12

Cognition

Ralph James Savarese

To understand the relationship between cognition and disability, let us appeal to the concept of "situated cognition" in cognitive neuroscience. The field of disability studies attends, after all, to the situatedness, or social construction, of disability. The two branches of situated cognition—*embodied* and *embedded*—can help to illuminate how a different kind of body and a different kind of environment generate a different kind of thought. *Embodied cognition* repairs the traditional mind-body divide, whereas *embedded cognition* reveals the extent to which we all depend on our physical and social environments to think. The former thus blurs the line between "physical" and "mental" disabilities because no condition is strictly one or the other, and the latter points to complex accommodative ecologies that enhance cognition by imaginatively distributing it beyond the individual.

According to Vittorio Gallese and Hannah Chapelle Wojciehowski (2011), "Classic cognitive science heralds a solipsistic account of the mind. . . . The picture . . . is that of a functional system whose processes can be described in terms of manipulations of informational symbols according to a set of formal syntactic rules." (Because sensing, acting, and thinking are not "separate modular domains" but, rather, a kind of dynamic feedback loop, embodied cognition insists that the mind be understood as both serving, and served by, a body. "By having fingers capable of grasping objects and legs capable of walking and climbing walls," write Robert Wilson and Lucia Foglia, "we sort and categorize stimuli in ways that are radically different from, say, the ways in which they are sorted by butterflies." Sensorimotor experience, to put it simply, "frame[s] the acquisition and development of cognitive structures" (Wilson and Foglia 2011).

By this logic, the sensing and acting associated with congenital deafness or autism or even impaired mobility would spawn a different kind of cognition. Among deaf people, for instance, a study from 2001 reported that "visual attention to the periphery [is] more efficient than in hearing people" (cited in Campbell, MacSweeney, and Waters 2008, 16). As significant, the auditory cortex can be used for sight. In a 2005 study, the movement of visible dot patterns activated "regions that support hearing (and only hearing) in hearing people" (cited in Campbell, MacSweeney, and Waters 2008, 16). Finally, while traditional language areas in the left cerebral hemisphere have been shown to support the use of sign language, the spatial processing demands of grammar in sign language appear to activate the right hemisphere more than processing spoken language does. All of this indicates at least a slightly different sensorimotor foundation or frame for deaf cognition.

And yet, what may seem modest on fMRI scans turns out to be quite significant in reality. That signing occurs in the open field of the hands, as opposed to the closed cave of the mouth, makes of language something truly kinesthetic. With two manual articulators, a face and a body, the signer can exploit simultaneity of expression—indeed, grammatical structures are often expressed nonmanually. Iconicity further distinguishes spoken language from sign language, with the latter containing many more instances of the partial or full onomatopoeia-like union of signifier and signified. This fact makes plain, in a way that the arbitrariness of spoken language does not, that the origin of meaning begins in the body. Any account of deaf cognition must recognize that distinctive sensing and acting have given rise to a distinctive language.

With autism, cognition is conspicuously embodied. Temple Grandin thinks in pictures, whereas Tito Mukhopadhyay thinks in fragmented, synesthetic sound. So significant are his sensory processing, proprioception, and facial recognition challenges that his published writings often seem like a marvel of literary defamiliarization: "Every time I have to hear Mr. Blake's voice, I recognize it by a squished tomato smell. After that, I know that there ought to be Mr. Blake somewhere around carrying his voice with him" (Mukhopadhyay, qtd. in Savarese 2010). In her YouTube video, "In My Language," Amanda Baggs treats what the medical community would call "perseverative behavior" as an attentional virtue. Extolling an autistic preference for detail over category (because the latter masters the world at the cost of seeing it), Baggs remarks, "The way that I move is an ongoing response to what is around me."

Even mobility impairment would produce a different form of cognition, though it might not show up, as it does in autism, on fMRI scans. When Nancy Mairs entitles a book *Waist-High in the World*, she implicitly acknowledges a different form of sensing and acting: namely, that which takes place in a wheelchair.

In contrast to embodied cognition, embedded cognition foregrounds the role of the natural and social environment in thought. Andy Clark and David Chalmers remind us that "our visual systems have evolved to . . . exploit contingent facts about the structure of natural scenes . . . and they take advantage of computational shortcuts afforded by bodily motion and locomotion" (1998, 8). Or, as Wilson and Foglia put it, "Visual experience results from the way we are dynamically hooked up to the world" (Wilson and Foglia, 2011).

Of course, we are also "hooked up" to other people as well as to forms of organized cultural behavior. Lucy Suchman (1987) has shown that workplace activity conditions what we do with our senses and hence how we cognitively operate. Airplane mechanics, for example, engage in a highly particular kind of seeing. We have long known that infants need the environment to shape sensory processing, but they also need other humans to develop intersubjective capacities, not to mention the language that so enhances them.

To capture the symbiotic nature of cognition, Clark and Chalmers deploy a provocative analogy:

> The extraordinary efficiency of the fish as a swimming device is partly due . . . to an evolved capacity to couple its swimming behaviors to the pools of external kinetic energy found as swirls, eddies and vortices in its watery environment. These vortices include both naturally occurring ones (e.g., where water hits a rock) and self-induced ones (created by well-timed tail flaps). The fish swims by building these externally occurring processes into the very heart of its locomotion routines. (1998, 9)

By referring to the fish and water as a "device," the authors move us beyond the individual organism to a larger ecology. "In such cases," they write, "the brain . . . complements the external structures, and learns to play its role within a unified, densely coupled system" (8). Edwin Hutchins's seminal essay, "How a Cockpit Remembers Its Speeds" (1995b), provides a version of this ecology, though with a metal bird, the air, and two pilots who make use of sophisticated computers. Cognition in some cases can even become "extended." When "features of an agent's physical, social, and cultural environment . . . do more than distribute cognitive processing, they may well partially constitute that agent's cognitive system" (Wilson and Foglia

2011). Clark and Chalmers (1998, 12) cite the example of a person with Alzheimer's disease who must use a notebook to remember where he is geographically.

"Coupled systems" allow many people with disabilities to function more successfully. Indeed, these systems prove the fundamental point of the social model of disability: that the disabling aspects of physiological distinction are largely manufactured. Stephen Kuusisto captures the machine ensemble of blind man and guide dog when he writes: "Our twin minds go walking, / And I suspect as we enter the subway / on Lexington / That we're a kind of centaur— / Or maybe two owls / Riding the shoulders of Minerva" (2000, 20–21). A more complex coupling—and, in fact, an elaborate ecology—is what enables a young woman with significant cerebral palsy to attend an elite liberal arts college in Iowa. Without a motorized wheelchair, a computer with eye-blinking text-to-voice capabilities, a classroom aide, a personal care assistant, accessible learning spaces and dorms, not to mention her own native intellectual gifts and what might be called external attitudinal energy (those progressive swirls, eddies, and vortices of nondisabled opinion), she would not be able to do it.

The embedded and distributed nature of cognition becomes strangely literal when we consider psychiatric medicines and neuroprostheses such as cochlear implants. The coupling may be internal rather than external, but such couplings are themselves embedded in larger cultural debates about curing disability and medicating purported emotional dysfunction. People with disabilities come to different conclusions about these interventions. Of the decision to treat her own bipolar disorder with Depakote, Suzanne Antonetta remarks, "It's hard to explain how I can believe depakoteering is the right decision for me. . . . I have no use for the 'medical model,' the model of mental difference as straight illness, like a never-ending flu" (2009–2010, 73). Although she believes in "mad gifts" (73), she prefers the "difference in [her] mind" (70) that the drug enables.

While the disabled "device" is potentially emancipatory—and in many ways equivalent to the nondisabled one—it is often coded as lack. In the case of cognitive disability, intense stigma persists. The historical conflation of physical disability with cognitive impairment suggests a perverse reconciliation of mind and body, and the belief that learning is impossible while being cognitively impaired continues to do great damage. At the same time, the neurodiversity movement has begun to attract scientists and doctors—one prominent researcher has referred to autistics as "just of another kind" (Wolman 2008). Embedded and distributed cognition might put pressure on narrow notions of personhood, which have traditionally excluded those deemed "profoundly retarded," encouraging us to see how the shibboleth of rugged individualism does not even apply to the most cognitively competent among us.