How Infants Come To Know “What Everyone Else Already Knows”

BUILT-IN BY EVOLUTION OR BY CAREGIVERS TURNING ON NEW “APPS”?

To thrive and grow, cultures continuously add new members, most frequently within the family. These novices, usually infants, come into the world as cultural blank slates. They do not know “what everyone else already knows.”

How do children develop this know-how? Some views claim that knowledge comes with your head. You have essences/primitives wired into your genes, which click on when you have certain experiences. However, recent research documents that culture and language change more quickly than DNA. Another model suggests that things gradually get into your head. You start out with some mental hardware and software that lets you store information, access it, and use it. Many of those theories appeal to a principle of spatio-temporal contiguity: because things co-occur or follow each other in a tight sequence, your mental machinery knows they go together. That approach does not work well either. At home, multiple sources of sound and sight surround infants: family members interacting, pets playing or fighting, vehicles driving by or planes flying overhead, natural phenomena unfolding (wind blowing, rain falling, insects buzzing, birds chirping), along with televisions blaring and telephones ringing. While these sources of information stream by, the infant might be looking at any one of these objects or events while hearing another. Such very busy scenes are not pre-digested or edited films with only the “important” elements presented prominently in sharp focus. Therefore, temporal contiguity or the simple co-occurrence of various actions or word and referent cannot be the answer, as there are infinite possibilities. For instance, a colleague caught her young daughter’s attention and then pointed to a tree and said “tree.” Later that day, the infant pointed to the corrugated sole of her tennis shoe and said “tree!!” How would mother have known that the child was looking only at the bark and not at the whole tree?
objects might block our way. As we move around, we perceive more, that more that we perceive allows us to know where to move next, and so on.

You might think from these ideas that objects tell us their function or affordances (opportunities for action)...like the bottle that Alice found with a tag that read “Drink me” (left) Can people all by themselves detect what people and things are for? Do they tell us what they are/what they do? Some say culture is sedimented in artifacts/tools. If that’s true, tell me what the objects (below) are. They can be plain or incised, greyish white or a pinkish adobe in color, 3/8” to 2” in diameter, hollow or solid, less than a quarter-inch thick, and concave. Some of my colleagues have guessed that they are money, game pieces, or Aztec hockey pucks.

The approach I favor asks: what’s the head inside of instead of what’s inside the head? The other theories I mentioned assume that our senses are faulty and that the brain has to stitch together and fix the flawed information we pick up from the environment. James J. Gibson’s theory of direct perception, however, says that we don’t see spots of color or wave lengths but whole objects that cover one another in space and that we see texture, rigid surfaces, and such directly. As we move about, we see/feel/perceive what’s a solid surface or bumpy and what

They are earlobe plugs. About 2500 years ago, pre-Columbian infants not only saw such ear lobe plugs used by others but felt them inserted in their own ear lobes first (above), and later learned how to put them in all by themselves. The earlobe plugs are of graduated sizes, a certain thickness, have an indentation on the edge that lets the opening in the ear fit around it tightly, so it won’t slip out. Unless your body is like that of the people who made an object, you have a particular action in your repertoire, have seen other people use something, or someone has shown you how to use something, it is unlikely that you will be
able to use an object that is unfamiliar. My answer to the question of how people learn is “knowing is direct and culturally directed.” We do perceive opportunities to act, but our culture/other people show us how and what to notice, so that we can survive and succeed. Without guidance, the task is daunting. Infants are immersed in a nonstop flow of perceptual information in sound, vision, touch, smell, taste, and bodily movement from a multitude of sources. They do not know how to detect a pattern of emerging events from a continuous stream of information. In contrast, “old hands,” or competent members, can identify common, everyday activities without a second glance and skillfully perceive opportunities for action. The work of caregivers is to narrow the “search space” by picking out perceptual information for infants, so that they may begin to notice, engage in, and communicate about the most common, everyday events. These practices direct attention to what to “notice and do,” whether the task is taking a bath, using tools, or participating in yearly celebrations and rituals. Usually, caregivers ask the novice to do something a step or two ahead of the infant’s present level of participation. When an infant-novice may not understand what is happening, what do caregivers do? Do they work to achieve a common understanding? If so, do they adjust what is said and done to assist the novice to achieve a higher or more culturally appropriate level of functioning? Yes and yes.

My work is about the most mundane, but important, work that mothers do. All of us have worked hard to become professionals, but I stress the under-appreciated, everyday work of guiding infant novices to becoming adept members of their culture, especially the initial “baby steps.” Around the world, caregivers—who are most often mothers, sisters, teachers, and other female kin—assume the most significant portion of this role. I explore caregiver methods or practices that propagate cultural knowing. To underscore that caregivers hold the key to critical cultural practices, I investigate the relation between what caregivers say and do and their infants’ emerging abilities to engage in everyday activities and to eventually express themselves in language. Both of these abilities are central to adept membership in technological and agrarian cultures at home as well as at school.

To communicate about ongoing events, the infant must be able to notice and participate in events first. Learning to communicate is not a one-way street. When interacting, participants educate each others’ attention to achieve a common understanding. The infants’ behavior benefits the caregiver and vice-versa. When infants initially misunderstand, their missteps pinpoint possible misperceptions. The infants’ perceiving and acting inform caregivers’ subsequent seeing and doing. Caregivers then pick out perceptual information for infants to pick up that provide them with the means to understand what’s going on and how to become more adept. The perceiving and acting of one person
more: in Mexico City among the urban poor and middle-class and in a rural village of 700 people; in the U.S. among upper-middle-class Euro-Americans and recent immigrants from the Latino working class. At approximately monthly intervals, I videotaped these families naturalistically at home going about their ordinary, everyday activities. Based on this work, I have proposed the SEED Model of Early Language Development (left). The following example—in which a caregiver and a toy assist an infant to imitate—illustrates the dynamic coupling of perceptual information and caregiver interaction whose “roots” or grounding are situated, (culturally) embodied, emergent, and distributed that eventually lead to language. (Note that the caregiver does not simply describe what to do in words. Infants do not understand yet what many words mean. That is what they “mean” to learn!)

Elsa, who is 14.5 months old, and her mother engage in a familiar routine with a toy that has a hidden affordance. A string is attached to a spring inside the toy and to a ring that protrudes from its back. Elsa adores the toy. During the last eleven months, the family had played the following “game” with her quite often. However, she had never attempted to imitate the others. For the past several months, she initiated the game by shoving the toy into someone’s hands and watched the reindeer’s body intently, waiting for it to vibrate, and then for the vibrating toy to be put on her tummy to tickle her. She paid no attention to anyone’s hands as they pulled and released the ring attached to the string that caused the toy to vibrate.

For the first time, Elsa is invited to imitate. After several rounds of playing the game, her mother invites her to imitate. She orients the ring on the back of the toy toward Elsa, making the affordance for pulling prominent and saying, “You do it!” As a result, Elsa grasps the ring (grasping is already in her repertoire). Elsa’s mother embodies her by holding Elsa’s hand steady as she grasps the ring while she pulls the toy away from Elsa’s hands. The infant could thereby feel her own body’s work of holding firmly against the tension as well as feeling the increasing tautness of the string on the spring’s affordance as the string unwound.

After this, Elsa found and grasped the ring and then pulled the string out slowly. She held on tightly and watched intently as the string embodied her by pulling her...
hand back toward the toy as it retracted slowly. The toy vibrated very weakly as little tension was left. Eventually, success came by accident. After several repetitions, Elsa pulled forcefully. The string snapped from her fingers. Her hand and the string moved as one; the part of the body that interacted with the environment, the end effector, “migrated” from the hand grabbing the ring to the leading edge of the string attached to the spring. The forceful pulling and quick release led to a vigorously vibrating toy. Although the infant knew that the toy afforded vibrating, she did not know how to use her body to make it do so, until both caregiver and toy educated her attention.

In this example, the orientation of the toy to the infant changed, so that she could see what to grasp. That is, she experienced the situated nature of the relationships of her person to the toy in a new way. Instead of just experiencing the result of someone else’s action and passively observing movements, Elsa experienced an increase in skill in and through her body by being put through the motions by her mother and the toy. Both (culturally) embodied her: that is, both mother and toy educated her attention, her bodily abilities, and her experiencing of what the toy afforded. Clearly these changes emerged over time as Elsa engaged in cycles of perceiving and acting that changed what she did next. Her perception gradually differentiated so that she could more skillfully detect the perceptual information that permitted to her to become adept at making the toy vibrate all by herself. Both her mother and the toy were sources of knowing distributed in the immediate environment, which had an immediate impact on her increase in skill.

In order to eventually communicate with speech, infants must know they have an instrumental effect on others (for example, pushing the reindeer toy into the mother’s hand so that she will make the toy vibrate), attain a shared understanding of ongoing events (coming to know that pulling the string on the reindeer toy makes it vibrate), and finally knowing that words stand in for “things.” As caregivers assist infants to imitate, they learn gradually to participate with persons and objects in the physical layout of everyday life. Unpacking “nonverbal interaction” has documented that assisted imitation cultivates the use of cultural objects to achieve various ends and nurtures a shared understanding of daily life, which is fundamental to communication.

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Credits: On page 26, drawing of Alice on page 26 by Sir John Tenniel from Lewis Carroll’s Alice in Wonderland (London: Macmillan, 1865); photo of earlobe plugs by Leonard Konopelski; and illustration shows the holes in the infant’s ears where the earlobe plugs go. Illustrations on pages 27 and 28 prepared by Brenda Johnson-Grau.