Chapter 11
Conclusion

There is a school of thought which says that authors should write their conclusions before they write the body of the book. In my case this was out of the question because although I knew what I was going to write about, I had no idea of where it was going to lead. These conclusions will fill in the gaps about some of the arrival points. There was one place, however, where I knew I was going and that was the social nature of the brain.

As early as 1997 the neuroscientist Leslie Brothers wrote convincingly about this topic and her work carried us well beyond the contemporary western notions of the isolated brain and the neuroscience of her time. As this book has shown, only 12 years later some of neuroscience has caught up with her. Major themes of this volume include

1. the social nature of human brains, now and in the evolutionary past,
2. an empirically responsible epistemology,
3. how neuroscience supports the priority given to manipulative action by the Chicago pragmatists,
4. a transactional view of the mind/body relationship,
5. emergence as a way out of reductionism,
6. a stress on the concept of agency and voluntaristic action.

The Social Nature of the Brain

If the "higher" element in higher education demands that the knowledge it conveys is beyond that of common sense culture, surely sociologists must become familiar with the confirmations of their subject matter discovered by neuroscientists and then teach them to their students. How can we afford to disregard the social nature of the brain?

In the last page of her book Brothers clearly states her perspective (1997: 146):

> In contrast to contemporary cognitive neuroscience, which views the mind as a kind of closet with entities like emotion, linguistic rules and memory arranged inside, I take mind to be irreducibly transactional. Rather than something packed inside a solitary skull, it is a dynamic entity defined by its transactions with the rest of the world: Like industrial regions,

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> theater districts and shipping ports, minds are best characterized by reference to the larger forms of life in which they play a part. Just as gold's value derives not from its chemical composition, but from public agreement, the essence of thought is not its isolated neural basis, but its social use.

The social nature of the brain has been revealed in many ways in these pages ranging from theories of the brain's evolution and its intelligence to implications for philosophical epistemologies and the sociology of power and politics. There is hardly a field in the liberal arts that neuroscience has not touched in spite of the differences in the goals and methodologies of these fields.

The evolution of the social brain. Another place of arrival that I knew before I started was neuroscience's connection with far distant disciplines such as evolutionary theory and paleontology. I have identified those scholars who see evolution as essential for understanding the brain. The evolutionary fact that hominid's intelligence allowed tool use and crude weapons is well known, but this did not suffice for survival. An equally important weapon which facilitated survival was social organization and the development of the social sensitivity which allows us to anticipate the behavior of others. As a matter of fact, Small (2008: 146) tells us that: "...the social intelligence hypothesis, assumes that the majority of adaptive problems that drove human psychological evolution were posed by other humans and not, say, the needs of the hunt or of tool making."

Neuroscience and Epistemology

The implications of neuroscience for philosophy were a surprise, especially in its contributions to a socially rooted epistemology via the route of work done on mirror neurons. Iacoboni's group has shown an interest in epistemology, philosophy, and sociology which is reflected in these pages. A critical member of their team, Vittorio Gallese, is knowledgeable in philosophy and phenomenology. Lucina Uddin also has been educated in philosophy. This book may encourage sociologists to do the same and let an epistemology open to both sociology and neuroscience inform their work as well.

I have ranged far in order to show how a sociologically informed neuroscience contributes to epistemology. We have seen how the work on mirror neurons has confirmed the priority that Mead and the Chicago pragmatists placed on motor action. In addition, we must recognize that the brain reduces the perceived world to its own terms. The brain's senses are transducers which change the stimuli emanating from the impartial character of the world into only those characters to which it can accommodate. Gazzaniga (1998) is referring implicitly to the brain as a transducer when he notes that rhodopsin, a chemical in the eye, changes light into neural energy and information.

As we have seen, the subjective quale of human sound is extraordinarily different from a scientific explanation of what may cause this quale in the world independent of our experience. The tree falling in the forest does not in itself make a human

noise. The brain converts intensities of compressed and rarified air into sound. This sound is as much a result of these compressions as it is a result of the brain which converts this energy into human experience. Science sees "reality" independent of anything human as an electromagnetic spectrum. But our brains can only accommodate minute units of this spectrum. Christian (1977: 198) quotes Buckminster Fuller as saying that what a man can hear, smell, touch, taste, and see is less than a millionth of reality.

The Neurological Supports for the Chicago Pragmatist Priority of Action

Another important example of the relationship between neuroscience and epistemology is the work by the sociologist Lakoff and the philosopher Johnson (1999). They use knowledge from brain studies to develop a theory of language with strong implications for a social epistemology. They challenge the traditional way of looking at concepts as merely symbolic and insist on an empirically responsible philosophy that roots itself in neuroscience. Like the Chicago pragmatists, they stress human motor action on the world. To them, most, but not all of the words and phrases comprising our language and thought are not literal but metaphorical.[1]

This perspective produces major shifts in the understandings we have about the nature of reason. Central to analytic philosophy is the assumption that reason is the transcendent structure of the universe, far removed from earthly action and any thing human. Instead, Lakoff and Johnson place the seat of reason in our experiences with motor action on the impartial world.

They also shed new light on the relationship between language and concepts by demonstrating that reason is largely embodied by the neural structures of our brains. The very categories that make our reasoning possible are examples of this structure. Contrary to those who see language as the exclusive source of carving the world into categories, Lakoff and Johnson show that concepts do not come out of the linguistic blue, but from the way our bodies are built. The brain cannot handle the vast amount of input which acts on it. This input must be reduced severely in order for it to move through smaller pathways. "Each human eye has about one hundred million light sensing cells but only about one million fibers leading to the brain. Each incoming image must therefore be reduced in complexity by a factor of 100" (Lakoff and Johnson).

Consistent with the notion of the brain as a transducer, they reject the notion that color exists in the non-human world. Our bodies and brains have evolved to create color. They identify four factors that make color happen: wavelengths of reflected light, lighting conditions, the color cones of our retinas which absorb light of different wavelengths, and the complex neural paths that are connected to the

[1] Lakoff and Johnson have been wrongly criticized for saying that *all* of out thought is molded by these metaphors.

cones. It is clear that all of these factors impinging on the brain are in constant flux. Because these factors are constantly changing, we never passively see red as a self-contained stimulus which is always red. What our brains do is abstract a stable concept of pure red out of these fluctuations. This process constrains the limits of social constructionism. Our senses and the nature of our brains impose strict limits as to how and what we can conceptualize and categorize. The fact still remains that different cultures stress differences in the significance and boundaries of colors.

Unconsciously and automatically our brains make this simplification. Contrary to analytical philosophy, Lakoff and Johnson conclude that neural beings can never think without relying on embodied concepts understood as neural structure, tied to and constrained by the sensory motor system of our brains. Consistent with Mead and the Chicago pragmatists, they see meaning as being built up as a result of the world's response to our actions. This approach corrects the notion that categories are merely linguistic productions and avoids the "linguistic turn" so popular in the 1990s.

A Transactional View of the Brain/Environment Relationship

But all this means nothing when the brain is deprived of its environment. Its consciousness and knowledge go outward to the world in an intentional fashion. When, in important senses, this does not occur we suffer the hallucinations of schizophrenia, the limitations of autism, and the pain of separation anxiety. The amygdala is no different. It too is geared outward to the dangers and pleasures of the social and physical world. Extra-sensory deprivation tanks cancel sensations and frequently generate conditions allowing for an out of body experience. In order for self-consciousness to exist, we must take the perspectives of others in our social environments.

Damasio (1994) makes a similar point: brain, body, and environment act as one indissoluble ensemble. Mind is derived, not from the brain alone; but it can be understood only in light of the organism interacting with an environment. Even more interesting is the fact that this environment is partially a result of the activity of the organism on it.

Emergence as a Way out of Reductionism

We have seen how Sperry and Mead counterreductionism by suggesting that the mind is an emergent separate from the brain, since under certain conditions it can exert a causal force over neural systems by replacing lost or damaged parts of the motor cortex. Sperry then shows how the mind is connected to the body because the emergent carries parts of the body's past with it. However, he includes another.

The Two Most Challenging Problems for Brain Science

There are two especially challenging problems for neuroscience. First is the problem of how to connect mind and brain. Brothers and others identify the second challenging problem as the failure to develop a theory that meets the particular needs of studying the brain.

Mind and Body as Separate Language Games. Brother's solution to the first problem is borrowed from Wittgenstein's argument that we reify concepts into pictures that simplify things. We then think that they tell us something real about the concepts. At this point Brothers (2002:8) says, "They become illusions." In everyday life, we take the term person to mean a body with a mental life. But Brothers takes this as a neuronist view that the mind can be found in the individual brain. In such a case we bring together the grammar of science with the grammar of everyday linguistic practices and misplace the source of the problem. Thus, in her hands the issue that the plagues philosophers of neuroscience discussed in Chapter 8 is resolved as a false one.

As passages in this volume testify, if one is capable of awe, this emotion is truly appropriate for the human brain. I have quoted Edelman's (2004) calculation that if we counted every synaptic connection in the brain it would take 32 million years to do the count.

A Social Critique of Society. My last surprise was that neuroscience has given us a way to critique society. I have quoted Damasio's statement that we could well become a nation so devoted to abstraction and so wary of emotion that the sociopathic becomes the norm. To come full circle, and in light of some of our present politics, we could well realize Carl Sagan's foreboding, quoted in my preface ". . .of an America . . . in steep decline, unable to distinguish what's true and what feels good, we slide, almost without noticing, into superstition and darkness."

The Seamy Side of Self

With all our sociological attention to the self as a distinctive feature of humanity, I am compelled to make a corrective. This vaunted self which I have described earlier as a unique center of behavioral control, and as enabling us to change the face of the globe, also has a negative side. While Meadian theory and much of neuroscience emphasize self-consciousness, I have also drawn attention to unconscious defense mechanisms which keep important tendencies, such as projection, out of our awareness.

What I have not mentioned before is the arguments by numerous writers that self-deception is woven into our natures by evolution and that it is necessary for social life. For example, Greenwald (1980), in a classic article titled *The Totalitarian Ego* succinctly sums up a wealth of the empirical evidence regarding the ways in which we constantly deceive ourselves. He sees the human ego as a ruthless destroyer of all information that might significantly change it. In this process it protects itself

from anything it does not want to hear. The ego or what sociologists would call the self-system is pictured as a thought control center much like a totalitarian political system. Its biases rewrite history to its benefit. As Tavris and Aronson (2007: 70) say:

> Whereas a totalitarian leader rewrites history to put one over on future generations, the totalitarian ego rewrites it to put one over on itself. History is written by the victors, and when we rewrite our own histories we do so as conquerors of nations do: to justify our actions and to make us look good about ourselves and what we did or did not do. If mistakes were made, memory helps us to remember that someone else made them. If we were there, we were just innocent bystanders.

Burton (2004: 196) warns that if the evolutionary account of the brain's tendencies toward self-deception is correct, "human nature stands in the way of human nature." While historically self-deception allowed humans to get by more easily in times of stone axes and arrows, nuclear weapons may be another entirely different matter. Recognizing the fragility of the human self as it has been portrayed in this book, Burton says we are stuck with our dependencies on deception and emphasizes that in order to lie effectively, we first need to lie to ourselves. Ramachandran and Blakeslee (1998) explain the neurological underpinnings for this by referring to Ekman's (1992a, b) studies of the muscles of the human face. A person who is telling a lie will often give this away by producing an unnatural smile and a false tone of voice. These "giveaways" come from the limbic system which controls involuntary spontaneous facial expressions. Since this system is largely unconscious, it is more prone to tell the truth. The cortex is involved in voluntary control where lies are planned and it is this tension between the two brain systems that creates the false smile. (See also Gazzaniga 2008: 103.)

Travis and Aronson (2004: 70) say that " memory smoothes out the wrinkles of dissonance by enabling confirmation biases to hum along selectively causing us to forget discrepant, disconfirming information about beliefs about ourselves that we hold dear." They add that: "Confabulation, distortion and plain forgetting are the foot solders of memory and they are summoned to the front lines when the totalitarian ego wants to protect itself."

Symbolic interaction and the emphasis on lived experience are not equipped to handle this critical but seamy side of the self. Since those describing lived–experienced are not concerned with or able to establish uniformities of human behavior this is no problem for them. However, we should know that underneath such experience is a critical layer that shapes it and our memories of it.

Using a Meadian symbolic interaction perspective, sociologist Jonathan Turner (2002: 173) concludes that the "brain is wired especially on the right side for pattern recognition." As Ralph Turner (1962) pointed out earlier in his theory of role-making, instead of having exact expectations of others as in role-playing, we are prepared to interpret behavior as congruent with the role. We also objectify ourselves in a manner consistent with our self-conceptions. This fits in nicely with the right brain's gift for gestalts.

Interestingly, Ramachandran and Blakeslee (1998) consider self-deceit as a small price to pay for coherence and stability. But Burton's point above, about modern

terminology and its implications, raises fears that in the long run, it may not be such a small price after all.

An important source of self-deception comes from memory. This is the foundation for the autobiographical self and is inherently unreliable. Schacter (2001: 228) describes what he refers to as its seven sins. The first three are sins of omission or ways of forgetting. They have to do with the decrease of memory over time: lapses of attention wherein we forget long-term events, lapses of attention such as forgetting one's keys, and the temporally absent "tip of the tongue" experience. The next three sins are those of commission where memory is present but inaccurate. First, misattribution occurs when we attribute our memories to an incorrect source. We may even confuse a dream with a memory from wakeful life. Second, suggestibility has to do with implanted memories that are incorrect. A bizarre case where a man developed memories of having abused his daughters is a dramatic case in point, but suggestibility can also happen in other situations. The third, called bias, refers to the ways that our current beliefs about our past selves are pulled into congruence with our present self-conceptions. The seventh sin is persistence wherein a memory cannot be driven from our minds as in post-traumatic syndromes. Schacter then proceeds to explore the neurological aspects of these different distortions.

Finally, I come to a close. Although I have described the foibles that certainty inflicts on its victims, we have seen that it cannot be helped. The certainty I have in mind at the present is that I have not included all there is to include and not being an expert in neuroscience, that I have made some errors. With this disclosure said, my goal has been to convey to my colleagues the possible links between sociology and neuroscience which inform each other's theory and research and help us develop our new field of neuroso.

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