Extended Mind and Representation

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ABSTRACT: Good old-fashioned cognitive science characterizes human thinking as symbol manipulation qua computation and therefore emphasizes the processing of symbolic representations as a necessary if not sufficient condition for "general intelligent action."[1] Recent alternative conceptions of human thinking tend to deemphasize if not altogether eschew the notion of representation.[2] The present paper shows how classical American pragmatist conceptions of human thinking can successfully avoid either of these extremes, replacing old-fashioned conceptions of representation with one that characterizes both representatum and representans in externalist terms.

Keywords: externalism, representation, computation, pragmatism, George Herbert Mead, symbol system, extended mind

First, cognitive externalism will be briefly explained, along with a review of how a pragmatist conception of experience stacks up as a kind of "pre-cognitive" externalism.[3] Second, a pragmatist social-psychological conception of mind will be presented—along lines initially developed by George Herbert Mead and John Dewey—to show how both symbol systems and systems symbolized (mind and world, ideas and facts) may be conceived in externalist terms.[4] Finally, an externalist conception of representation along these lines will be briefly outlined. Each of these three steps supports an alternative version of the brain-as-computer metaphor where the brain and nervous system are cast as only *part of* a computer, e.g., as a so-called *chipset*.[5]

1. Pragmatist Psychology and Cognitive Externalism

Cognitive externalism is more an attitude than a particular doctrine. As such, it is a background framework of assumptions or presuppositions pertaining to how best to go about investigating the nature of human cognition.

Cognitive externalism emerged at the end of the 20th century as part of a response to the research methodology of "good old-fashioned artificial intelligence and robotics" (GOFAIR)—a multidisciplinary research paradigm that prevailed from the 1950s into the late 1980s. The GOFAIR conception of mind was taken essentially from 17th- and 18th-century British empiricism by way of the psychophysical methodology pursued in the "new psychology" of the latter half of the 19th century. In the 1950s,

computers and *computation* and a respective computer-metaphorical conception of the brain and/or mind emerged—basically as a supercharged version of the chemistry metaphor at the heart of Lockean empiricism and the steam-engine metaphor at the heart of Humean empiricism, not to mention the clock metaphor at the heart of Cartesian rationalism. Unfortunately, GOFAIR research did not purposefully confront the recalcitrant conundrums of modern epistemology, hoping perhaps that a computer metaphor would be able to bypass if not cut through those conundrums. The GOFAIR paradigm therefore languished by the end of the 1980s, having failed to measure up to its own high expectations. A number of alternative perspectives began to take hold promoting various conceptions of mind as embodied, embedded, enactive, and extended,[6] not to mention situated, distributed, dynamical, and ecological.[7] Computation and computer metaphors have remained in the picture, but recent innovations have been less constrained by the suppositions and presuppositions of GOFAIR.

In particular, Clark and Chalmers published their seminal article, "The Extended Mind,"[8] that initiated a debate about the plausibility of an externalist conception of mind. Cognitive externalism is essentially a kind of functionalism, drawing on the principle of multiple realizability[9] as reflected in what Clark and Chalmers call the "parity principle." In short, any part of the world that functions in a process that we would easily accept as part of a cognitive process if it were to take place in the brain may be just as easily accepted as being part of a cognitive process.

In effect, the extended-mind thesis may be cast as a version of the computer metaphor except that the "motherboard" is allowed to encompass aspects of the world beyond the brain and central nervous system. For example, the brain might function on the whole or for the most part as a "chipset" with a nervous system composed of various "buses," while the mind's "CPU" and "memory" may include aspects of the body *and* its environment. What matters is the functionality of the system as a whole regardless of how and where its structural realization is located. If information that is present in the world can be accessed and utilized as easily and "immediately" as is information present in neural systems, then there is no good reason to characterize only the latter as accessing "main memory."[10]

The implications of such a view are significant in various ways. The point to be emphasized here is that a similar view was promoted by Mead and Dewey more than a hundred years ago in a different context, preceding by many decades the advent of the computer metaphor and machine-state functionalism. The Chicago school of pragmatism in the 1890s promoted a form of functionalism, after all, though functionality was conceived in terms of the utility of various actions in instances of

agents having to deal with given uncertainties or present difficulties. This conceptual orientation was Darwinian, not computational. The agent in this case was at bottom a live creature instinctively intent on staying alive. Episodes of resolving difficulties by a given live creature are what Dewey called "experiences"[11] and what Mead called "acts."[12] These notions are directly related to Dewey's early notion of the "unit of behavior"[13] and his later conception of inquiry,[14] which in turn is an enhanced generalization of Peirce's doubt-belief conception of inquiry[15] as a process of "fixing" (as in stabilizing) belief in response to some respective destabilizing doubt (where scientific methodologies supply the best way to find such solutions, etc). The ongoing procedural nature of staying alive conceived in such terms was therefore neither computational nor non-computational in character, nor did it assume mental or representational capabilities in its most general formulation.

To put it simply, the structuralist distinction between sensory input and motor reaction (together constituting a "reflex arc") was to be replaced by a functionalist stimulus/response distinction. The simplest "unit of behavior" (Dewey) or the simplest "act" (Mead) was to be identified with a process of habituation or conditioning (a process of resolution, etc.) in which (1) interactive but discordant sensory inputs and correlative motor outputs are *both* present in the stimulus, and where (2) the response is a learned (educated, evolved) coordination of such input/output interactions—the (re)formation of a particular routine mode of behavior (a habit, as it were) in which respective inputs and outputs are reliably if not robustly coordinated. *An experience* (for Dewey) or *an act* (for Mead) is thus neither a sensory input nor a motor output but rather a distinct episode of resolution (habit formation, learning, etc.) in which discordant manners of input/output interaction are ultimately and routinely coordinated. (Or when such coordination is not forthcoming, exit from and avoidance of such interactive circumstances is perhaps the only "resolution," if such remains possible.)

In this view, things are what they are for a given live creature by virtue of their functional roles in resolving difficulties. A brick or a shoe *is* a hammer not by virtue of its particular matter or general form but rather because it can fulfill the function (can serve the purpose) of pounding a nail. Not just mental abilities but *any type of thing* would be cast in such functional terms. Objects are what they are (on the fly) by virtue of how they function in service to living—to one's staying alive, maintaining some degree of well-being if not perhaps flourishing.

The fact that this view is compatible with a kind of cognitive externalism is not hard to see. First, consider the claim that an experiencer (and thus a thinker?) is *constituted* by systems of habits—stable systems of processes and mechanisms for orchestrating input/output interactions. If

such habits are extended, then an experiencer constituted by such habits is extended. So are habits extended? Habits consist of reliable ways that systematic couplings of both inner and outer events and processes are coordinated and wielded in respective inner/outer circumstances. As embodiments of law-like regularities, habits are relational in character. Peirce[16] describes habits as general law-like "rules of action." As such, habits are engrained attunements of the experiencer to relationships among variables such that changes in one or more such variables will in a regular law-like manner involve (effect or be the effect of) variations in other respective variables. These law-like regularities may involve both "inner" and "outer" variables, not to mention variables that are not exclusively either.

For instance, a child's learning how to walk depends as much on reliable constancies in its environment (gravitation, flat surfaces, hard surfaces, etc.) as on reliable physiological features (neural, muscular, skeletal, etc.). The presence of a constant force of gravity is as essential to learning to walk as is the constant rigidity of one's shins and thighbones. A direct law-like correlation between energy expended and distance travelled can be realized only in the presence of such inner and outer constancies. Thus a learned ability to walk cannot be located only in growing muscles and bones (involving, e.g., bone rigidity, energy consumption, the coordination of visual and tactile neural systems, etc.) but must involve respective variables in the environing world as well (e.g., the direction and magnitude of the force of gravity, directions and distances to be travelled, the orientation and contour of the surrounding terrain, etc.). Some parts of the walking process will also involve variables that singularly cannot be so easily identified as bodily or environmental (e.g., directions and speeds of limb movements, directions of bodily orientation relative to the direction of the force of gravity, etc.). This is one of any number of such examples of habits that incorporate both bodily and environmental variables. We may readily say that habits as such involve (causal, dynamic) *couplings* of processes and mechanisms involving both environmental and bodily variables.

So, *if* the experiencer is constituted by habits in this sense, then the experiencer would be extended across any alleged inner/outer divide as far as its habit-couplings are extended across any such divide. An experiencer will be *constituted* by inner/outer couplings *insofar as* it is constituted by its habits.

But there is a glitch here. The coupling/constitution challenge[17] is not yet answered merely by saying that the experiencer *is* the couplings. That conclusion has been drawn by way of arguing that habits are extended; but there is no principled reason (yet) not to say instead that the experiencer *is* only those aspects of habits that are enclosed within the skin, etc., not

including anything else in the external world that may be necessary for their proper functioning.

In response, we may instead postulate that an experiencer is constituted not by habits as such but by the *continued functioning* of (systems of) habits. That is, the one most fundamental fact about an experiencer is that it is alive and thus continually active in various ways, living in ways governed by its habits and frequently if not forever attending to instances where the ongoing functioning of those habits is impeded or threatened. These life-activities *constitute* the experiencer. That is, an experiencer is made up not of habits, strictly speaking, but of the *workings* of habits.

As such an experiencer is an integrated (and growing) fusion of experiences—that is, experiences regarded in a count sense as episodes of coordination etc. The word 'experience' is also used as a mass noun ("His experience was limited to advertising and sales") or as a verb ("She experienced success for the first time"). In all of these kinds of usage—whether as a count or mass noun, or as a verb—the core notion is that of coordination of an *extended* range of causally coupled things and activities.

If this sounds odd or unusual, consider the transitive verb 'plowing' ("He is plowing the north forty"), the intransitive verb 'plowing' ("He is plowing quickly"), the mass gerund 'plowing' ("Plowing takes time") and even perhaps a count gerund 'plowing' ("His plowings from one day to the next were consistently straight and even"). Implicated in each of these kinds of usage is an activity involving, e.g., a tractor pulling a plow across a field with the curved plow blades slicing through and turning over portions of soil, all dependent upon a uniform downward gravitational force making possible the traction of the tractor tires as well as the slicing force of the plow blades. One might ask then where the plowing as such is located in this scenario. In one legitimate sense it is where the plow is actually slicing the soil. That might be the focus of a mechanical engineer intent on designing a better plow. Note that plowing in that sense is not just in the soil nor just in or on the blade but in the *slicing* of the soil by the blade. Likewise, for a farmer intent on *using* a given plow to prepare for this year's crop, plowing may be regarded as the regular back-and-forth movement of the tractor-and-plow through the field—located not in any one component of this activity but in the activity as a whole (including the continuing pull of gravity keeping the tractor and plow pressed to the soil). In a third sense, plowing can be regarded as a "simple" act as part of growing and selling a crop—regarded, namely, as a black box where the "box" encloses an extended range of activities as outlined in the previous two senses of the word. The word 'plowing' has many such senses, but it is easy to see that, whether as a noun or a verb, it designates a kind of

working that is extended across various causally coupled things and activities.

Analogously, the workings of habits that constitute an experiencer are easily conceived, in perhaps several senses, as extended across many causally coupled things and activities inside and outside of the head.

To summarize, this position may be characterized as follows: (1) the experiencer is first and foremost a *live sentient creature* and thus a fusion of token life-activities; (2) these life-activities are systematically governed in law-like ways by *habits* (as explained above); (3) the creature's *efforts* and *attention* tend to be directed at conditions where such habits are functioning with some actual or prospective difficulty; (4) the creature's *experiences* are (by definition of the term, as a count noun) episodes of attempting to resolve such difficulties; (5) generically, the *purpose* of any such experience will be to resolve the respective discordance or difficulty so as to maintain some overall coordination of the experiencer's habits (even if some of the latter require modification); and (6) distinctive elements or features or dimensions of an experience are what they are (contextually) by virtue of the type of role they play in securing a resolution to the given difficulty.

The last claim says in effect that this position is a kind of externalist-friendly *functionalism*. On this account, an experiencer is continually repairing itself (or attempting to do so) from one experience to the next. The point of such repair is to secure and maintain the coordinated working of inner/outer life-activities insofar as that coordinated working is the experiencer itself. In that case, different aspects of experience are what they are by virtue of the role they play in such working. In *this* functionalist sense, moreover, as the coordinated working of inner and outer life-activities, the experiencer is best regarded as extended. That is, the experiencer *is* the working of habits, and *the working of habits* is extended.

This includes the workings of life-activities before, during, and after any given episode of repair. It includes the workings of repair itself, the latter being the essence of *experience* (in a mass sense), episodes of such repair being the *experiences* (in the count sense) where attention is focused (where effort is directed, etc.). The coupling/constitution issue in the case of experiences (as opposed to the experiencer) is a matter of locating where such repair processes take place. Item (5) in the summary above indicates how the actual repair process will often be extended into the world (building a fire, patching a roof, locating water). What matters in such instances is securing the working coordination of inner and outer processes such that repairs will typically include manipulations of environmental factors involved in that coordination.

Applying a computer metaphor here, we should expect that the workings of the "CPU" of an actual (as opposed to artificial) experiencer will be slow compared to those of present-day computers given that the former will sometimes involve, e.g., tactile/mechanical manipulations of objects in the environment (pebbles in grooves of wooden or stone tablets, chalk marks on blackboards, pencil or ink marks on pieces of paper, and so forth). Actual calculators and computers in general (not to mention other technologies), rather than *modeling* brains, in fact provide mechanical *enhancements* of the latter kinds of manipulations (speed them up, render them more reliable, etc.) and thus, as external devices, may become incorporated into the constitution of experiencers who can effectively utilize them.

In this sense, rather than think (metaphorically) of brains as computers, it might be better to think (literally) of computers as machines that enhance our natural abilities to manipulate information. The brain is no more a computer than it is a clock or steam engine. Steam engines, with some added engineering, enhance what we can do with our arms, hands, backs, and legs (as conduits of power). Computers enhance what we can do with pebbles in grooves or pencil marks on paper (as conduits of information). A computer metaphor may well be useful, but things need to be aligned and characterized properly. A brain *by itself* is not best thought of as a CPU. Rather, the workings of an actual CPU, literally, are a technological enhancement of *manual activities* that otherwise are slow, monotonous, and respectively unreliable. The brain, from a metaphorical perspective, is more like a "chipset" mediating processes that take place outside of the brain/chipset itself—processes of a manual character that take place outside of the body altogether.

So, then, what about *mental* abilities if we do not liken them to CPU-centric computational abilities? The word 'mind' is not a gerund. The word 'thinking' (as a verb or as a gerund) is closer to 'plowing' in grammatical usage. One could argue by analogy that thinking is extended in various senses much like plowing is extended (as two different but analogous kinds of workings) if only one could specify the analogues of tractor, plow, soil, and/or gravitational force. Actually, whether the latter is doable or not, it misses an interesting point.[18]

Grammatical usage of the word 'mind', as a noun, is more like the grammatical usage of the noun 'home'. Many uses of the noun 'home' also implicate various kinds of "workings" that are hard to locate anywhere that is not extended across various causally coupled things and activities. When asked where your home is, you may first think of a particular house, though as the song says, "a house is not a home when" etc. When a real estate company tries to sell you a "home," they are really only selling you a house, though the sales pitch implicates that the house is

such that it could be the center or focus of activities that constitute a home. A house may well be the locus of a home, but it does not encompass the full extent of a home insofar as the wider neighborhood and community (including everything from schools and roads and accessible employment opportunities to reliable plumbing and power) is important if not essential to maintaining the kinds of "holdings tight" and "kisses goodnight" that also are essential to "turning a house into a home." Might we regard *mind* in an analogous way?

The interesting point here is that we have already cast experience and experiencers in just this way. It is not clear what more can be said along these lines that would distinguish *mind* over and against *experience*. It might be that there is no real difference other than that mind (something possibly unique to humans) is just a particularly complex mode or faculty of experience that has emerged over millions of years of natural evolution. Thus mind is extended because experience is extended. But this is not very satisfying even if there is perhaps a grain of truth in it. Several distinctive features of thinking remain unaccounted for if we stop with merely a hand-waving appeal to evolutionary "complexity."

These missing features are linked to the notion of representation. They are features that are perhaps best explained in terms of representation and the use of representations. For instance, the word 'think' is a verb ("You should think about what you have done"). Thinking is a kind of activity that has a distinctive "aboutness." We think *about* stuff. This is something else besides the directedness of experiences. That is, we think about stuff typically for some reason. Having a purpose, a reason for doing such and so, is a way of being directed. Thinking might take place in order to achieve that purpose, e.g., as a way of stepping back and planning a course of action or assessing possibilities. Another way to illustrate this point—that aboutness and directedness are not the same thing—is to contrast thinking with inquiry. Inquiry typically involves more than just thinking, but thinking may take place in order to advance some inquiry. Inquiry will be *directed* at some problematic subject matter, while respective thinking will be *about* features of that subject matter. For instance, one may think about the facts at hand in order to formulate some testable explanation of those facts.

Nothing in the last paragraph is particularly contentious, though it does not tell us very much about what thinking is. Whether we regard mind as extended or not, we need to be able to make sense out of the fact that we sometimes stop what we are doing and think about it. We sometimes stop and think about what we are doing. We sometimes stop to think. There are various ways to say that. It casts at least some kinds of thinking as involving disengagement from ongoing activities in order to reassess aspects of those activities that "give one pause," as it were. Casting

experiencers as bundles of workings of intertwined habits does not directly say anything in particular one way or the other about this kind of disengagement that accompanies at least some kinds of thinking.

A plausible explanation might be found in an account of representation and the use of representations as occurring "inside the head." This would surely distinguish thinking as such from experience more generally if, as proposed above, the latter were regarded as typically being extended outside of the head. Thinking would thus be distinguishable as a kind or aspect of experience that essentially takes place entirely in the brain. Stopping to think would then be a matter of "turning inward."

This might serve to "save the appearances," but it is not the tack taken by Mead and Dewey. A pressing problem for Mead and Dewey was to find an account of mind the origins and character of which could be explained in naturalistic evolutionary terms. Mead in particular thought this problem through in some detail and developed a view of thinking as a distinctive kind of extended experience specifically suited to representation and the use of representations. There is no reason to locate this particular kind of activity inside the brain exclusively so long as it can function as a manner of disengagement from automatic activities in order to facilitate the consideration of possible options and the planning of how better to proceed (typically in response to difficulties emerging in merely automatic activities). What distinguishes thinking in this sense from other kinds of "workings of habits" is that it is a kind of reflexivization of the workings of *social* habits. Evolutionarily speaking, we are thinking creatures *because* we are more fundamentally social creatures. In this view, thinking is extended not just because it is a kind of extended experience but also because it specifically involves extensions into social and cultural environments.

We can think only because we can converse, so to speak. How does Mead explain this?

2. Social and Cultural Externalism

It has been proposed that a living, growing creature should be conceived as the workings of integrated bundles of habits (routine ways of acting or being, established ways of life, etc.) that as such are not confined in their constitution to the interior of the creature's skin or skull. A habit in itself is to be regarded as a more or less settled (fixed) coordination of bodily and environmental factors. In other words, a live creature is supposed to be a body-in-an-environment whose ways of living are continually evolving in such a manner as to maximize the chances of its staying alive. Ways of living become established (as habits) insofar as they work successfully in promoting survival and wellbeing. Growth and evolution are matters of the continual development and modification of habits,

broadly conceived, such that the latter are precisely what constitute the features and character of a given type of living body-in-an-environment.

Much of the motivation for this way of thinking, for Mead and Dewey, was to avoid the irreparably convoluted inconsistencies of modern epistemology. It called for starting over more or less from scratch to build up a different picture of experience, rationality, and human nature in general. Dewey and Mead consciously sought to begin with *and to maintain at every turn* a conception of the thinking creature as an integrated living body-in-an-environment. Rather than having to bridge an unbridgeable Cartesian chasm between body and mind, the task for Dewey and Mead was to explain how (and what it even means to say that) a species of live creatures might *evolve* mental capabilities.

Burke[19] explains Mead's just-so account of the evolutionary origins of mental capabilities and the capacity for selfhood. Burke and Everett[20] show moreover how Mead's evolutionary social psychology promotes an externalist conception—indeed a socially-externalist conception—of *mind* and *self*. Namely, in line with contemporary cognitive externalism, the world exterior to a given brain and skull includes other brains and skulls, many of which interact in social groups. It is a simple corollary that societies are part of the world external to individual brains and skulls and thus would surely be part of any "extended mind" if anything is.[21] We will review this account in order to better comprehend the role of *representation* in Mead's social psychology.

The following rather dense passage introduces and in effect defines several key terms—"idea," "symbol," "significant symbol," "thought," "thinking," "abstract thinking," "objectivity"—that together give a fairly good picture of Mead's conception of mentality. The terms just listed are italicized in the quote below though not in the original text.

> The possibility of this [adoption of an attitude of the other] entering into his experience we have found in the cortex of the human brain. There the co-ordinations answering to an indefinite number of acts may be excited, and while holding each other in check enter into the neural process of adjustment which leads to the final overt conduct. If one pronounces and hears himself pronounce the word "table," he has aroused in himself the organized attitudes of his response to that object, in the same fashion as that in which he has aroused it in another. We commonly call such an aroused organized attitude an *idea*, and the ideas of what we are saying accompany all of our significant speech. . . . Where a vocal gesture uttered by one individual leads to a certain response in another, we may call it a *symbol* of that act; where it arouses in the man who makes it the tendency to the same response, we may call it a *significant symbol*. These organized attitudes which we arouse in ourselves when we talk to others are, then, the ideas which we say are in our minds, and insofar as they arouse the same attitudes in others, they are in their minds, insofar as

> they are self-conscious in the sense in which I have used that term. But it is not necessary that we should talk to another to have these ideas. We can talk to ourselves, and this we do in the inner[22] forum of what we call *thought*. We are in possession of selves just insofar as we can and do take the attitudes of others toward ourselves and respond to those attitudes. We approve of ourselves and condemn ourselves. We pat ourselves upon the back and in blind fury attack ourselves. We assume the generalized attitude of the group, in the censor that stands at the door of our imagery and inner conversations, and in the affirmation of the laws and axioms of the universe of discourse. . . . Our *thinking* is an inner conversation in which we may be taking the roles of specific acquaintances over against ourselves, but usually it is with what I have termed the "generalized other" that we converse, and so attain to the levels of *abstract thinking*, and that impersonality, that so-called *objectivity* that we cherish. In this fashion, I conceive, have selves arisen in human behavior and with the selves their minds.[23]

Individuals are able to think, on this account, insofar as they are able to converse reflexively in just the ways that they converse with other social objects, this being possible because those manners of interaction already function habitually if not instinctively in individuals' normal conduct.

To help fill out this story, recall the general sense in which Mead's story is an *evolutionary* story.[24] The basic idea for Mead is that new types of *activities* described at each stage of any such evolutionary account will initially emerge as effective means to achieving various ends (constrained and motivated by changing environmental conditions as much as by established behavioral capabilities). When such activities prove to be valuable (and if they are otherwise naturally selectable), they may generate new species-specific *abilities*. In that case, the possibility of regularly engaging in a given activity becomes an engrained, embodied ability—thus an evolutionary accomplishment, an evolutionary achievement, a further step or stage in evolutionary development of the species.

This suggests a ratcheting process.[25] Evolutionary progress is not just a matter of individuals or species engaging in *new activities*. It also requires stabilizing the capacity to engage in those activities so as to establish new inheritable ready-to-hand *abilities*. It is not just a matter of composition and variation but also of selection and transmission. The combined effects of composition and variation plus selection and transmission of abilities constitute the innovation plus stabilization that characterize a ratcheting process.

It must be emphasized that *abilities*, not genes, are the focal units of evolutionary explanation, both biological and cultural. In particular, the evolution of *social objects* need not be reduced to genetic or genotypic versus phenotypic evolution. Genes are one kind of embodiment of

stabilized achievements of new abilities, to whatever extent the latter are biologically transmittable from parent to child. But some abilities—e.g., the corpus of abilities that constitute *language*—are to a great extent transmitted by other means. The Lamarckian notion that "an individual organism changes during it's lifetime, and these changes can be passed on to offspring" begins to make some sense here so far as cultural evolution is concerned. The evolutionary stories we have to tell in such cases could *nevertheless* be cast in terms of evolutionary ratcheting processes.

Specifically, a corpus of abilities that constitute *language* has come to be part of the innate hereditary (genetic) legacy of humans, only needing to be triggered and adequately sustained as a child develops. A general capacity is transmitted biologically. Genetic variations may in fact result in certain linguistic *in*capacities,[26] where such exceptions prove the rule, as it were. But specific abilities that constitute competence with particular languages like English or Portuguese are *not* transmitted biologically—English and Portuguese are not hard-wired. These particular abilities are transmitted by *cultural* means that are simply not explicable in terms of genes alone. We can generalize this to virtually any kind of culture-specific abilities.

Mead's story on the whole is a fairly complicated evolutionary story that attempts to explain *how* mental capabilities might have come about at all—as opposed to mere perceptual abilities that would be expected of a healthy frog or any other kind of sentient creature. The story eventually involves the reflexivization of social capabilities in order to produce robustly individual thinking selves.[27] This story is consistent with an externalist view of mind and self beyond the individual skull, not just physically but socially.

The acceptability of Mead's account of human origins hinges particularly on being able to justify the later stages in that account—to show, namely, how the later steps are evolutionarily enforceable without recourse to explanatory skyhooks. The story we want to tell calls for a particular succession of biological ratcheting effects that need not be uniquely human, nor must they have occurred exactly when they did. But as a matter of fact, they developed in such a manner as to enhance human *cultural* ratcheting in unprecedented ways, attaining some kind of threshold momentum by roughly fifty thousand years ago. Such evolutionary advances might be the result not just of increasingly complex machinations of symbols and the habits these symbols may trigger but of the emergence of abilities to appreciate and freely manage (1) *recursively enumerable* grammars of symbols that (2) are suited for reference to yet-to-be-actualized possibilities. In this sense, we would have to account not just for the emergence of symbols or even languages, but of symbolic languages that allow open-ended consideration and management of

possibilities—thus engendering conditions crucial for the acquisition of essential human characteristics such as the capacity to *think*, *analyze*, and *theorize*. From a functionalist perspective, the thinker's thinking and hence the thinker are to be cast as being constituted by the workings of the abilities that make for such capacities. If parts of these workings take place outside of the skull, then the *thinker* is not to be located wholly within the skull.

It is no surprise of course that Mead's story envisages a kind of social externalism. Mind as such is located in a field of conduct that encompasses both individual and object. A pertinent fact here about "an environment" is that some of its constituent objects will in many cases be *social objects*.

What does that mean? In general, established organism/environment relations determine the types of objects that occupy a living being's environment. That is, objects are individuated depending on how the living organism and environment are dynamically related. "Objects exist in nature as patterns of our actions."[28] Different types of living beings may thus have very different environments in one and the same physical expanse.

This relational perspectivity applies all the more to other living creatures of one's kind (or in the group to which the given living creature belongs) such that another of one's kind is a particular sort of object—a *social object*—in one's environment. If Otto's mind encompasses tablets on which he can write, then it just as easily encompasses other people to whom he is appropriately related in some stable fashion and with whom he can converse or otherwise cooperate.[29]

A key component of Mead's story at this point is that one's social group *as a stably organized whole* may be regarded as an agent capable of *gesturing* (that is, as a social object with tangible features). Vocal gestures (as a contingent matter of fact) are especially well suited to facilitating self-consciousness insofar as an individual is easily capable of gesturing to an entire group *and* an entire group may react in kind as a single social object. Vocal-gesturing capabilities of course have a long evolutionary lineage, antedating the emergence of selfhood by a long shot; but that only means that they are present as a reliable medium of gesturing by the time some such medium would figure into the emergence of self-consciousness.[30] The point is that (anticipations of) regularities in individual/group interactions are subject to being incorporated into one's normal (habitual) conduct. An individual, then, will find itself "tending to act toward himself as the other acts toward him" just when (1) vocal gestures made *and heard* by the same individual can initiate tendencies to respond to them as the group would respond to them such that (2) this "beginning of an act of the other in himself" (adopting an attitude of the

other, as it were) enters into his own experience. The organized reactions of the group as a whole will thus become "imbedded" in the individual's own conduct. A "generalized other" in effect defines the individual's *character* as a unique personality insofar as it incorporates the group's tendencies into the habitual conduct of the individual.

Complex social institutions can therefore be social objects in this way, namely, where an individual is appropriately related to such institutions in a stable way and with which that individual can dynamically interact. Things like coffee cups, chairs, pens, and paper exhibit various tangible features in a given living creature's experience depending on how they function in the relational dynamics of that experience. Social objects, as physical objects, will likewise have tangible features, and one peculiar class of these tangible features will include so-called "gestures"—a particular kind of stimulus to action that serves as the currency of social interactivity as such.

Another important element of the story here is Mead's conception of an *attitude*. An attitude of a given type (by definition) is a "readiness to act" in some respective way. Adopting an attitude, then, is making ready to act in some respective way, readying respective abilities without completing their execution. In the event of adopting an attitude, the range of possible consequences of executing the respective actions are just that: unactualized possibilities. These possibilities are accessible as objects of attention (available, that is, as *anticipations* or *expectations*) insofar as they are built into the habits that constitute respective abilities that have been readied by adopting the given attitude. Detecting such possibilities in given circumstances is essentially just a case of distance detection, but "distance" in a "space" of possible results of possible courses of action in a quite broad sense. Distance detection, literally, is of course a very primitive capability that emerged very early in animal evolution; so there is nothing magical going on here if such magic was not going on then.

Social acts (whether hostile or benign) typically involve the adoption of preparatory attitudes (posturing in various ways: hailing, greeting, threatening, feigning, placating, etc.) that themselves may be regarded as constituent "utterances" of a sort in a developing conversation of attitudes (for example, consider two grown male dogs sizing each other up, mutually deciding whether or not to fight). Such conversations of *attitudes* can be complicated, and abilities to engage in such complicated conversations can be evolutionarily useful insofar as they introduce a capacity for weighing different possible consequences of various courses of action short of actually executing those actions.

Then, recall Mead's statement quoted earlier that, in more evolved forms, such aroused attitudes are what we would call *ideas*. Ideas in this sense are inherent in the utterances that constitute conversational speech

insofar as such utterances are gestures indicating respective attitudes. Somewhere along the evolutionary/developmental line, certain types of gestures will have become associated with respective types of ideas. "Where a vocal gesture uttered by one individual leads to a certain response in another, we may call it a *symbol* of that act; where it arouses in the man who makes it the tendency to the same response, we may call it a *significant symbol*."[31] Such symbolic gestures become the *terms* by means of which *conversations* as social acts may take place.

All of this rests on having stabilized and maintained abilities to converse—abilities that continue to function and change so as to make possible the alteration (degradation or enrichment) of abilities higher (later) in the evolutionary ratcheting hierarchy. Details of how such capabilities come about are sparse, but an account of the emergence of capacities to think pivots on the advent of symbols and symbol systems as means for managing if not exploring different types of attitudes and systems thereof—as means for managing and exploring ideas, as it were. Symbols, recall, are types of gestures, e.g., types of vocal gestures used in conversation or in the coordination of social acts more generally. If we now plug this into the story outlined earlier about a *generalized other* as an interlocutor in reflexive "talk," we get what we could call *thinking* as reflexive talking by means of "significant symbols" (whether silent or audible).

Another important point here—one that shows how Mead's view differs from Hobbesian psychological egoism—is that *social objects* predate *selves*. Our ancestors surely lived as members of well-defined cooperative social groups long before they were selves. Civilization and culture are not the later product of prior full-blown selves eventually deciding by mutual agreement, in the interest of securing peace in a war of all against all, that it would be prudent to bridle and rein in their respective self-serving freedoms. Rather, prior to the evolutionary emergence of *selves* as such, an individual's reactions to the gestures of others, presumably, were to some degree instinctive and automatic (as in sex, parenthood, hostility, etc.). Sociality, sometimes hostile and sometimes not, for better or worse, will have adopted certain interactional and transactional regularities (e.g., hierarchical social structures) that became the stage on which selfhood might have emerged.

Selves emerged in the evolution of the human species (incrementally via natural evolutionary tendencies, just as the development of selfhood in a contemporary human infant is gradual) when individuals became social objects in their own respective experience. This is the case insofar as individuals are capable of *social acts*—"acts which involve the cooperation of more than one individual."[32] One is able to engage in commerce, as a buyer, say, though the part of the exchange of property

that belongs to the seller just as necessarily constitutes part of this social act and thus belongs to the buyer as a proper reaction to the buyer's gestures. One typically does not buy and sell to oneself; but an individual can be a social object in its own experience insofar as it adopts the particular role of buyer that requires another individual to play out the complimentary role of seller. Both roles in proper relation to one another serve to constitute each individual's habits of conduct even if the individual plays only one of those roles in the execution of a respective social act. An individual is able to be a buyer only because the buyer role has been instantiated in that individual's experience of other social objects so as to provide a template for that particular kind of participation in social acts. Similarly, an individual is able to be a first baseman only because others are in that instance realizing other roles of a baseball game. Then, an individual can be a social object in its own experience (as a buyer or as a first baseman, etc.) by virtue of its being the one playing a specific standard role in a standard cooperative act.

Yet another key point is that only selves have minds. Selves predate minds. Selfhood predates mentality. The emergence of mentality is possible only where the emergence of selfhood has laid proper groundwork. How so? Animals will have been sentient at very early evolutionary stages. Mentality (having cognitive capabilities, etc.) is more than just sentience. And it is more than just selfhood. Mead takes many pages to develop this part of the story,[33] but a crucial distinction to highlight here is one between becoming a social object in one's own experience (the emergence of selves) and becoming a self in one's own experience (the emergence of "self-consciousness"). An individual appears not just as a *social object* but as a *self* in its own conduct insofar as it is able to take attitudes that others take toward it in these various cooperative interactions.

The notion of *representation* may easily enter the story here insofar as talking and thinking are often addressed to some concrete situation. That is, talking and thinking typically play a role in resolving some given difficulty. We talk to one another often in order to resolve some shared problem. Recall as well that *an experience* or *an act* is an episode of just that—resolving some given difficulty. So talking and thinking—e.g., planning a course of action, or simply exploring possible courses of action—typically play a role in furthering the completion of some act. *An inquiry*, for Dewey, is such an act in which talking and thinking play a crucial role in furthering its completion. This crucial role, in broadest terms, could be said to be representational in character. The respective talking and thinking is *about* facets of the problem at hand, particularly in regard to exploring and assessing its particular features and its potentials for resolution. A plan, after all, is a "representation" of a possible future

course of action. This role of thinking in inquiry can be carried out "symbolically" as it were.

3. Representational Externalism, Extended Computation

On Mead's account, the prior emergence of abilities to *converse* eventually gave rise to abilities to *think*. Abilities to think presuppose abilities to converse. There is nothing in this account to suggest that the workings of symbolic representation that constitute thinking occur only in brains or inside skulls. At least some such workings might occur only by way of *talking*, or by way of *writing* things out and exploring their implications on paper, chalkboard, etc. A pragmatist account of cognitive externalism[34] is quite general but shows in particular how the (fast) workings of perception (directly accessing information outside of the head) are extended. The (slow) workings of representation are also extended to the extent that their symbolic media are extended. These two kinds of workings will *correspond* in some functional way insofar as talking and thinking registers and assesses possibilities while perceiving accesses and classifies present actualities,[35] each pertaining to a common inquiry (a common experience, a common act).

This yields a type of representational and/or computational externalism—a theory, more or less, of extended computation and/or representation. Recall that the workings of habits that constitute an *experiencer* (not necessarily a thinker) are easily conceived as extended across many causally coupled things and activities inside and outside of the head. This view was characterized earlier as follows: (1) the experiencer is first and foremost a *live sentient creature* and thus a fusion of token life-activities; (2) these life-activities are systematically governed in law-like ways by *habits* (as explained above); (3) the creature's *efforts* and *attention* tend to be directed at conditions where such habits are functioning with some actual or prospective difficulty; (4) the creature's *experiences* are (by definition of the term, as a count noun) episodes of attempting to resolve such difficulties; (5) generically, the *purpose* of any such experience will be to resolve the respective discordance or difficulty so as to maintain some overall coordination of the experiencer's habits (even if some of the latter require modification); and (6) distinctive elements or features or dimensions of an experience are what they are (contextually) by virtue of the type of role they play in securing a resolution to the given difficulty.

Notice that the first five of these six characteristics, while essential to thinking, do not require thinking; and the sixth characteristic only suggests how we might begin to distinguish thinking from other elements of experience.

Consider the following example. The anti-snake behaviors of California ground squirrels are complicated, involving intricately complex sequences of choice points and behavioral transitions that in any case do not require thinking as such.[36] An internalist conception of experience is not *needed* to account for these behaviors. An externalist conception of experience may do just as well. More importantly, if we consider what it would mean for a squirrel to *think* about what it is doing, we still need not introduce an internalist viewpoint.[37]

Given that none of the points (1)–(5) requires an internalist framework, it is interesting to speculate about what it would take for such a creature to engage in or to evolve capabilities of thinking. In line with point (2) above, if we regard the squirrel's brain neither as its entire CPU nor as its sole "memory" bank but rather as a chipset with the job of mediating extended organism/environment life-activities, then we cannot appeal to mere "complexity" of habits to account for what is rather a matter of distinguishing functional roles. That is, it would beg the question at hand to imagine that a *thinking* squirrel would simply be one with a more complex brain solely capable of supporting, say, internal representational activities (the latter being thinking activities).

An externalist can agree that thinking is essentially representational in character, and this may require a more complex chipset inside the head, but it does not require that representational activities as such take place exclusively inside the head. What distinguishes representational activities as thinking activities is not where they occur so much as how they function throughout the course of an experience or act to facilitate achievement of the purpose at hand. Evidence that a squirrel is able to think, on this account, would probably involve activities like rehearsing or planning or practicing search-and-destroy procedures—where acting out such procedures in the absence of any evidence of snakes would be a way of *representing* what may transpire when a snake is encountered. The same behaviors that occur instinctively in the presence of snakes would now presumably, in the absence of snakes, play a different functional role (as rehearsing or planning or practicing or whatever the case may be). Granted, it is not easy to imagine a real squirrel engaging in these kinds of representational behaviors, nor is it at all clear how or why such representational capabilities would ever have evolved as part of a squirrel's innate repertoire of habits (namely, thinking can often slow things down, which is not so good when facing a rattlesnake ready to strike), though it does help to clarify what an externalist conception of thinking might look like.

It is easier to imagine such representational behaviors taking place in human experiences—where a different evolutionary groundwork is in place. Human behaviors include the use of symbols and symbolic media.

For example, planning next year's garden requires some thinking. Such thinking will proceed as one draws up lists, charts, diagrams, tables, calendars, etc., representing on paper, say, what may actually transpire next year. The nice thing about pen and paper is that, with sufficient care, information etched onto the paper will not easily degrade and thus may be repeatedly accessed, modified, and otherwise utilized. This kind of information storage does not take place solely within a normal brain. *Something* takes place solely within the normal brain throughout such a thinking process, but that something typically is not all there is to thinking or even representation—just as what happens in the chipset of a computer is not all there is to computing.

Likewise, a theoretical physicist *A* may work for some time with chalk and chalkboard, or with pencil and paper, working out the mathematical details of some particular model of a certain kind of physical system that so far is not well understood. Tweaking the model in various ways will of course draw out the process in more extensive and complicated ways. These representational behaviors—*A*'s thinking—will encompass the making of marks on paper or chalkboard as much as anything else. In some cases such representational behaviors may take place only in *A*'s head, but we would want to say that, typically, thinking could not take place in any sustainable way without such external markings to the extent that such markings are a constituent part of the workings of representation and thus *memory*. Physicist *A* may *utter the results* of such cogitations by means of a written publication in an appropriate journal, or perhaps more simply by way of direct conversation with a colleague *B* who is able to see to testing those results in a laboratory setting—able to perform activities whose actual results should but may not correspond to what *A*'s cogitations will have predicted in such circumstances.

Such examples exhibit the perspective one must take to properly characterize mental processes. Not having the thinker's present purposes in view would be like assessing a painting by analyzing the chemistry of the pigments, or judging a novel by analyzing the grammar, or worse, only the font that was used in the printing. Not taking into account different functional roles that otherwise similar behaviors may play in pursuing such purposes leaves only bodily motions as the subject matter of behavioral psychology.

The generic template for an act (an experience, an inquiry) consists then of two types of extended "workings" in the development of the act: one which tracks actual facts of the case, and one that represent such facts and their implications in order to track possible courses of further development.[38] The common purpose for these two types of workings is the completion of the given act, namely, effective resolution of the difficulty or disturbance that initiated the act. Generally speaking, sources

of difficulties would include almost anything that occurs in the life of an experiencer, not excluding the very coordination (correspondence, mutual coherence) of these two basic types of workings insofar as they constitute the life of a *thinking* experiencer.

Illustrations of the latter would include numerous episodes in the history of any given science. Such episodes emerge and develop and are resolved or not by way of the workings of both theoretical and experimental activities in coordination with one another (often resulting in their mutual reconstruction by way of modified theoretical and/or experimental techniques and instrumentation). The extended nature of both of these types of workings in science is obvious. Experimentation consists of fact-finding activities that include manipulations of environmental circumstances through the controlled use of appropriate conditioning and measuring instruments. Theoretical activities consist of idea-finding activities that include manipulations of public discourse that may involve alterations in linguistic and analytical methods.

It is crucial to note, of course, that the extended nature of this generic template of coordinated fact-finding and idea-finding is exemplified in the acts/inquiries of any single thinking experiencer. Instances of silent and dark reflexive discourse employ symbols and techniques derived from ever-evolving languages and conversations in one's community, and one could argue that only such silent and non-visual reflexive discourse counts as thinking and that it may easily be regarded as an activity taking place only inside the skull. On the contrary, such discourse, while occurring not infrequently, is perhaps less common than might be expected. Such reflexive discourse (silent and dark or not) utilizes a language of some respective community and will sooner or later have to be represented in some sensible if not public way just to recalibrate its terminology and semantics, given (1) that the public language from which the language of one's private thinking is derived may be assumed to be always changing (so that remaining proficient in using such a language is like trying to hit a moving target), and (2) that one is no doubt always continuing to *learn* the language to a greater extent or in finer detail, which necessarily involves direct participation in its public use.

Basically, one uses a language privately (silently, etc.) not unlike the way one utilizes air that has been inhaled—internally, inside the lungs—such that one must sooner rather than later exhale. The content of the language "inhaled" into one's cortex or wherever is only as good as the scope and detail of the generality of the *generalized other* with whom one silently and darkly converses, and the continual growth and development of that generalized other as a consequence of ongoing interaction with particular others other than oneself is surely a major part of the extended workings that constitute the thinker.

Notes

1. This is the classical view promoted by Allen Newell and Herbert Simon, "Computer Science as Empirical Inquiry: Symbols and Search," *Communications of the ACM* 19(3) (1976): 113–126.

2. For instance, see Robert Shaw, "The Agent-Environment Interface: Simon's Indirect or Gibson's Direct Coupling?" *Ecological Psychology* 15(1) (2003): 37–106; Robert Port and Timothy van Gelder (eds.), *Mind as Motion: Explorations in the Dynamics of Cognition* (Cambridge, MA: MIT Press, 1995); Rodney Brooks, "Intelligence without Representation," *Artificial Intelligence* 47 (1991): 139–159; Scott Kelso, *Dynamic Patterns: The Self-Organization of Brain and Behavior* (Cambridge, MA: MIT Press, 1995).

3. See Frederick Adams and Kenneth Aizawa, "The Bounds of Cognition," *Philosophical Psychology* 14 (2001): 43–64; Frederick Adams and Kenneth Aizawa, *The Bounds of Cognition* (Malden, MA: Blackwell Publishing Ltd., 2008); Richard Menary (ed.), *The Extended Mind* (Cambridge, MA: The MIT Press, 2010); F. Thomas Burke and Stephen Everett, "Social-Psychological Externalism and the Coupling-Constitution Fallacy," in *George Herbert Mead in the Twenty-First Century*, ed. F. Thomas Burke and Krzysztof Piotr Skowroński, (Lanham, MD: Lexington Books, 2013), pp. 107–135.

4. For example, see John Dewey, *Experience and Nature* (Chicago: Open Court, 1925); John Dewey, *Logic: The Theory of Inquiry* (New York: Henry Holt, 1938); George Herbert Mead, "The Mechanism of Social Consciousness," *Journal of Philosophy, Psychology, and Scientific Methods* 9 (1912): 401–406; George Herbert Mead, "The Genesis of the Self and Social Control," *International Journal of Ethics* 35 (1924–1925): 251–277; George Herbert Mead, "The Process of Mind in Nature," in *The Philosophy of the Act*, ed. Charles W. Morris (Chicago: University of Chicago Press, 1938), Chap. 21, pp. 357–442.

5. The term 'chipset' is ambiguous. Here it means a particular group of chips on a motherboard that controls many of the latter's data-transfer capabilities (by way of both high-speed and low-speed channels), providing in effect the interfaces among a computer's subsystems—thus mediating interactions among, for example, the CPU, different kinds of so-called memory, and I/O devices.

6. Richard Menary, "Introduction to the Special Issue on 4E Cognition," *Phenomenology and the Cognitive Sciences* 9 (2010): 459–463.

7. Ecological psychology emerged in the 1940s from military research into the nature of perceiving moving objects from moving perspectives, e.g., sighting and identifying an airplane in flight from the point of view of the pilot of another airplane in flight (Gibson 1950). This research was largely eclipsed by GOFAIR in later decades, though it continues to have a tenacious following and is responsible for some of the recent innovations in the cognitive sciences.

8. Andy Clark and David Chalmers, "The Extended Mind," *Analysis* 58 (1998): 10–23.

9. Hilary Putnam, "Minds and Machines," In *Dimensions of Mind: A Symposium*, ed. Sidney Hook (New York: New York University Press, 1960), pp. 148–180.

10. Gibson's notion of a perceptual system being *attuned* to information in the world may be useful here. As a matter simply of terminology, we could say that the difference between an organism's *environment* (those parts of the world to which an organism's perceptual systems are attuned) and the *world at large* is that the former includes only what its perceptual systems are capable of accessing immediately. The organism's perceptual systems, on such a picture, would extend into the world at large to include its environment. Creatures capable of perceiving should thus by default be regarded as *integrated* body/environment systems, to use Menary's term. As stated, this does not identify "perceiving" with "accessing information immediately." It only says that information that is accessed and utilized to constitute *perception* may be immediately available in the world outside of the skull and thus need not be "represented" internally in order to be accessed and utilized. Representations may be necessary for *thought*, but not for perception.

11. John Dewey, *Art as Experience* (New York: Henry Holt, 1934).

12. George Herbert Mead, *The Philosophy of the Act*, ed. Charles W. Morris (Chicago: University of Chicago Press, 1938); George Herbert Mead, "Concerning Animal Perception," *Psychological Review* 14 (1907): 383–390.

13. John Dewey, "The Reflex Arc Concept in Psychology," *Psychological Review* 3 (1896): 357–370.

14. Dewey, *Logic: The Theory of Inquiry*.

15. Charles Sanders Peirce, "The Fixation of Belief." *Popular Science Monthly* 12 (1877): 1–15; Charles Sanders Peirce, "How to Make Our Ideas Clear," *Popular Science Monthly* 12 (1878): 286–302.

16. Peirce, "How to Make Our Ideas Clear."

17. Adams and Aizawa, "The Bounds of Cognition"; Adams and Aizawa, *The Bounds of Cognition*.

18. The issue here is mind, mentality, thinking. This is not the problem of consciousness. That problem is already present as a mystery in an account of experience as extended, in the form of what we might refer to as the problem of *sentience*. It is assumed here that animals other than humans are sentient creatures. They are experiencers. They are capable of feeling pain, etc. If we could explain the nature of that feeling, then we can very likely explain consciousness as a variation on that theme.

19. Tom Burke, "The Role of Abstract Reference in Mead's Account of Human Origins," *Transactions of the Charles S. Peirce Society* 41(3) (2005): 567–601.

20. Burke and Everett, "Social-Psychological Externalism and the Coupling-Constitution Fallacy."

21. For instance, see David Spurrett and Stephen Cowley, "The Extended Infant: Utterance-Activity and Distributed Cognition," in *The Extended Mind*, ed. Richard Menary (Cambridge, MA: MIT Press, 2010), pp. 295–324.

22. It is unfortunate that Mead should use the term "inner" here, unless it refers to being inside the self but not necessarily inside the skull. The term "reflexive" is a better term. As with arithmetic calculations solely in our heads or

with the aid of pencil-and-paper, whether or not talking to oneself takes place in a forum of thought is not decided by whether it proceeds silently or out loud.

23. Mead, "The Genesis of the Self and Social Control," pp. 287–288.

24. Burke, "The Role of Abstract Reference in Mead's Account of Human Origins," pp. 571–573.

25. Michael Tomasello, A. C. Kruger, and H. H. Ratner, "Cultural Learning," *Behavioral and Brain Sciences* 16 (1993): 495–552; Michael Tomasello, "Language is Not an Instinct," *Cognitive Development* 10 (1995): 131–156; Michael Tomasello, *Cultural Origins of Human Cognition* (Cambridge, MA: Harvard University Press, 1999).

26. Cecelia Lai et al., "A Forkhead-Domain Gene is Mutated in a Severe Speech and Language Disorder," *Nature* 413 (2001): 519–523; Wolfgang Enard et al., "Molecular Evolution of FOXP2, a Gene Involved in Speech and Language." *Nature* 418 (2002): 869–872.

27. The main elements of that account can be gleaned from George Herbert Mead, *On Social Psychology*, ed. Anselm Strauss (Chicago: University of Chicago Press, 1956) and George Herbert Mead, *Selected Writings*, ed. Andrew J. Reck (Chicago: University of Chicago Press, 1964). See also Hans Joas, *G. H. Mead: A Contemporary Re-examination of His Thought* (Cambridge, MA: MIT Press, 1985), chap. 5.

28. Mead, "The Genesis of the Self and Social Control," p. 289.

29. Clark and Chalmers, "The Extended Mind."

30. Robin Dunbar, *Grooming, Gossip, and the Evolution of Language* (Cambridge, MA: Harvard University Press, 1997).

31. Mead, "The Genesis of the Self and Social Control," pp. 287–288.

32. Mead, "The Genesis of the Self and Social Control," p. 279.

33. For example, Mead, "The Genesis of the Self and Social Control," pp. 278–289.

34. Burke and Everett, "Social-Psychological Externalism and the Coupling-Constitution Fallacy"; Everett, *Vehicle Externalism, the Coupling-Constitution Fallacy, and Dewey*.

35. This does not mean that perceiving (e.g., perceiving distances) is not prospective. But such instinctive anticipations that result from perceiving are typically not the subject of thought, that is, unless they are or become in some way relevant to what is being thought about. It may sound trivial to put it that way, but the point is that possibilities that are occurrent as such in perception are not for that reason alone the subject of thought. That will depend on what their role or function becomes in the given inquiry. Similar ideas are tentatively explored in Burke, "(Anti)Realist Implications of Pragmatism's Dual-Process Active-Externalist Theory of Experience," and more fully in *What Pragmatism Was*, chap. 7.

36. Richard Coss, "Evolutionary Persistence and the Contextual Modulation of Antisnake Behavior," presented at the Fifth International Conference on Event Perception and Action. Oxford, OH, July 1989; Richard Coss, "Context and Animal Behavior III: The Relationship Between Early Development and Evolutionary Persistence of Ground Squirrel Antisnake Behavior," *Ecological*

Psychology 3(4) (1991): 277–315; Richard Coss, "Evolutionary Persistence of Ground Squirrel Antisnake Behavior: Reflections on Burton's Commentary," *Ecological Psychology* 5(2) (1993): 153–194; Richard Coss and Donald Owings, "Rattler Battlers," *Natural History* 98(5) (1989): 30–35; Matthew Rowe and Donald Owings, "The Information Afforded by Rattlesnake Rattles: A Study of Risk Assessment by California Ground Squirrels," presented at the Fifth International Conference on Event Perception and Action. Oxford, OH, July 1989; Gregory Burton, "Behavioral Relics and Animal-Environment Mutualism: Commentary on Coss 'Context and Animal Behavior III' (1991)." *Ecological Psychology* 5(2) (1993): 153–169; Donald Owings, "The Cognitive Defender: How Ground Squirrels Assess Their Predators," in *The Cognitive Animal: Empirical and Theoretical Perspectives on Animal Cognition*, ed. Marc Bekoff, Colin Allen, and Gordon Burghardt (Cambridge, MA: The MIT Press, 2002), pp. 19–25.

37. Burke and Everett, "Social-Psychological Externalism and the Coupling-Constitution Fallacy."

38. Burke, "(Anti)Realist Implications of Pragmatism's Dual-Process Active-Externalist Theory of Experience."

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