

6 Cognitive science and Dewey's theory of mind, thought, and language

Over eighty years ago, half a century before the term “cognitive science” had even been coined, John Dewey developed his view of mind, thought, and language in ongoing dialogue with the biological and psychological sciences of his day. He drew on empirical research in a number of fields, including biology, neuroscience, anthropology, cognitive psychology, developmental psychology, social psychology, and linguistics. Dewey's approach thus offers a model of how philosophy and the cognitive sciences can productively work together. The sciences reveal aspects of the deepest workings of the mind. Philosophy evaluates the underlying assumptions and methods of the sciences, and it places the empirical research on cognition in its broader human context, in order to determine what it means for our lives.

In a nutshell, Dewey's theory of mind is naturalistic, non-reductive, and process-oriented. His view is *naturalistic* in that it employs empirical research drawn from a number of natural and social sciences. It eschews explanations that rely on supernatural notions, rejecting any idea of a non-empirical ego or pure rationality. However, even though Dewey appropriated modes of inquiry characteristic of the sciences, he took great care to avoid the reductionist tendencies that limit the explanatory scope of certain sciences. His account is thus *non-reductive* because he saw that no single scientific account, cluster of scientific perspectives, or particular philosophical orientation ever tells the whole story. Consequently, he insisted on a plurality of methods from various sciences, he recognized multiple levels of explanation for mental phenomena, and he famously used art and aesthetic experience to reveal the depths of human experience and understanding. His view is *process-oriented* insofar as it always regards experience and thinking as ongoing

processes of organism–environment interaction. He never hypostatizes cognitive functions into discrete faculties and never turns dynamic cognitive processes into fixed structures.

These three defining aspects of Dewey's view are manifested in his insistence that any useful philosophical account of mind, thought, and language must do justice to the depth and richness of human experience. *Experience* is Dewey's most important notion. It is meant to include *everything that happens* – both from the side of the experiencing organism and from the side of the complex environments with which that organic creature is continually interacting. Experience “includes *what* men do and suffer, *what* they strive for, love, believe and endure, and also *how* men act and are acted upon, the ways in which they do and suffer, desire and enjoy, see, believe, imagine – in short, processes of *experiencing*.”¹

Dewey argued that we are the inheritors of seriously mistaken views of mind, thought, and language that are the unfortunate result of fragmenting experience into subjective vs. objective elements, passive vs. active processes, and mental vs. physical components. He was especially disturbed by early empiricist views of experience as built up out of passively received atomistic sensations that must somehow then be synthesized into unified experiences.

In stark contrast to such reductive and atomistic accounts, Dewey argues that the basic unit of experience is an integrated dynamic whole that emerges through the coordination of an active organism and its complex environment. Experience thus has aspects of the organism and characteristics of the environment in dynamic relation. It is only within such a multidimensional purposive whole that we mark distinctions and recognize patterns relative to our purposes, interests, and activities as biological and social creatures. In an early important article, “The Reflex Arc Concept in Psychology” (1896) Dewey challenged the reigning stimulus-response view of experience, according to which a given perceptual stimulus gives rise to some action (response), either immediately or via some inner mediating mental ideation. Dewey argues that experience does not come to us as discrete stimuli and responses; rather, it comes to us as unities organized relative to our ongoing engagement with our environment. Dewey's point is that:

the reflex arc idea, as commonly employed, is defective in that it assumes sensory stimulus and motor response as distinct psychical existences, while

in reality they are always inside a co-ordination and have their significance purely from the part played in maintaining or reconstituting the co-ordinations.²

Dewey's resistance to any account that trades on rigid dualisms, hypostatized functions, or one-dimensional reductive explanations is thus based on his argument that all such accounts falsify our experience.

A NON-DUALISTIC, FUNCTIONAL VIEW OF MIND

Dewey founds his theory of mind and thought on the assumption that a human being is a living organism, with at least a mostly functioning brain and body, engaged in continuous interaction with various environments, which are at once physical, social, and cultural. Mind has deep biological dimensions, but it is also fundamentally a social phenomenon. The critical challenge for any naturalistic view like Dewey's is to explain mind solely in terms of dimensions of experience, without "the appearance upon the scene of a totally new outside force as a cause of changes that occur."³ What are known as "higher" cognitive functions (e.g. conceptualizing, reasoning, language use) must be shown to emerge from "lower" (perceptual, motor, and affective) functions, without relying on non-natural entities, causes, or principles.

Dewey's naturalism is thus defined by what he called the *principle of continuity*, according to which, "there is no breach of continuity between operations of inquiry and biological operations and physical operations. 'Continuity' . . . means that rational operations *grow out of* organic activities, without being identical with that from which they emerge."⁴ In other words, Dewey attempts to explain "mind" and all its operations and activities non-dualistically, as grounded in bodily operations of living human creatures, who are themselves the result of prior evolutionary history and who have typically passed through a crucial sequence of developmental stages that have shaped their cognitive capacities and their identity.

In light of the principle of continuity, the old distinction between non-living things (the physical), living things (the psycho-physical), and creatures capable of thinking (the mental) must be reconfigured

in terms of “levels of increasing complexity and intimacy of interactions among natural events,” such that novel cognitive functions emerge at each higher level.⁵ The psycho-physical is distinguished from the merely physical by the emergence of sentience and self-movement in an organism. The mental emerges in select species through the development of the ability to conceptualize, reason, and communicate symbolically. Mind is thus embodied:

Since mind cannot evolve except where there is an organized process in which the fulfilments of the past are conserved and employed, it is not surprising that mind when it evolves should be mindful of the past and future, and that it should use the structures which are biological adaptations of organism and environment as its own and its only organs. In ultimate analysis the mystery that mind should use a body, or that body should have a mind, is like the mystery that a man cultivating plants should use the soil; or that the soil which grows plants at all should grow those adapted to its own physico-chemical properties and relations.⁶

Dewey coined the term “body-mind” to avoid the dualism inherent in speaking of body *and* mind.⁷ The terms “body” and “mind” are thus merely convenient abstractions from our primary experience, which is an ongoing process of feeling-saturated awareness and thinking that has physical, emotional, intellectual, social, and cultural dimensions inextricably woven together. He summarizes:

Body-mind simply designates what actually takes place when a living body is implicated in situations of discourse, communication, and participation. In the hyphenated phrase body-mind, “body” designates the continued and conserved, the registered and cumulative operation of factors continuous with the rest of nature, inanimate as well as animate; while “mind” designates the characters and consequences which are differential, indicative of features which emerge when “body” is engaged in a wider, more complex and interdependent situation.⁸

In other words, we can appropriately speak of mind whenever our engagement with our environment involves capacities for recognizing patterns, marking distinctions, and coordinating behaviors by means of symbolic interactions. Mind is an evolutionary accomplishment that cannot exist without a body in continual interaction with its world. Thus, for Dewey, mind is not an innate capacity or a distinct metaphysical entity or substance. Rather, mind emerges out of the strivings of certain highly developed organisms who have

learned to inquire, communicate, and coordinate their activities through the use of symbols. Mind is the primary vehicle by which creatures like us are able to sustain our existence, pursue our various conceptions of well-being, share meaning, and engage in the distinctive forms of inquiry that mark our species. Dewey attributes mind only to humans, because he thinks that they alone are capable of the complex symbolic interaction and communication that he regarded as necessary for the mental in its fullest sense. However, notwithstanding Dewey's anthropocentrism, most ethologists today would surely grant some form of mind at least to certain higher primates who appear to communicate symbolically and to coordinate their behaviors in acts of problem-solving and social intercourse.

Dewey's non-dualist functional approach is quite compatible with mainstream views in cognitive neuroscience today, according to which *organism* and *environment* are correlative terms, definable only in relation to their continuous interaction. There is no mind without a functioning body and brain, nor a functioning brain without cognitive activity engaging the world. Cognitive neuroscientist Antonio Damasio captures these organism–environment and mind–body couplings in a way that Dewey would embrace:

(1) The human brain and the rest of the body constitute an indissociable organism, integrated by means of mutually interactive biochemical and neural regulatory circuits (including endocrine, immune, and autonomic neural components); (2) the organism interacts with the environment as an ensemble: the interaction is neither of the body alone nor of the brain alone; (3) The physiological operations that we call mind are derived from the structural and functional ensemble rather than from the brain alone: mental phenomena can be fully understood only in the context of an organism's interacting in an environment.⁹

Given his insistence on the multidimensionality and non-duality of experience, the only thing Dewey might add to this quotation is perhaps that not only are brain and body an indissociable organism, but so also body and environment constitute an indissociable organic whole. In *Experience and Nature* Dewey emphasizes all of this complex interconnectedness in his provocative claim – a claim that would be completely at home in contemporary cognitive neuroscience – that “[t]o see the organism *in nature*, the nervous system in the organism, the brain in the nervous system, the cortex in the

brain is the answer to the problems which haunt philosophy."¹⁰ However, Dewey understandably devoted more attention to the social and cultural dimensions of mind than one might expect from a neuroscientist like Damasio. For Dewey, mind emerges when symbolic interaction and sharing of meanings becomes possible for a group of creatures. Mind represents the horizon of potentially shareable meanings available to certain highly complex organisms, whereas individual consciousness is a particular organism's actual awareness of specific meanings:

Mind denotes the whole system of meanings as they are embodied in the workings of organic life; consciousness in a being with language denotes awareness or perception of meaning; it is the perception of actual events, whether past, contemporary or future, *in* their meanings, the having of actual ideas . . . Mind is contextual and persistent; consciousness is focal and transitive. Mind is, so to speak, structural, substantial; a constant background and foreground; perceptive consciousness is process, a series of heres and nows.¹¹

This passage construes mind as an intersubjective network of meaning, and consciousness as an ongoing process by which we can be aware of meanings. However, I do not think it precludes our speaking, in a derivative fashion, of an individual organism (for example, a person) having a "mind." Yet no individual alone could have a mind unless there had been other conspecific social animals to establish a shared system of meaning and to coordinate their behavior via that system. Dewey would say that certain animals develop what we call "mind" only when they acquire a specific set of interacting functional capacities within a communal context in a society.

As life is a character of events in a peculiar condition of organization, and "feeling" is a quality of life-forms marked by complexly mobile and discriminating responses, so "mind" is an added property assumed by a feeling creature, when it reaches that organized interaction with other living creatures which is language, communication.¹²

To say that I have a "mind" is to say that I am an organism whose potential for very complex interactions has risen to the level where I can communicate meanings with other creatures (who have "minds"), can engage in various modes of inquiry, reasoning, and creativity, and can coordinate activities with others using symbols that have shared meaning for us.

However phenomenologically rich this description of mind might be, it still leaves us with the critical problem of explaining how processes that we call "thinking" can emerge for certain types of animate creatures, yet without any breach of continuity with their basic biological functions.

THOUGHT AS EMBODIED COGNITION

If there is no pure soul or transcendent ego to serve as the locus of thinking, then where does it come from? Once again, Dewey's answer is *experience*. All thinking arises from bodily processes of organism–environment transaction, and it takes whatever value it has from its ability to enrich and transform that experience. In his *Logic: The Theory of Inquiry*, Dewey famously argues that our views of thinking and logic have been mesmerized and held captive by disembodied, ahistorical, and overly intellectualized theories of cognition. We tend to fixate on certain concepts, logical principles, and methods of thinking as though they constituted eternal, pure, universal structures of an allegedly transcendent reason. This kind of selective abstraction reinforces the illusion of a pure seat of thought in something variously called "mind," "reason," or "pure ego." Our ability to think then becomes an utterly inexplicable mystery, on a par with the alleged mystery of how mind can affect body. On this view, thought and its supposedly universal logical forms appear to be absolute givens that drop down from above into certain species of bodily creatures, as though their embodiment had no role in shaping their conceptualization and reasoning.

In sharp contrast with this disembodied view, Dewey honors his principle of continuity by arguing that thinking is a naturally evolving process of experience that occurs only for certain complex animals, under certain very specific bodily conditions. Thinking operates through the recruitment of sensory-motor and other bodily processes. Following William James and C. S. Peirce, Dewey crafts a non-dualistic, body-based theory of human cognition, a view grounded in the brain science and psychology of his day, but also remarkably consonant with so-called "embodied cognition" views in contemporary cognitive neuroscience, as summarized by Don Tucker:

Complex psychological functions must be understood to arise from bodily control networks. There is no other source for them. This is an exquisite parsimony of facts.

There are no brain parts for abstract faculties of the mind – faculties like volition or insight or even conceptualization – that are separate from the brain parts that evolved to mediate between visceral and somatic processes.¹³

Dewey argues that we must stop conceiving of thinking as a disembodied, transcendent activity and instead see it only as one of several very remarkable processes of embodied experience. The experiential prompt for human thinking is our human need for inquiry to help us resolve problematic situations. Indeed, Dewey even suggests that “the word ‘thought’ . . . is a synonym of ‘inquiry’ and its meaning is determined by what we find out about inquiry.”¹⁴ Dewey characterizes the experiential process of inquiry as having three phases. In the first phase, an organism (here, a live human creature) is confronted with an indeterminate, problematic situation that upsets his or her normal habits of interaction. For example, yesterday you were feeling just fine, going about your mundane business of living, with little or no thought, or even consciousness, of what you were doing. Your routine habits carried you unreflectively through your day. However, today you feel nauseous, your joints ache, and you have the chills. Your situation is disrupted, and its entire quality has changed in a distressing way. Your normal habits of living do not suffice to carry experience forward to some happy issue.

This prompts the second phase, in which you begin to wonder what is wrong and how you might fix it. You want to feel better. Inquiry has commenced. You start to discriminate aspects of your experience to see what they mean and how you can transform them for the better. For example, you notice what is most dominantly characteristic of your situation – chills, fever, upset stomach, and headache. You project various hypotheses about what this particular set of symptoms might indicate. That is, you engage in a *thought* process that employs distinctions (concepts) and looks for their implications. You make some preliminary judgments based on your past experience. Could this be the flu? Or maybe food poisoning? Perhaps it is a reaction to the new antibiotic you just started taking for a chronic infection? You consult with others. You make judgments about what to expect if one hypothesis or another is the correct one. In short, you inquire. You speculate on how you might cure yourself.

Already, and this is a third stage, you are beginning to take action (by thinking and inquiring) to try to change the quality of your

experience for what you perceive to be the better. Thinking itself is action, for it transforms experience as it develops. Successful thinking is thus part of an arc of experience that starts with your problematic situation and eventually, if thought is effective, returns to transform your situation. As such, thinking is value-laden and purposive, insofar as it is directed toward resolving some problem, reestablishing a flow of experience, or discovering new ways of organizing experience that lead to growth and enhanced meaning.

Because Dewey rejects mind/body dualism, he regards the activity of thinking as just as much a matter of habits as any other form of human bodily activity. Just as when a potter employs motor skills to mould clay by means of the manual eye-hand habits she has painstakingly developed, so also the ways we think are the present result of developed and still-developing habits for working through experience. Dewey boldly affirms that "ideas, thoughts of ends, are not spontaneously generated. There is no immaculate conception of meanings or purposes. Reason pure of all influence from prior habit is a fiction."¹⁵ The character of our thought is thus the present result of the quality of the intellectual habits we have acquired. Those habits are realized in our bodies and brains, in relation to our surroundings. They are not lodged in some mental substance or transcendent, disembodied ego.

Contemporary neuroscience would no doubt translate Dewey's talk of habits of thought into the language of neural connectivity and synaptic weights. Having an "idea" or "concept" is correlated with specific patterns of neural activation in the brain (in response to interaction with one's environment), all of which have affective dimensions. An "inference" is construed as our tendency to move from one set of neural activations to another set, as a result of weighted connections between those neural assemblies. Neither in Dewey's account nor in recent cognitive science is there any notion of a disembodied process, carried out in some inner theater of consciousness, in which an allegedly non-material mind or ego inspects and manipulates disembodied ideas. The ways we think are just as much bodily habits as the ways we walk, sing, or throw a ball. Consequently, Dewey's account of thinking situates thought not in "the mind," but in the world, as an ongoing process of habitual ways of engaging experience, and sometimes of reshaping it.

The previous example of trying to figure out why you feel ill is but one instance of human thinking, but it represents in its structure the

most salient aspects of all thinking – from mundane practical problem-solving to scientific or mathematical or logical theorizing to moral reflection, political deliberation, or artistic creativity. All thinking begins within an integrated, embodied, felt situation. Dewey notoriously claims that the start of every thought is a felt experience of a pervasive unifying quality of the entire situation that you inhabit at a given moment. Thought arises out of this qualitative experience, as we begin to discriminate objects, notice their properties, and trace out relations and connections between them. The ways we notice patterns and discriminate objects will be the result of the habits of perception, thought, and action that we have acquired through our previous experience, given our bodily and neural makeup.

Dewey's idea of a pervasive unifying quality is the key to his view of thinking, but it is perhaps the most problematic and neglected part of his theory. What makes Dewey's idea seem so strange to us today is our engrained habit of conceiving the world as populated by discrete objects that possess discrete properties, toward which we direct our thinking. Dewey does not deny that we experience objects, but he insists that beneath and before any experience of objects and qualities there is always one's encounter with the whole situation, which is uniquely characterized by its pervasive distinguishing quality. In *Art As Experience*, Dewey explains this key idea:

An experience has a unity that gives it its name, *that* meal, that storm, that rupture of a friendship. The existence of this unity is constituted by a single *quality* that pervades the entire experience in spite of the variation of its constituent parts. This unity is neither emotional, practical, nor intellectual, for these terms name distinctions that reflection can make within it.¹⁶

Imagine that you have just entered a colleague's office. There is an all-encompassing way it feels to be in that place, and the unifying quality of that place is clearly different from your own office. Your experience is a blend of perceptual, emotional, practical, and conceptual dimensions intertwined in *that* particular place. Granted, as soon as you enter the office, you have already begun to recognize objects, mark patterns, and focus on various parts of the entire setting, but Dewey argues that all of this discriminating activity takes place within a unified experienced background out of which objects, people, and events emerge.

Dewey often turned to art as a way of explaining the primacy of this unifying quality that defines a given situation. Consider the experience of walking into a large room of an art museum and having your attention fall immediately on a large painting on the opposite wall. Although you may have never seen this particular painting before, you can discern that it is a Picasso. Nobody will mistake that pervasive quality by which you identified the Picasso for what you encounter in the next room in a Matisse papercut or in a sunset by Emil Nolde. We cannot describe that unifying quality, because in attempting to do so we begin to identify particular lines, colors, shapes, and qualities that are already abstractions from the organic reality of the work. All thought, says Dewey, emerges within some such global grasp of a situation. It is just that we are so busy marking distinctions that we are seldom aware that our first encounter – our primary experience, as it were – was fundamentally qualitative and felt.

In line with contemporary neuroscience today, Dewey argues that what we experience as objects are actually selections of elements out of the ongoing flow of our experience, which is saturated with feeling, meaning, and interest. Dewey explains that an “object” is:

some element in the complex whole that is defined in abstraction from the whole of which it is a distinction. The special point made is that the selective determination and relation of objects in thought is controlled by reference to a situation – to that which is constituted by a pervasive and internally integrating quality.¹⁷

The qualitative situation is primary and objects emerge within it, relative to perceiving, acting agents who have values and purposes. In other words, we do not start with properties or objects and then combine them into experiences; rather, we start with integrated scenes within which we then discriminate objects, discern properties, and explore relations. Objects and their qualities – along with our ability to think about them – emerge for us via our ability to orient ourselves within particular situations, given our perceptual and motor capacities, our past experience, our interests, and our values.

It is no accident that Dewey prefers to cite artworks as exemplary of pervasive qualities, for Dewey believed that in art we find human meaning-making in its most intensified and eminent form. Not surprisingly, he held that thinking in art is just as rigorous as thinking in any other discipline, such as science, mathematics, or philosophy.

Most people will readily acknowledge that artworks are characterized by unifying qualities, but they fail to recognize that this is true for *all* types of experience, including *all* types of thinking. In Dewey's words: "All thought in every subject begins with just such an unanalyzed whole. When the subject-matter is reasonably familiar, relevant distinctions speedily offer themselves, and sheer qualitiveness may not remain long enough to be readily recalled."¹⁸

There is empirical evidence from brain science suggesting that Dewey was correctly describing the process of a developing thought, which moves from the felt pervasive quality to higher-level conceptual discrimination and inference. Tucker describes the core-shell architecture of the brain (in addition to the front-back and right-left structures) that is principally responsible for our global grasp of any situation.¹⁹ To vastly oversimplify, our brain developed through evolution by adding new structures and layers on top of more primitive parts shared with some of our animal ancestors. The present-day result is a brain with core limbic structures (mostly responsible for body-monitoring, motivation, emotions, and feelings) that are connected to the shell of "higher" neocortical layers that have more differentiated functions, such as perception, body movement, action planning, and reasoning. One striking feature of this core-shell organization is that structures in the core regions are massively interconnected and involve limbic processes responsible for emotions and feelings, whereas structures in the shell are more sparsely interconnected and are less directly tied to affect centers. An important consequence of this neural architecture is that there is more functional differentiation and more modularity of brain areas in the cortical shell than in the limbic core. Tucker summarizes:

First, *connections stay at their own level*. With the exception of "adjacent" connections (paralimbic connects to higher-order association, higher association connects to primary association, etc.), connections from one level go primarily to other brain areas of that same level . . .

Second, *the greatest density of connectivity within a level is found at the limbic core*. There is then a progressive decrease in connectivity as you go out toward the primary sensory and motor modules . . . In fact, the primary sensory and motor cortices can be accurately described as "modules" because each is an isolated island, connected with the diencephalic thalamus but with no other cortical areas except the adjacent unimodal association cortex of that sensory modality or motor area.

The exception is that the primary motor cortex does have point-to-point connections with the primary somatosensory cortex.²⁰

The structures and functions Tucker is describing here would make sense of Dewey's claim that our experience always begins with a pervasive unifying quality of a whole situation, within which we then discriminate objects, with their properties and relations to one another. The limbic core, with its dense interconnections and emotional valences, would present us with a holistic, feeling-rich, emotionally nuanced grasp of a situation. The more modular and highly differentiated sensory and motor regions of the shell (cortical) structure would permit the discrimination and differentiation that we call conceptualization. Tucker explains: "The meaning, or semantic function, of a network may be allowed greater complexity as its architecture becomes more differentiated."²¹ In Dewey's terms, the meaning of a situation grows as we mark more differences, similarities, changes, and relations: that is, as we are able to make finer discriminations within the ongoing flow of experience.

Cognitive processing does not occur merely in a linear direction from core to shell structures, however. There are "reentrant connections," so that what occurs at "higher" or more differentiated levels can influence what happens in the limbic areas, which then affect shell regions, in a never-ending dance of self-modulating experience.²² But the core-to-shell movement of cognition helps explain why and how there can be pervasive felt qualities which then issue in acts of differentiation and conceptualization. Tucker summarizes the structural basis for this growing arc of experience that Dewey described as the movement from a holistic pervasive qualitative situation to conceptual meaning:

At the core must be the most integrative concepts, formed through the fusion of many elements through the dense web of interconnection. This fusion of highly processed sensory and motor information ... together with direct motivational influences from the hypothalamus, would create a *syncretic* form of experience. Meaning is rich, deep, with elements fused in a holistic matrix of information, a matrix charged with visceral significance. Emanating outward – from this core neuropsychological lattice – are the progressive articulations of neocortical networks. Finally, at the shell, we find the most differentiated networks ... [which] are the most constrained by the sensory data, forming close matches with the environmental information that is in turn mirrored by the sense receptors.²³

Conceptual meaning arises from our visceral, purposive engagement with our world. As Gallese and Lakoff show, our ability to formulate and reason with both concrete and abstract concepts recruits structures of sensory-motor processing and operates within an emotionally charged motivational framework that evolved to help us function successfully within our complex environments.²⁴

LANGUAGE AND EMBODIED MEANING

Dewey's notion of *meaning* is notoriously obscure, but throughout all of the many definitions of the term in various parts of his writings, certain characteristic elements stand out. A word or symbol has meaning to the extent that, within a certain community of people, that symbol points beyond itself to past, present, or future possible experiences that can be had: "Meanings are rules for using and interpreting things; interpretation being always an imputation of potentiality for some consequence."²⁵ Dewey anticipates the deepest insights of what later came to be known as speech-act theory when he insists that speaking a language is a matter of coordinated social action: "The heart of language is not 'expression' of something antecedent, much less expression of antecedent thought. It is communication; the establishment of cooperation in an activity in which there are partners, and in which the activity of each is modified and regulated by partnership."²⁶ We use symbols that have acquired meaning through "conjoint community of functional use" to inform, question, beg, help, plan, joke, flirt, and a host of other forms of human interaction.²⁷

Dewey also anticipates some of the most significant empirical findings of recent cognitive science research on the bodily grounding of meaning. We have seen that in Dewey's theory of mind and thought, there is no place for ideas as quasi-entities floating around in some disembodied mental space, subject to manipulation by an allegedly pure ego. On the contrary, meaning has to come from experience, and experience is at once irreducibly bodily, biological, and cultural. From an evolutionary and developmental perspective, our higher cognitive functions, including language use and abstract thinking, appropriate structures of our bodily, biological engagements with our environment. Dewey observes that:

Just as when men start to talk they must use sounds and gestures antecedent to speech ... so when men begin to observe and think they must use the

nervous system and other organic structures which existed independently and antecedently. That the use reshapes the prior materials so as to adapt them more efficiently and freely to the uses to which they are put ... is an expression of the common fact that anything changes according to the interacting field it enters ... In a similar fashion, unless "mind" was, in its existential occurrence, an organization of physiological or vital affairs and unless its functions develop out of the patterns of organic behavior, it would have no pertinency to nature.²⁸

What Dewey hinted at some eighty years ago has today become a commonplace in cognitive neuroscience. What are known as "higher" cognitive functions, such as abstract conceptualization and reasoning, appropriate the embodied meaning and the cognitive structures and operations (e.g. making inferences) of our sensory-motor processes:

The brain evolved to regulate the motivational control of actions, carried out by the motor system, guided by sensory evaluation of ongoing environmental events. There are no "faculties" – of memory, conscious perception, or music appreciation – that float in the mental ether, separate from the bodily functions. If we accept that the mind comes from the brain, then our behavior and experience must be understood to be elaborations of primordial systems for perceiving, evaluating, and acting. When we study the brain to look for the networks controlling cognition, we find that all of the networks that have been implicated in cognition are linked in one way or the other to sensory systems, to motor systems, or to motivational systems.

There are no brain parts for disembodied cognition.²⁹

Tucker's claim that "the mind comes from the brain," does not reduce the mind to the brain. It only claims that mental operations must be correlated with various processes in the brain and central nervous system, including all of the bodily centers responsible for perception, motivation, feeling, emotion, and action. Moreover, the neural processes that underlie our cognitive functions occur only through bodily interaction with our environments – environments with tightly interwoven physical, social, and cultural dimensions.

In Dewey's theory of mind language permits us to mark distinctions and to stabilize the meaning that makes mind and abstract thought possible. This view requires the broadest conception of *language*, as involving all forms of symbolic human interaction, and not just words alone: "language is taken in its widest sense, a sense wider than oral and written speech. It includes the latter. But it includes

also not only gesture but rites, ceremonies, monuments and the products of industrial and fine arts."³⁰ The possession of language allows humans to mark crucial distinctions in their experience, to refer to past and future things and events (things that are not now present to us), and especially to formulate abstractions as means of solving problems and coordinating actions. A natural language, for Dewey, would thus be a repository of symbols for all of the distinctions and demarcations of aspects of experience that a culture has found it significant to identify and remember over its long history.

The acquisition of language is such a monumental achievement, according to Dewey, because it makes possible our use of objects and events as *signs*, which can have symbolic and representational value. Felt qualities of a situation have a certain unreflective meaning to us (insofar as they point toward other past, present, or future possible experiences), but language permits us to become reflectively aware of meaning and to organize our experience in terms of that meaning:

Where communication exists, things in acquiring meaning, thereby acquire representatives, surrogates, signs and implicates, which are infinitely more amenable to management, more permanent and more accommodating, than events in their first estate.

By this fashion, qualitative immediacies cease to be dumbly rapturous . . . They become capable of survey, contemplation, and ideal or logical elaboration; when something can be said of qualities they are purveyors of instruction.³¹

In light of Dewey's principle of continuity, then, the central problem for a naturalistic theory of language is to explain the syntax, semantics, and pragmatics of natural languages and symbol systems, but without employing any notion of disembodied mind, conceptualization, or reasoning. Dewey does no more than sketch the broad outlines of such a theory. Key to his view is the idea that meanings of abstract terms must somehow be based on sensory-motor processes of cognition. Structures of perception and action must be appropriated for higher-level cognition and abstract thinking.

Over the past three decades, a new field – known as cognitive linguistics – has developed, which attempts to explain the phenomena of natural languages as products of cognitive mechanisms that have their origins in perception, object manipulation, and bodily motion. Although not directly influenced by Dewey, cognitive

linguistics is based on the assumption that our most impressive feats of abstract conceptualization and reasoning operate through the recruitment of more garden-variety cognitive processes in sensory-motor parts of the brain. The basic form of explanation is that meaning is grounded in our sensory-motor experience and that these embodied meanings are then extended, via imaginative mechanisms such as images, schemas, conceptual metaphor, metonymy, radial categories, and various forms of conceptual blending, to shape abstract thinking. For example, the conceptual metaphor "knowing is seeing" is widespread across cultures because it is based on the experiential correlation (and neural co-activation) of visual experience with gaining knowledge of a situation.

Joseph Grady has hypothesized that any normally functioning human being will acquire hundreds of basic, shared "primary" metaphors of this sort, simply because we have the bodies we do and interact with recurrent regular features of our environment.³² For instance, hundreds of times each day we typically interact with containers (boxes, cups, rooms, our bodies, vehicles) and thereby automatically acquire the spatial logic of containers. If my keys are in my hand, my hand is in my pocket, my pocket is in my pants, and my pants are in my office, then my keys are in my office. This is a corporeal logic that I acquire without conscious reflection, just by interacting repeatedly with my environment (an environment populated by many types of containers that stand in various relations). This "container" logic can then be recruited, via the cross-domain mapping of a primary metaphor (here, the metaphor is "categories are containers"), to structure our understanding of abstract conceptual "containment." Once categories (or concepts) are understood as metaphorical containers, then the logic of physical containment (e.g. if container A is in container B, and container B is within container C, then container A is in container C) carries over to relations of abstract concepts (e.g. all A are B; all B are C; therefore, all A are C).

Primary metaphors can be blended and extended to create more elaborate conceptual metaphors for all of our abstract concepts, such as causation, will, justice, mind, knowledge, and love. Lakoff and Johnson have argued that entire philosophies and scientific theories are based on elaborate developments of systematic conceptual metaphors that are shared by members of a particular culture.³³ Our most important abstract concepts, which are absolutely crucial for our

reflective thinking, are typically defined by multiple inconsistent metaphors, each of which has some source domain tied to concrete bodily experiences.

Although Dewey does not offer an explicit account of conceptual metaphor as lying in the heart of human thought and language, there are places where he appears to have glimpsed just such imaginative processes as crucial to abstract thought.

Every thought and meaning has its substratum in some organic act of absorption or elimination of seeking, or turning away from, of destroying or caring for, of signaling or responding. It roots in some definite act of biological behavior; our physical names for mental acts like seeing, grasping, searching, affirming, acquiescing, spurning, comprehending, affection, emotion are not just "metaphors."³⁴

Were Dewey alive today, he would no doubt take an interest in the large number of cross-cultural analyses of body-based metaphors by which we frame our conceptions of mind, mental operations, and knowledge. Like Nietzsche, Dewey seems to have understood that culturally shared conceptual metaphors, of which we are hardly ever conscious, constitute the deepest habits of our conceptualization and reasoning. As a result, our scientific theories and philosophies are vast systematic developments of underlying metaphors. Such metaphors are not errors or falsifications of a pre-given reality, but are instead the very means by which we can recruit the corporeal logic of our bodies for the purpose of abstract reasoning. Formal logic and mathematics – the allegedly most pure and universal forms of thought – are actually based on metaphoric elaborations of patterns of inquiry that employ the experiential logic of our sensory-motor experience. Lakoff and Nunez, for example, have shown how the spatial logic of physical containers underlies Boolean algebra, and they have extended this form of metaphor analysis into aspects of higher mathematics.³⁵

Because he recognized the metaphorical character of our abstract concepts, Dewey was highly critical of our human tendency to hypostatize concepts and meanings, as though they were eternal, fixed, disembodied essences. Dewey cites the example of Platonism in mathematics, where patterns found to be useful for inquiry are elevated to the mysterious status of absolute entities and relations:

Consider the interpretations that have been based upon such essences as four, plus, the square root of minus one. These are at once so manipulable and so

fertile in consequences when conjoined with others that thinkers who are primarily interested in their performances treat them not as significant terms of discourse, but as an order of entities independent of human invention and use.³⁶

Our mostly unreflective postulating of abstract entities, coupled with our desire for fixity and certainty in the face of our finite, contingent existence, leads us to hypostatize meanings, concepts, and thought processes as though they were eternal, disembodied, and pure of carnal entanglements. Dewey sought to remind us of the bodily roots of meaning, thought, and language, for he saw that only in this way could we explain where meaning comes from and how language can be about our world.

Language is thus a complex, systematic mode of interaction among certain types of creatures, by means of which they use symbols to coordinate their actions, establish relationships, and understand and transform their world. Dewey cannot clearly separate out mind, thought, and language, because mind signifies a reservoir of shared meaning and communication, meaning in its eminent sense requires language, language permits symbolization and abstraction, and thought is a process of inquiry that uses symbols that have meaning for the inquirers.

DEWEY'S NATURALISM AND COGNITIVE SCIENCE

Dewey's naturalism represents his attempt to avoid what he considered the most catastrophic errors of Western philosophy – errors caused by the model of mind as a disembodied theater of consciousness in which abstract entities (ideas) are examined and manipulated (by a pure ego) according to absolute logical rules to secure epistemic certainty and unchanging truth. What is missing in this model is the inescapable temporal and bodily character of all experience and thought. Thinking, for Dewey, is a *process* that emerges from our bodily engagement with our surroundings. Dewey learned from the dominant behaviorist psychology of his day to emphasize the importance of action and the transformation of the world, rather than internal “mental” states and operations. At the same time, however, he is no mere behaviorist, because he appreciates the critical role of

the felt unifying qualities of situations and the role of feelings and emotions in meaning and thought.

It is such tendencies in Dewey's thinking that align him with so much cognitive science in the twenty-first century. The relevant cognitive science is not the disembodied sort popular during the first two-thirds of the twentieth century, which grew out of computer science, artificial intelligence, and analytic philosophy of mind and language. Indeed, Dewey's non-dualistic, non-reductive, and process-oriented account of cognition provides a critique of disembodied, functionalist views that characterize the first-generation orientation. Dewey would have been much more at home with "second-generation" (embodied) cognitive science, which requires a radical rethinking of some of our most enduring conceptions about human thinking and communication.³⁷ Virtually every key term (e.g. reason, mind, self, meaning, thought, logic, knowledge, will, value) has to be re-conceived from the perspective of embodied cognition. There can be no assumption of disembodied entities, capacities, or processes. Concepts are not quasi-entities but rather "takings" from the flow of experience – a flow that is not merely mental or merely physical but both at once. There can be no single unified center of consciousness that controls perceiving, thinking, and willing. Neuroscience reveals no such center, but instead finds massive parallel processes loosely coordinated within a certain temporal window that is felt by us as a moment of experience.³⁸

In short, pragmatism's greatest contribution to cognitive science is to construct the appropriate general philosophical context for understanding the empirical results about mind, consciousness, meaning, thought, and values. Second, pragmatism can identify and criticize limiting or mistaken methodological assumptions that define the various sciences of mind. Finally, beyond sketching the broadest possible framework for studying mind and language, pragmatism can show us how to interpret the relevant implications of cognitive science for our everyday lives.

For example, were Dewey alive today, one can imagine him challenging reductionist tendencies in scientific explanations wherever he might discern them. The complexity of brain functioning understandably leads some researchers to isolate functions and then look for neural correlates for them. However unavoidable such decontextualizing moves might be in actual research, Dewey would have

rightly insisted on always remembering that mind, thought, and language are grandly multidimensional, requiring not just a functioning brain, but also a functioning body to serve it, which in turn is continually interacting with complex environments that have physical, social, and cultural dimensions. Fortunately, reductionism need not be an intrinsic part of any of the cognitive sciences, which can recognize multiple irreducible levels of explanation. This is why Dewey's theory of mind, thought, and language can be seen as loosely compatible with contemporary cognitive science of the embodied mind. However, because we are just beginning to glimpse what the discoveries of the cognitive sciences mean for our lives, pragmatism's work has only begun.

NOTES

1. J. Dewey, *Experience and Nature* (1925), *LW* 1:18; emphasis in the original.
2. J. Dewey, "The Reflex Arc Concept in Psychology" (1896), *EW* 5:99.
3. J. Dewey, *Logic: The Theory of Inquiry* (1938), *LW* 12:31.
4. Dewey, *Logic: The Theory of Inquiry*, p. 26; emphasis in the original.
5. Dewey, *Experience and Nature*, p. 200.
6. Dewey, *Experience and Nature*, p. 211.
7. Dewey, *Experience and Nature*, p. 217.
8. Dewey, *Experience and Nature*, p. 217.
9. A. Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain* (New York: G. P. Putnam's Sons, 1994), p. xvii.
10. Dewey, *Experience and Nature*, p. 224; emphasis in the original.
11. Dewey, *Experience and Nature*, p. 230; emphasis in the original.
12. Dewey, *Experience and Nature*, p. 198.
13. D. Tucker, *Mind from Body: Experience from Neural Structure* (Oxford: Oxford University Press, 2007), p. 202.
14. Dewey, *Logic*, p. 29.
15. J. Dewey, *Human Nature and Conduct: An Introduction to Social Psychology* (1922), *MW* 14:25.
16. J. Dewey, *Art as Experience* (1934), *LW* 10:44; emphasis in the original.
17. J. Dewey, "Qualitative Thought" (1930), *LW* 5:246.
18. Dewey, *Art as Experience*, p. 249.
19. The following description of a possible neural basis for the experience of a pervasive quality is taken, with minor revisions, from my book, M. Johnson, *The Meaning of the Body: Aesthetics of Human Understanding* (Chicago: University of Chicago Press, 2007), chapter 4.

20. Tucker, *Mind from Body*, pp. 80–81; emphasis in the original.
21. Tucker, *Mind from Body*, p. 97.
22. G. Edelman and G. Tononi. *A Universe of Consciousness: How Matter Becomes Mind* (New York: Basic Books, 2000).
23. Tucker, *Mind from Body*, p. 169.
24. V. Gallese and G. Lakoff, "The Brain's Concepts: The Role of the Sensory-Motor System in Conceptual Knowledge," *Cognitive Neuropsychology* 21 (2005), 455–479.
25. Dewey, *Experience and Nature*, p. 147.
26. Dewey, *Experience and Nature*, p. 141.
27. Dewey, *Logic*, p. 52.
28. Dewey, *Experience and Nature*, pp. 217–218; emphasis in the original.
29. Tucker, *Mind from Body*, p. 58.
30. Dewey, *Logic*, p. 51.
31. Dewey, *Experience and Nature*, pp. 132–133.
32. J. Grady, "Theories are Buildings Revisited," *Cognitive Linguistics* 8 (1997), 267–290.
33. G. Lakoff and M. Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York: Basic Books, 1999).
34. Dewey, *Experience and Nature*, p. 221.
35. G. Lakoff and R. Nunez, *Where Mathematics Comes from: How the Embodied Mind Brings Mathematics into Being* (New York: Basic Books, 2000).
36. Dewey, *Experience and Nature*, p. 153.
37. Lakoff and Johnson, *Philosophy in the Flesh*.
38. See Edelman and Tononi, *A Universe of Consciousness* and A. Damasio, *The Feeling of what Happens: Body and Emotion in the Making of Consciousness* (New York: Harcourt Brace and Company, 1999).