move with the wind.

12–18 months

Key themes: sense of independence changes when child can walk and move on her own, develop balance and fine-motor coordination, learning about cause and effect

- Outside: different surfaces and paths for push, pull, and scooter toys to help build muscle and gain confidence perambulating.
- Inside and outside: block areas.
- Inside and outside: special cozy places for child alone or in a small group to put their bodies inside spaces and climb on top.
- Inside: imaginary play with gathering and moving around of objects, baskets, and small containers.
- Outside: have defined areas for quiet play with clear edges (could be material change: grass to stone pavers or wood/plastic lumber decking or shade provided by wood trellis or tree).

18–24 months

Key themes: with ability to move around, child beginning to feel self-agency, starting to think of herself as competent

- Offer water play that ranges from using water tables or a sink inside to small buckets and containers outdoors to more extensively designed water play areas; combine with sand to extend construction and imaginary play opportunities.
- Provide electrical outlets in convenient location to play recorded music.
- Include in outdoor grassy areas hills where child can move freely, but where fencing and landscape barriers provide clear demarcation of boundaries so caretakers' time is not spent saying "No, you can't go there or do that."
- Install sinks and shelves at child's height so she can get things for herself, wash hands, eat, play, and have access to art materials; built-in steps at changing table show her she is able to help caretaker by climbing up onto changing table.
- Allow art projects to get messy (think of projects more as opportunities to experiment with different media rather than consideration of the output); locate sinks nearby with floor easy to clean, materials storage in the vicinity so child can help herself.
- Provide space for storage for extra clothing to encourage going outside in all types of weather; have places to put on extra layers in the winter, or wash off dirty feet and shoes in the summer.