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The Functionalist's Dilemma

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Language, Consciousness, Culture: Essays on Mental Structure. Ray Jackendoff. xxiv + 403 pp. MIT Press, 2007.

Science, as Thomas Kuhn famously observed, does not progress linearly. Old paradigms remain as new ones supplant them. And science is very much a product of the times.

The symbol manipulation paradigm for the mind spread like wildfire in the late 1950's. Formal logic in the tradition of Bertrand Russell dominated Anglo-American philosophy, with W.V.O. Quine as the dominant figure in America. Formalism reigned in mathematics, fueled by the Bourbaki tradition in France. Great excitement was generated by the Church-Turing thesis of the equivalence between Turing machines, formal logic, recursive functions, and Emil Post's formal languages. The question naturally arose: Could thought be characterized as a symbol manipulation system?

The idea of artificial intelligence developed out of an attempt to answer this question, as did the information processing approach to cognitive psychology of the 1960's. The mind was seen as computer software, with the brain as hardware. The software was what mattered. Any hardware would do—a digital computer or the brain, which was called “wetware” and seen (incorrectly) as a general-purpose processor. The corresponding philosophy of mind was called “functionalism”, which claimed that you could adequately study the mind independently of the brain in terms of its functions, as carried out by the manipulation of abstract symbols.

The time was ripe for Noam Chomsky to adapt the symbol manipulation paradigm to linguistics. Chomsky's metaphor was simple: A sentence was a string of symbols. A language was a set of such strings. A grammar was a set of recursive procedures for generating such sets. Language was syntacticized—placed mathematically within a Post system, with abstract symbols manipulated in algorithmic fashion by precise formal rules. Since the rules could not look outside the system, language had to be “autonomous”—independent of the rest of the mind. Meaning and communication played no role in the structure of language. The brain was irrelevant. The idea was called “generative linguistics,” and it continues in many US linguistics departments.

By the mid-1970's, there was another paradigm shift. Neuroscience burst onto the intellectual stage. Cognitive science developed beyond the formalist cognitive psychology to include neural models. And a linguistic theory committed to viewing language in terms of the brain and integrated with other aspects of the mind developed. It was called “cognitive linguistics,” and has been steadily developing into a rigorously formulated neural theory of language based on theory of neural computation and actual developments in neuroscience. Language and thought are seen as physically embodied and carried out biologically, not merely an abstract symbol manipulation system.

Ray Jackendoff's *Language, Consciousness, Culture* is set solidly within the generative linguistics paradigm, and he staunchly defends functionalism and the symbol manipulation paradigm. "Some neuroscientists say that we are beyond this stage of inquiry, that we don't need to talk about "symbols in the head" anymore. I strongly disagree." He goes on to argue that the symbolic representations given by linguists are simply right and takes the brain as irrelevant. Interestingly, he does not cite the major work arguing the opposite, Jerome Feldman's, *From Molecules to Metaphors* (2006), also published by MIT Press. Feldman shows how the symbolic analyses of language and thought done by cognitive linguists can be characterized in terms of neural computation. But, as Jackendoff says, cognitive linguistics has been "steadfastly ignored by mainstream generative linguistics." As Kuhn would have predicted.

All this creates a dilemma for Jackendoff. He sees the limitations of the functionalist paradigm, and rails correctly against Chomsky's syntacticization of meaning, but he stays with a version of symbolic logic, in which meaning is also syntacticized by a formal logical syntax. He reads widely in cognitive science and neuroscience, while "steadfastly ignoring" the literature of the cognitive and neural theories of language that answers many of the questions he raises, though in a paradigm he could not accept. He sees correctly that developments in the cognitive and brain sciences ought to be taken seriously by philosophy and the social sciences, but his forays into social, moral, and political ideas are limited by his functionalist approach. He takes up deep questions of causation, space, and time, but his analyses are again limited by his dedication to the symbol manipulation paradigm, which won't allow the required brain-based solutions.

Take the question of meaning. In 1963, I proposed a theory of generative semantics in which a version of formal logic became an input to generative grammars, and was later joined in this enterprise by James D. McCawley and John Robert Ross, two of Chomsky's best known students. Among our tenets were that conceptual structure is generative, prior to and independent of language, and inaccessible to consciousness. Jackendoff argued strongly against this position at the time, but in this book, only 40 years later, he adopts these tenets, while keeping Chomsky's idea that syntactic structure is independent of meaning. He adopts a parallel structure theory, in which he holds both ideas at once. As we did then, he now declares that Chomsky's syntactocentrism is a "scientific mistake." Yet, as a Chomskyan syntactician, he has to keep an autonomous syntax for grammar alongside his autonomous syntax for meaning seen as symbolic logic. Thus, he sanctions business as usual in generative syntax despite the "scientific mistake."

In the 1960's, Charles Fillmore proposed a theory of "case grammar" in which there were general semantic roles like agent, patient, experiencer, and so on and principles mapping these to grammar. This idea was accepted in cognitive linguistics and has since been developed over the past 40 years by Fillmore and many others in the theory of grammatical constructions—in which semantics is directly paired with syntactic form.

Jackendoff adopts a version of this by two of Fillmore's students, Van Valin and La Polla in 1997. Laudable, if a little late.

In 1975, Fillmore began the development of "frame semantics," expanding the concept of conceptual frames in great detail over the three decades since then. It has become central in cognitive linguistics worldwide, and is widely applied, as in my work on political analysis in four books over the past decade. Jackendoff accepts a much less precise and worked out version of frames by Erving Goffman and Marvin Minsky from the mid-1970's, but "steadfastly ignores" Fillmore's elaborate research over 30 years, and its widespread application.

In 1997, Sridhar Narayanan in his Berkeley dissertation worked out a neural computational account of actions and events, which generalizes to the semantics of aspect (event structure) in linguistics and actually computes the logic of aspect. In this book, Jackendoff tries adopting Chomsky's syntactic structures to action structure, which Patricia Greenfield of UCLA first attempted in the 1960's. His account, a decade after Narayanan, doesn't characterize actions nearly as well, does not compute the logic of actions, does not characterize the semantics of aspect, and does not fit the theory of neural computation. But again, it is laudable to see Jackendoff at least trying to link motor actions to linguistics, as Chomsky never would, in an attempt to break out of the functionalist mold while staying in it.

Jackendoff, in each of these cases and many others, is asking questions well beyond the Chomskyan enterprise, and in some cases approaches what cognitive linguists have achieved. But one place he gets it very wrong is conceptual metaphor.

It is now almost three decades since Mark Johnson and I wrote *Metaphors We Live By*. Since then hundreds of researchers have developed a whole field of study. In 1997, Narayanan developed a neural computational theory of metaphor, which Johnson and I elaborated in great detail in our 1999 book, *Philosophy in the Flesh*.

In the neural theory, conceptual metaphor arises in childhood when experiences regularly occur together, activating different brain regions. Activation repeatedly spreads along neural pathways, progressively strengthening synapses in pathways between those brain regions until new circuitry is formed linking the regions. The new circuitry physically constitutes the metaphor, carrying out a neural mapping between frame circuitry in the regions and permitting new inferences. The conceptual metaphor More Is Up (as in *prices rose*, the *temperature fell*) is learned because brain regions for quantity and verticality are co-activated whenever you pour liquid into a glass or build any pile. Affection Is Warmth (as in *He's warm person*, *She's an ice queen*) because when you are held affectionately as a child by your parents, you feel physical warmth. Hundreds of such "primary metaphors" are learned early in life. Complex metaphors are formed by neural bindings of such primary metaphors. And metaphorical language expresses both primary and complex metaphors.

You would never know this from reading Jackendoff's discussion, which is based on our 1980 book, but nothing in the nearly three decades since then. In his section on rights and obligations, Jackendoff speculates on what he guesses Johnson and I would say on the subject and then argues against his guess. He guesses wrong. No one acquainted with the extensive cognitive linguistic literature on conceptual metaphor since 1980 would have made such a mistake.

For a cognitive linguist like myself, reading Jackendoff's book is both painful and hopeful. Painful because he keeps trying to do interesting and important intellectual work while being stuck in a paradigm that won't allow it. Hopeful because he may help the transition from a brain-ignoring symbol-manipulation paradigm to a brain-based neural theory of thought and language. I wish that other linguists, both generative and cognitive, had his scope and intellectual ambition.

George Lakoff is Richard and Rhoda Goldman Distinguished Professor of Cognitive Science and Linguistics at the University of California, Berkeley, and Senior Fellow at the Rockridge Institute. He is the author of Don't Think of an Elephant! (2004); Moral Politics (1996; 2002); Metaphors We Live By (1980) and Philosophy in the Flesh (1999) both with Mark Johnson; Women, Fire, and Dangerous Things (1987); Where Mathematics Comes From (2000) with Rafael Núñez, Whose Freedom? (2006) and Thinking Points (2006) with the Rockridge Institute. The Political Mind will appear from Viking/Penguin in 2008.