“The Evolution of Articulated Reasons: Reasoning as Discursive Niche Construction”

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DRAFT for *Why and How We Give and Ask for Reasons*

Daniel Dennett (2014) offers a schema for the evolution of reasons and reasoning that is grounded in the purposiveness of natural selection. The cyclical processes through which organisms reproduce and sustain their lineages mark a transition from merely persistent patterns and structures to purposive ones, from patterns explainable causally to those explainable by their place within a larger, purposive process. On Dennett’s schema, other organisms *have* reasons for their constitutive processes and behaviors even though they are not capable of representing or “giving” those reasons to themselves or others. The reasons *for* their functional processes and behavioral responses explain what they do even though those reasons are not themselves elements or features *of* the processes they explain.

Dennett is arguing on two fronts here, as he has for much of his career. His explicit critical target is those biologists and philosophers who take Darwinism to have excised any place for purposiveness, normativity, or rationality from the natural world as scientifically intelligible. His arguments nevertheless also target those “liberal” naturalists and anti-naturalists for whom the supposed scientific erasure of reason and design justifies the autonomy of non-natural domains of purposiveness. The latter targets range widely, from advocacy of an autonomous space of reasons to imagining an Intelligent Designer’s supposed creation *ex nihilo*. Dennett’s conclusions on the latter front vary accordingly. Understanding the evolution of design and reasons provides scientific intelligibility and natural-scientific constraints to “Pittsburgh normativity” while banishing any vestige of divine or intelligent creation from restoration to intellectual respectability.[1]

My own recent work on language and conceptual capacities as forms of biological niche construction (Rouse 2015, 2023b) and my “radical naturalistic” challenges to debilitating assumptions shared by scientistic and liberal naturalists (Rouse 2022, 2023a) broadly accord with Dennett’s dual project. My account nevertheless introduces important complications to Dennett’s conception of the evolution of reasons. These complications vindicate the insistence in Pittsburgh on a sharper divide than Dennett acknowledges between human conceptual capacities and sophisticated forms of animal cognition. Conceptual capacities and the articulation of reasons do have explicable origins in the ineliminable normativity of biological development and evolution. A more adequate evolutionary schema nevertheless introduces a consequential distinction between the purposiveness and one-dimensional normativity of organismic life cycles and the role of reasons and reasoning in human ways of life. This difference is rooted in the evolutionary novelty of a two-dimensional “space of reasons” that is opened by discursive practices and conceptual articulation in our lineage. Recognition of this distinction in turn has important consequences for how we understand evolutionary explanations of other organisms’ ways of life and forms of behavior.

I develop this account in three stages, starting with a more specific conception of the purposiveness and normative accountability of other organisms’ ways of life. We can then turn to a sketch of some key issues in the evolution of discursive practices, their two-dimensional normativity, and the articulation of reasons and reasoning. The final section then takes up the implications of this account for evolutionary explanations and scientific understanding more

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[1]. Dennett is referring to a group of left-Sellarsians for whom the normative aspects of discursive practices, perception, and action are ineliminable; characteristic figures include Robert Brandom, John Haugeland, John McDowell, Quill Kukla, and Mark Lance, among others.

generally.

I — Biological Normativity

Organisms are goal-directed processes. Aristotle distinguished activities whose goal was not part of the activity (as a house is separate from the building of that house) from activities whose goal is to continue or reproduce that activity. Living organisms exemplify the latter form of goal-directedness: their vital processes acquire normative significance in succeeding or failing to maintain and reproduce themselves amidst changing conditions. This aspect of biology is commonly described in terms of biological functions, but organismic processes only have a function as contributions to the *goal* of sustaining the organism's life and reproducing its lineage. Darwinism did not fundamentally challenge this aspect of biological purposiveness. As Mark Okrent noted,

> Darwin was the greatest Aristotelian of the nineteenth century. Darwin agrees with Aristotle ... on the central issue of whether [biological processes] are evaluable in a non-arbitrary fashion ... For Darwin and Darwinians, living organisms are those [processes] that carry the principle of nonarbitrary normative evaluability in themselves. Since to be alive is to do something that allows it to continue to live, it is life itself that provides the standard against which a particular living thing is to be evaluated. The end or goal of the process is the very process itself, for the end of the process is that the process should continue. (2007, 68-69)

Aristotle thought that organismic forms remain stable over time, whereas Darwin recognized that they develop and evolve, but those changes are also non-arbitrarily open to evaluation for whether they sustain the organism and its lineage.

Organisms die and some lineages go extinct. Other lineages persist through long sequences of life cycles. Identifying *what* persists or perishes and thereby succeeds or fails is nevertheless complex. Organisms are material entities, but their material components change continuously. They turn over multiple times throughout their life spans, and then persist and dissipate after the organism's death, often as constituents of other organisms. For Aristotle, what supposedly persists and is reproduced is not a material entity but its supposedly constant organismic form. Organismic forms nevertheless also change continuously. Organisms grow, develop, and die. Metamorphic changes also introduce developmental discontinuities. The dead metaphor of "development" suggests teleological culmination in mature, adult form, but aging continues the developmental process until death. Organisms reproduce to sustain a lineage, but reproduction is descent with modification that results in evolutionary change in the reproducing populations. The key outcome of *Darwin's* revisionist Aristotelianism is that this constitutive goal is irreducibly deictic and hence not describable abstractly. The goal is to continue *this* process, in whatever form it or its descendants subsequently take. Organisms are temporally extended, open-ended *processes* of developmental and evolutionary change (Dupre and Nicolson 2018).

Organisms are also not self-contained, however, but are instead environmentally intra-active processes.[2] The organism's biological environment—what matters to its physiology, development, and evolution— is not simply its physical surroundings. Different organisms living in the same physical region inhabit very different environments, because their *biological*

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[2]. Karen Barad (2007) distinguishes "interaction," in which the entities that interact are identifiable apart from those interactions, from "intra-action," in which the boundaries and identity of its intra-acting components are constituted by or within the intra-action. I am arguing that organisms and their environments are constitutively intra-active.

environment is only specifiable in relation to their life processes. As Richard Lewontin concluded,

> As a consequence of the properties of an animal's sense organs, nervous system, metabolism, and shape, there is a spatial and temporal juxtaposition of bits and pieces of the world that produces a surrounding for the organism that is relevant to it. ... It is, in general, not possible to understand the geographical and temporal distribution of species if the environment is characterized as a property of the physical region, rather than of the space defined by the activities of the organism itself. (Lewontin 2001, 52-53)

Lewontin's reasoning also applies in reverse, however. Organismic processes are only sensory, nervous, metabolic, or morphological in their responsiveness to what thereby becomes their developmental and selective environments.

We are now in a position to begin complicating Dennett's analysis of biological purposiveness. Dennett highlights two aspects of a gradual transition from locally contingent causal processes to goal-directed processes. That transition begins with cyclical patterns of causal interaction:

> The prebiotic world was not utterly chaotic, a random confetti of atoms in motion. In particular, there were *cycles*, at many spatiotemporal scales: seasons, night and day, tides, the water cycle, and thousands of chemical cycles discoverable at the atomic and molecular levels. (2014, 51)

He suggests that the critical step, however, was the segregation of some cyclical causal processes from disruption:

> Membranes that tend for whatever reason to prevent [the chance collision of two

> unrelated processes with a destructive result] will be particularly persistent and will permit internal cycles (do-loops) to operate without interference. And so we see the engineering necessity of membranes to house the collection of chemical cycles— the Krebs cycle and *thousands* of others—that together permit life to emerge. (2014, 53)

Although there had to be many intervening steps, Dennett is arguing that segregation and systematic interconnection of cyclical processes within an encompassing membrane enabled the emergence of "things that are *better* at persisting/reproducing in the local circumstances than the alternatives" (2014, 53). For Dennett, it is the interconnection and proliferation of the causes of that enhanced cyclical persistence that provide "*reasons why* [their] parts are ordered and shaped as they are" (2014, 53).

I have quoted Dennett at some length because several gaps in his model show why the emergence of biological normativity is not yet the emergence of *reasons*, even at this fairly high level of generality. The first gap is that Dennett's account of the significance of membranes leaves out a crucial consideration. They do not merely segregate biochemical processes from external disruption. They also enable systematic interconnection of those "internal" processes with other patterns of causal intra-action across that boundary. Those internally functional cycles only persist within thermodynamically open systems that incorporate the kinds of membrane-crossing processes mentioned by Lewontin. These environmental intra-actions include metabolic processes that import and convert energy; excretory processes that export toxic waste products; sensory capacities that detect resources, threats, and reproductive opportunities; capacities for motility and germline dispersal; immunological regulation of traffic across membranes; and neural connections that coordinate among those environmental intra-actions.

This constitutive traffic across the membranes enclosing the body of an organism discloses a second gap in his model, concerning the *locus* of biological purposiveness and Dennett's attributions of reasons. Dennett attributes purposes and reasons to the "thing" that successfully persists "in" its surrounding circumstances, but that characterization overlooks the processual character of organisms. The material "thing" enclosed within a membrane also persists for some time after its death, but at that point, the organism is no more. The membranes that segregate some functional processes from disruption are themselves components of a more encompassing life process. Dennett's reasoning starts with those cyclical processes, which suggests that the locus of biological purposiveness and normativity is the processual coupling of its components through multiple cycles. Understood in that way, an evolutionary individual is "a life cycle whose components cannot reconstruct themselves when decoupled from the larger cycle" (Griffiths and Gray 2001, 213). The "thing" enclosed within a membrane *is* a component that cannot sustain its ongoing reconstruction and reproduction on its own. As Griffiths and Stotz conclude,

> A series of developmental events is a single process because those events serve a common evolutionary goal, namely to maximize the representation of cycles descended from them in future generations vis-á-vis the representation of the variant cycles with which they compete. ... [More precisely,] an individual life cycle is a token of a life history strategy, and that strategy is its telos ....(2018, 239)

In the absence of the environmental components of that cycle, that strategy fails, at which point a body is not an organism but a disintegrating corpse.

This more expansive, processual conception of organisms is reinforced by a third gap in

Dennett’s presentation of the emergence of biological purposiveness and normativity. The maintenance and reproduction of populations of organismic life cycles is normative because those processes can fail. Life cycles are forms of differential reproduction, in which changes in some components are accommodated by adaptive changes in others. Dennett emphasizes the evolutionary adaptation of organismic populations to changes in their “external” circumstances. The difficulty is that the causal intra-actions of organisms and their selective environments are bi-directional. Biologists now increasingly recognize that,

> Niche construction is ... a fact of life. All living organisms take in materials for growth and maintenance, and excrete waste products. It follows that, merely by existing, organisms must change their environments to some degree. (Odling-Smee, Laland and Feldman 2001, 116)

This recognition reconfigures how to understand the normativity of biological development and evolution. Sometimes populations of organisms persist through changes over time because the surviving life cycles in the lineage differ from their predecessors in the pattern of variation among their internal functional processes or behavioral responses. Sometimes a population persists instead because those processes or behaviors affect their environmental circumstances in ways conducive to sustaining those processes and behaviors. Both patterns and their intermediate combinations amount to evolutionary success, because biological normativity has no privileged direction of fit. Evolution is a process of *co*-evolutionary intra-action among organisms and their environments.

A fourth consideration left out of Dennett’s account is that the “local circumstances” in which organisms develop and reproduce are not limited to an abiotic environment, but include their conspecifics and other organisms with which they intra-act. Robert Brandon and Janis Antonovics point out,

> For any individual organism, its conspecifics can be influential factors in its development and reproduction, and systematically relevant to selection within and of the population. Consequently, the selective environment for a population must incorporate interactions among conspecifics in partially shared circumstances as a social-ecological environment in cases of density-dependent and frequency-dependent selection. (1996, 165)

Behavioral patterns can also have niche constructive evolutionary significance if their presence in the developmental environments of subsequent generations creates selection pressures favoring descendant behavioral patterns in their own or other lineages. The co-evolution of languages with human neurological, vocal, and auditory capacities is one of the clearest examples of behavioral niche construction with broader evolutionary significance (Dor and Jablonka 2000, 2001, 2004; Bickerton 2009, 2014; Rouse 2015, 2023).

The final gap in Dennett's model concerns holistic interconnections among the processual components of evolutionary life cycles. Kim Sterelny provides an entree to this issue with his distinction between "detection systems" and more flexible behavioral repertoires (2003, ch. 2). Detection systems are relatively inflexible responses to specific environmental cues. Complex behavioral or other functional patterns can result from extended chains of detection and response. The difficulty, however, is that such rigid patterns provide opportunities for other organisms to utilize that rigidity with disruptive effects. Confronting that disruption, some organisms succeed by developing flexible responsiveness to more complex configurations of environmental features. Those more complex response patterns accrue cognitive, metabolic, and opportunity costs, however, and the evolutionary benefits of such behavioral flexibility may not match their costs. From an evolutionary perspective, even relatively rigid detection systems are not simple behavioral responses to specific perceptual cues. Detection systems persist through more complex tradeoffs among the benefits of successful detection and response, the reliability of both simple and integrated perceptual repertoires, the prevalence and consequences of disruptive interventions, and the cognitive and metabolic costs of the alternative response patterns.

The holistic complexity of organism-environment intra-action is exacerbated by how the relevant environmental "features" are not organism-independent. Kathleen Akins (1996) illustrated one side of this interdependence in discussing how organisms perceive and respond to differences in ambient temperature. What matters to organismic function is not the objective temperature of the ambient surroundings, but its "narcissistic" significance for the organism itself. Thermoreceptors on the skin are responsive to the temperature differences relevant to that part of the body rather than to more generic thermal effects. Organisms nevertheless also encounter evolutionary tradeoffs between what is environmentally relevant to their overall success and what is perceptually detectable by them. The navigational orientation of foraging bees, for example, is responsive to *detectable* patterns of ambient light produced by conjoined regularities in solar position and vagaries in the atmospheric diffusion of light. Researchers conclude that bees will respond similarly to

> object[s] less than 20 degrees across (up to fifty times the sun's apparent size), [with] any amount or direction of polarization (the sun's actual light is unpolarized), [and] less than 15% ultraviolet. In other words, having navigated by the sun for days, a forager will blithely accept a 15 degree, 100% polarized, green triangle for the .4 degree, unpolarized

> white circle we know as the sun. (Gould and Gould 1988, 128)

If bees have *reasons* to fly in one direction rather than another, those reasons are massively underdetermined.

The connections between these two aspects of environmental responsiveness—perceptual detection and behavioral or physiological response— are a further source of indeterminacy in organism-environment interdependence. Two classic examples will conclude this initial discussion. Vervet monkeys' responses to recorded playback of other vervet vocalizations show their differentiated communicative significance (Radick 2007, ch. 7). Vervets undergo predation from snakes, leopards, and eagles, whose visible presence can evoke distinctive warning cries. These utterances nevertheless also indeterminately indicate directions of danger, its urgency, the direction of movements to safety, and the presence of genetic kin manifestly unaware of the situation. Vervet calls thus do not differentially indicate a kind of predator, a locus of danger, a direction of movement to safety, kinship relations, or some other *aspect* of the situation. Those situations instead confront the vervets holistically, as visceral, affectively fraught solicitations to call and flee. An exchange between Robert Cummins and John Haugeland displays a similar explanatory indeterminacy in how prairie dogs respond to their own vulnerability to predation. Cummins suggested that,

> Predator recognition systems tolerate a lot of false positives in the interest of speed. But when a prairie dog dives in its hole in response to a shadow made by a child's kite, this is a *false* positive, a mistaken predator identification, not an accurate shadow detection. (Cummins 2002, 132)

Haugeland responded that,

> ...[W]e could, with equal justice, attribute the 'error' (or design trade-off) to a prairie-dog activity selector that takes it as a cue to dive. In other words, instead of saying that prairie dogs are easily fooled, we say that they are skittish or easily spooked. (Haugeland 2002, 140)

The initial conclusion from these considerations is that the cyclical patterns of intra-action among organisms and their selective environments do indeed constitute goal-directed processes open to non-arbitrary assessment for their success or failure in sustaining those very processes. The deictic identification of these temporally extended patterns nevertheless does not by itself differentiate aspects of those patterns that serve as reasons from other aspects they serve as reasons *for*, nor does it provide conceptual determinacy to those reasons and conclusions. The developmental evolution of most organisms and lineages is open to non-arbitrary evaluation for *whether* it successfully sustains populations within that lineage, but is indifferent to *how* that success is attained or *what* ways of life emerge in that lineage.

II — Discursive Practices and Conceptual Articulation

This initial conclusion of the purposive indeterminacy of how biological lineages evolve is reinforced by consideration of the evolution of reasoning and articulated reasons in the hominin lineage. Humans are animals, whose patterns of environmentally intra-active development are descended from those of other social primates. Three distinctive aspects of human evolution are especially relevant background to understanding the evolution of reasons and reasoning. The first consideration is a now-widespread consensus concerning a decisive evolutionary shift in early hominin ways of life, succinctly summarized by Kim Sterelny:

> [A] transformation in the ways hominins interact with, and extract resources from, their

> environment ... [is] a clear historical signal of the invention and establishment of a new lifeway, built around a new mode of foraging. By two hundred thousand years ago, and most probably much earlier, hominins had evolved into social foragers. Such foragers depend on harvesting high-value but heavily defended resources. (2012, 10-11)

Social foraging in dispersed fission-fusion groups required and enabled new forms of cooperative interdependence. Other social primates seem only to coordinate their behavior with what other group members are doing, towards goals specifiable individually even when better achieved collectively. By contrast, humans now extensively engage in common projects whose goals are not merely *achievable* only in concert with others. The goals themselves and the contribution of individual performances to achieving those goals depend on the collaborative involvement of others, and could not even be pursued without that continuing collaboration (Sterelny 2012, 2021; Tomasello 2014, 2019; Laland 2017).

The second consideration in the background is the subsequent emergence of a practice-differentiated way of life in the human lineage (Rouse 2023; 2015, ch. 4-5). Practices conjoin material and behavioral niche construction by building and maintaining needed material settings and equipment coupled with developing and sustaining the requisite skills and interdependent activities. Humans now do not merely engage in common projects with others. Human ways of life now incorporate many partially autonomous practices, including economic, political, familial, religious, scientific, sanitational, artistic, ludic/recreational, and other collaborative activities whose interdependence extends over time. Participation in these varied practices is enabled not only through closely coupled engagement with other participants, but because other practices that participants do not engage in both provide for many of their biological needs and play supporting roles in sustaining and fulfilling the goals of the practices they do take up. People thereby live very different lives from one another by taking up different practices, which also allows them to develop different skills and capacities.

The final background consideration is the more complex forms of biological normativity that emerged within this practice-differentiated way of life (Rouse 2023b, ch. 6). Like the (human) animals who participate in them, and like other organisms in this respect, practices are patterns of environmental intra-action which only continue to exist through their ongoing reproduction. If people do not continue to participate in a practice and attract or recruit other participants, the practice disappears. The ongoing reproduction of a practice is thus initially goal-directed in much the same way as organisms and lineages are. The goals of ongoing practices are internal to their continuing reproduction, and they can succeed or fail in remaining part of human ways of life. The interdependent plurality of practices nevertheless opens a new normative complexity. Continuing an organismic lineage serves or satisfies no external or encompassing normative concern; its success or failure is only open to assessment internally and deictically. Lineages thereby provide no non-arbitrary basis for assessing nature as better or worse for sustaining their continuation or allowing their extinction. Practices, however, can succeed or fail in this deictic way, and also in a different way by contributing to the reproductive prospects of the lineage.

As people begin to participate in multiple practices, with some opportunities for choice among them, their participation also becomes open to non-arbitrary assessment for how it contributes to their life as a whole. Linguistic practices provide a familiar example of this articulated internal purposiveness. As Robert Brandom long ago noted,

> When one has mastered the social practices comprising the use of a language sufficiently, one becomes able to do something one could not do before, to produce and comprehend novel utterances. One becomes capable not only of framing new descriptions of situations and making an indefinite number of novel claims about the world, but also becomes capable of forming new intentions, and hence of performing an indefinite number of novel *actions*, directed at ends one could not have without the expressive capacity of a language. (1979, 194)

These expressive capacities may have no recognizable significance for those who do not take them up, and other organisms do not *lack* these expressive capacities in a normatively significant way. For those who do master these capacities, however, their exercise and further development can acquire normative significance *within* their lives. Continuation of the practice, and cultivation of the skills, capacities, and achievements it makes possible, may be increasingly pursued "for its own sake." In this respect, however, the expressive capacities enabled by mastery of a language do not differ from the skills and achievements enabled by participation in other practices. Practices that once were sustained for their instrumental contribution to the success of the lineage can thereby acquire independent motivational force for *how* they contribute to the lives of those who participate, master their skills, and appreciate their distinctive achievements. As the diversity of practices increases, and people also increasingly divide their own life-activities among various practices, those practices and their characteristic internal goal-directedness may also come to have instrumental significance for how they contribute to or interfere with other practices. The conjoined or mutually incompatible skills and achievements of a nexus of practices can then come to have a similar partially autonomous motivational force for their participants.

With these three considerations in the background, we can now turn to the evolutionary origins of language and practices of reasoning. Most animal communicative activities evolved by providing fitness-enhancing considerations for what to do in current circumstances (Hauser 1996, Laland 2017). The communicative behaviors of conspecifics typically enhance those organisms' flexible responsiveness to information-translucent circumstances (Sterelny 2003, ch. 2). Early hominins' territorial scavenging in fission-fusion groups nevertheless required more extensive communication concerning distal circumstances and marshaling collective responses to those circumstances. Recent work on the evolutionary origins of language starts from such ostensive indications of distal foraging opportunities as forms of inceptive niche construction, in which organisms both introduce and adapt to changes in their developmental and selective environments (Odling-Smee, Laland and Feldman 2003, 45).

Effective collaborative responses to distal circumstances created selection pressures for stabilization and ease of acquisition of proto-linguistic communicative repertoires, which also enabled more enhanced communicative abilities in a "stretch-and-assimilate" loop of positive feedback between communicative abilities and pressures for their stabilization and acquisition (Dor and Jablonka 2000, Bickerton 2009, 2014). The resulting novel forms of perceptual input and expressive performance arguably then led to sub-personal neural reorganization for interpretation and construction of more complex communicative strings (Bickerton 2014). The key initial point is that the transition from proto-linguistic expressions to language was a process in which human perceptual and cognitive abilities co-evolved with these changing expressive capacities as forms of behavioral niche construction. Human infants develop amidst verbal environments. Human capacities for perceptual and expressive uptake of those verbally articulated performances evolved under selection pressures for ease of acquisition of those very capacities, but they must develop anew in each generation through intra-action with discursively articulate care-givers.[3]

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[3]. The best evidence for the indispensability of verbal developmental environments is the plight of colonial plantation workers forcibly brought together without a common language among them or spoken around them. The expressive limitations of the pidgin communicative repertoires they initially developed sharply contrast to the expressive capacities of the creole languages that evolved as subsequent generations developed in the linguistic environments of pidgin communication (Bickerton 2008).

A comprehensive exposition of discursive and other expressive capacities as evolved forms of behavioral niche construction is beyond the scope of a single paper. I have elsewhere developed more elaborated accounts of this conception of language and its evolution and development (Rouse 2023b, ch. 7-8; Rouse 2018; Rouse 2015, ch. 3-5), but even these discussions only sketch a more complex phenomenon. I will instead highlight several aspects of these accounts that bear on the evolutionary difference between the biological purposiveness and normativity of other organismic ways of life and the role of reasons and reasoning in the discursively articulated way of life that evolved in the hominin lineage.

A niche constructive conception of language and reasoning starts with the recognition that languages only exist as discursive practices. Speaking and responding to others are activities people engage in, which are also salient aspects of the developmental environments of subsequent generations. The human lineage co-evolved with such practices, which have been reproduced by developing anew in each generation. That biological development is aided by neural structures that evolved in discursive environments, and language acquisition is usually scaffolded by caregivers who also contribute to those discursive surroundings. Language never stands alone, however, but is also integrally involved in many other practices. Understanding how discursive practices are situated amidst people's practice-differentiated way of life will be crucial to understanding the place of language and reasoning in the world.

The most significant way in which a niche constructive understanding of discursive practices bears on the evolution of reasons and reasoning is its shift from a representational to an articulative conception of language in the world. This conception, which will be sketched in the remainder of this section, builds on the inferentialist account of discursive practices initiated by Sellars (2007) and Brandom (1994). Sellars and Brandom present their inferentialism as an alternative to representationalist conceptions of language, but they only partially break from those conceptions. They model language as a partially autonomous game, in which "moves" in the form of assertions and queries acquire intra-linguistic "content" through their inferential relations to other moves in the game. The intra-linguistic significance of those moves is then extended beyond language itself once the model incorporates "language entries" in the form of perceptual reports, and "language exits" in the form of actions corresponding to the intra-linguistic conclusions of practical inferences (Sellars 2007, ch.2; Brandom 1994, ch. 4). The "game of giving and asking for reasons" is then not "just" a game, because the normative statuses of moves in the game are held accountable to the players' interaction with a causal nexus in perceiving and acting. Representation is then not a relation between linguistic tokens or types and facts or states of affairs, but a more holistic relationship between intra-linguistic inferential relations and their more or less reliable causal inputs and outputs.

The fundamental difficulty with this conception is that it misconstrues the boundary between normatively constituted discursive practices and their causally consequential environment. Brandom's game model abstracts from the worldly involvements of discursive performances and the bodily situatedness of persons who participate as speakers and discursive scorekeepers. Inferentialist semantics presumes that the assertions that make moves in the reasoning game are publicly accessible by other participants, but that access is accomplished practically and perceptually. Reliable perceptual and practical skills are not subsequent "add-ons" to intra-linguistic moves, but are constitutive of those moves as publicly accessible performances. Moreover, they are accessible *to* embodied persons concretely situated in the world rather than to “players” identifiable by an abstract discursive score of linguistic commitments and entitlements. Understanding the evolution and development of language and discursive capacities thus requires turning the Sellars/Brandom model inside out. Speakers and reasoners are embodied organisms, practically and perceptually situated in the world with one another. What requires explanation is not how abstract discursive moves acquire empirical significance through language entries and exits, but rather how concretely situated performances of embodied agents become conceptually articulated.[4]

Four aspects of how discursive practices are embedded in the niche-constructive organism-environment intra-action of human animals make especially significant contributions to understanding the evolution of reasoning and conceptually articulated reasons. The first consideration is the vocative role of linguistic utterances.[5] Linguistic utterances are not just free-floating sonic emissions that others then encounter within their ambient surroundings. They are spoken *by* someone and addressed *to* one or more others. This vocative directedness is accomplished in varied ways with varying specificity, but it is an ineliminable aspect of linguistic performances (Kukla and Lance 2009, ch. 6-8). Understanding this directedness also transforms people’s situations, by calling *for* an appropriate response. People can ignore or refuse such addresses, but doing so is a consequential act. Utterances are repeatable and

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[4]. This critical analysis of Brandom’s model of discursive practices is more fully developed in Rouse 2023, ch. 7-8; Rouse 2018; and Rouse 2015, ch. 5.

[5]. Kukla and Lance (2009) develop an extensive account of the vocative aspect of linguistic performances as constitutive of their discursive character, where the vocative directedness of utterances is not separable from their normative significance as obligating acknowledgment and response, which is itself vocatively directed. My account is deeply indebted to theirs, although they do not emphasize the evolved and developed biological character of discursive practices as niche constructive.

re-usable, but *in situ* they always have such vocative/recognitive transactional involvements.

The vocative role of discursive performances is closely entangled with their ostensive significance (Kukla 2017). Speech acts do not merely *call out* to others, but in doing so also *point out* aspects of their partly shared circumstances, in some respect. Most organisms do not engage in ostensive indication to others. They encounter their environments holistically, as soliciting some responses rather than others, and other organisms appear as integral to those environments. Even animal communications are just one more component of their surroundings. The salience of those other organisms within the environment often significantly reconfigures its affordances and solicitations, but it is a mistake to think that most organisms perceive or respond to objects, properties, or relations, and re-identify them in different situations. As John Haugeland pointed out,

> [Responding] to a sleeping brown dog with some expression like, "Lo, a sleeping brown dog" has effected a huge data reduction. And this is usually regarded as a benefit, because, without such a reduction, a *symbolic* system would be overwhelmed. But it is also a serious bottleneck in the system's ability to be in close touch with its environment. Organisms with perceptual systems not encumbered by such bottlenecks could have significant advantages in sensitivity and responsiveness. (1998, 220)

Other organisms are not so encumbered. In human environments, however, vocative and ostensive directedness instead coincide to configure re-identifiable objects and their aspects, properties, and relations as triangulated *intersections* among speakers' and audiences' environments. Identifying such zones of intersection involves to some extent recognizing and accommodating differences in how that zone is situated in each person's environmental orientation—what is to my right is to your left, and so forth--- but establishing those zones also provides a basis for more extended collaboration over time, distance, and separation from one another. Often such ostensive co-orientations are tailored to particular occasions or projects, whose deictic indications are anaphorically repeated and elaborated (Brandom 2019, 124-25). The gradual development of language both exemplified and massively extended such co-orientation, however, as people both grasp words as recombinable components of utterances, and root that grasp in the ostensive role of word use in picking out aspects of shared circumstances.[6] Sharing the large swaths of overlapping lexical and grammatical familiarity that comprise grasp of a natural language provides a vast, cumulatively developed repertoire of ostensive convergence that constitutes a massive niche constructive inheritance in human ways of life.

A third, crucial feature of the role of language in people's organismic embeddedness in their developmental environments is almost invariably overlooked in most semantic theorizing. People mostly do not first hear, acquire, and understand words as such, and only then connect them to articulated aspects of their surroundings. We instead often encounter words immersed in familiar settings of use. This situational immersion is evident in pre-linguistic infants' encounter with verbally rich environments. Words such as "bottle," "car," or "beddie-bye" are not sounds denoting objects; their sonic and later vocal familiarity are integral to the ambiance of feeding, traveling, or sleep. Such concrete immersion of words and their semantic grasp in practical

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[6]. Ostensive relations between words and things are bi-directional, however. Sometimes familiarity with word use allows identification of an object within one's practical circumstances; sometimes the circumstantial salience of aspects of partly shared circumstances helps secure semantic grasp of a word.

engagement with the world does not go away with the consolidation of linguistic competence, but is instead central to that competence. Semantic theorists often posit representational relations between words and things as connecting language to the world, but that is a fundamental misunderstanding. We have always already encountered language as worldly, a familiar and salient aspect of everyday immersion in practical engagement with circumstances. The worldliness of much of the language(s) we speak is easily overlooked, but it can be recovered with some examples. Familiar units of measure for length, weight, temperature, or temporal durations are integral to everyday activity. We not only do not have to refer to or recall a measurement scale to grasp their concrete significance in familiar ranges. On the contrary, we understand the scale because it is grounded in visceral familiarity with the height of a 6-footer, the warmth of an 80 degree afternoon, or the duration of a half hour. People are understandably disturbed by unfamiliar measurement scales because those scales are uprooted from the visceral meaning of familiar quantitative measures that gives them semantic intelligibility.

Another telling example can be discerned in people’s grasp of monetary significance. Social ontologists now often disagree about how money is constituted and sustained as an objective feature of social worlds, but they overlook the pervasive, concrete immersion of monetary significance in everyday life. Quill Kukla notes that,

> Money is caught up and intertwined almost maximally robustly in a huge number of our concrete practices. How much of it we have determines what we wear and eat, where we live, and so forth. An enormous number of our daily actions are directed toward getting it, calculating out how much of it we have in our pocket, spending it, and so on. Meanwhile, how we interact with and respond to one another, at an intricately embodied

> level, is shaped in all kinds of ways by how much money we perceive one another as having and how much money we have and have had in the past and expect to have in the future. (Kukla 2018, 12-13)

"Money" in this sense does not denote discrete objects, however, but the pervasive entanglement of monetary significance and its verbal expression throughout people's everyday lives. Inflation is *psychologically* unsettling not so much for how it debilitates people's standard of living as for how it destabilizes their visceral grasp of monetary significance. The objects denoted by monetary words are grasped via the practical immersion of those words in everyday worldly engagement rather than the reverse.

One reason this concretely verbal character of our everyday lives is usually overlooked is that it never stands alone. Words and sentences are grasped in three distinguishable ways that nevertheless function together as niche constructive transformations of human environments. We have so far considered the concrete immersion of word use in familiar worldly involvements, which on a niche constructive conception replaces discrete perceptual and practical language entries and exits as the primary locus for how language engages the world. The partial autonomy of discursive practices provides a second context that shapes linguistic understanding. The words we hear and use, even when concretely situated amidst practical engagements, are understood as iterations of words already in use and re-usable in other contexts. The words used now are the *same* words used previously and subsequently, and not just similar sounds or marks. They inherit their significance from the relations among these uses in different conversational contexts. Words are also grasped as only semantically significant in sentential combinations, which in turn get their significance from their inferential relations to other sentences and their sub-sentential components. Discursive practices and the ways in which words "make sense" in combinations and across contexts, which inflect their uses on other occasions, is what establishes these familiar sonic patterns or inscriptions as words rather than things.

A third aspect of how people encounter, understand, and use language is the inferential extension of semantic significance across different practices. The first two aspects of discursive articulation, by themselves, would have more complex worldly significance than vervet monkey warning calls, but would not be different in kind. What gives discursive practices a more profound articulative role is that language use is caught up in a practice-differentiated way of life. The concrete involvement of words in people's immersion in practical activities is accountable to the dependence of those practices on other practices, and the ways in which language use helps secure and coordinate those relations among practices. Mark Lance has aptly summarized the key role of diverse practices in constituting the discursively articulated environments that people inhabit:

> To be a person—a language user, an intentional being, a truth claimer—is to operate in a system of mutually interdependent subpractices, held together by incompatibility norms. One must be part of a social system such that it is a general norm that certain performances in one context cannot be jointly entitled alongside performances in other contexts, regardless of the differing practical goals and internal norms of the two contexts. (2017, 179)

Articulated reasons and reasoning arises from conjoining the ostensive intersections of people's developmental environments with the collaborative or antagonistic intersections among interdependent practices. The need to enable compatible coupling among different practical involvements is accomplished in part discursively. The interfaces among different practical engagements in the world coalesce around the inferential identification of objects, properties, and relations and the normative concerns at issue in resolving practical conflicts and achieving mutual supports. Just as the ostensive intersections of people's developmental environments require partial re-orientation to identify their intersections, so the interfaces among different practices require re-orienting people's immersion in those practices to recognize and accommodate their mutual effects.

This aspect of the discursive articulation of human developmental and selective environments is integral to the two-dimensional normativity of people's practice-differentiated way of life. Discursive practices play an integral role in that two-dimensional normativity in part by allowing explicit expression of the normative concerns at issue in the goal-directedness of particular practices, and in how those practices are accountable to other concerns arising at interfaces among practices (Rouse 2023b, ch. 6). The biological normativity of other organisms only concerns whether life and lineage continue, and not how that continuation is achieved, with what transformations in the organisms or their way of life. Human ways of life evolved in differentiated but interdependent ways, and the discursive articulation of practices provides the basis for reasoning about how to sustain practices amidst their dependence on how other practices develop. Reasons, reasoning, and the discursive articulation of human developmental environments come into the world as part of our differentiated, collaboratively interdependent ways of life.

This aspect of a niche constructive account of discursive practices exhibits both its reliance on key aspects of Brandom's inferentialism, and also its inversion of Brandom's model of how discursive practices engage their causal nexus. Brandom rightly identifies objects and the subsentential expressions denoting and sententially "framing" them discursively as the locus of coordination of among different conceptual "perspectives" in discursive practices (1994, ch. 8). A niche constructive account of the evolution of a practice-differentiated way of life nevertheless shows why Brandom explicated the conceptual articulation of objects from the wrong direction. Brandom initially identifies "objects" discursively as open-ended sets of extensionally inter-substitutable singular terms. He then ascribes empirical content to discursive commitments by reliably connecting them to causally consequential objects by speakers' judgments about one another's reliability in perception and action. I conclude this section with three ways in which Brandom's account of the conceptual articulation of objects needs to be inverted.

The first consideration is that Brandom mistakenly presumes that the causal nexus in which we find ourselves is already composed of discrete objects. A wide range of work in philosophy of science has shown that this presumption is false (Barad 2007, Smith 1999, 2019, Teller 2020, Woody 2004, Rouse 2015, ch. 7-8, 2023b, ch. 7-8). The identification of objects within a causal nexus and their re-identifiability in other settings are already conceptually articulative, normatively accountable performances. The *appropriate* boundaries of those objects is dependent on the normative concerns at issue in the practical contexts in which they are picked out by the ostensive coordination of practical involvements and their constitutive normative concerns. A second consideration we already saw above: the identification and re-identification of words within discursive practices itself exemplifies this practical-perceptual normative coordination, and cannot be appropriately understood in abstraction from our practical, causal involvement in the world. A third consideration, developed elsewhere, is that Brandom's effort to incorporate accountability to that causal nexus within discursive practices failed; at best, on Brandom's model, discursive judgments about the world would only be accountable to other judgments about people's practical and perceptual reliability (Rouse 2002, ch. 6-7; 2018). Having initially abstracted discursive practices from their practical-perceptual involvement in our biological environments, Brandom has cut off any basis for restoring that connection.

This consideration of the evolutionary origins of discursive practices thereby reinforces the conclusion of our earlier consideration of the purposiveness of other organismic ways of life. That purposiveness is only one-dimensional and holistically indeterminate. It constitutes purposive cycles of organism-environment intra-action that can succeed or fail to sustain themselves and reproduce descendant cycles, but can provide no basis for articulating *how* that purpose ought to be achieved, and hence *what* roles their components ought to play in those changing processes. Hence, it shows that other organisms not only do not give themselves reasons, but they also do not *have* distinct reasons for developing or evolving in one way rather than another. Turning Brandom's model of discursive practice inside-out thereby vindicates different aspects of Dennett's and Brandom's understanding of the normativity of reasons and reasoning. Dennett rightly argues that discursive practices of reasoning and the reasons they articulate need to be recognized and understood as evolved aspects of human biological ways of life. Brandom and other "Pittsburgh" defenders of the normativity of reasoning are nevertheless right in more sharply differentiating the discursive articulation of reasons in human ways of life from the biological purposiveness of other organisms.[7]

III — Making Sense of Evolution

Two related tasks remain for completing this constructive response to Dennett's schema for the evolution of reasons and reasoning. Taken together, fulfilling these tasks circumvents an apparent dilemma confronting my criticism of Dennett. From one direction, it might be argued that Dennett's account can in the end accommodate the differences I have emphasized between organismic purposiveness and reasoned conceptual articulation in human ways of life. From the other direction, however, it might be argued that if Dennett's schema cannot explicate reasons for other organisms' physiology and behavior, then my reasoning would undercut the legitimacy of evolutionary explanations for other organisms.

Trying to reconcile Dennett's schema with mine begins with Dennett's recognition that only humans (as far as we know) act *from* reasons and make them explicit. He could plausibly endorse my account of the evolution of explicit and articulated reasons as emerging in humans' collaborative, practice-differentiated way of life. Reasons and reasoning emerged within the discursive articulation and ongoing re-alignment of the goals and normative concerns of particular practices and interdependent groupings of practices. Reasons would then come on the scene explicitly only with the evolution of discursive practices in the hominin lineage. Dennett would then argue, however, that once those discursive practices and conceptual norms emerge

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[7]. Haugeland (1998, ch. 10-13) and McDowell (1994) have their own ways of distinguishing the Sellarsian space of reasons from the biological normativity of organisms. Sellars's own account of the relation between the evolutionary origin of humans and the manifest image of humans as reasoners is perhaps less clear on this point.

in our lineage, they can legitimately be read back into the physiology and behavior of other organisms. Indeed, reasons and reason-giving more generally became part of human ways of life long before anyone could undertake evolutionary assessment of the reasons for how organismic life cycles evolved. The evolutionary reasons for what those organisms do would nevertheless be "real patterns" in their natural history, even though they never function cognitively as reasons operative within those organisms' own cognitive economy (Dennett 1991).

This reading of Dennett's schema for the evolution of reasons would correlate it with his long-standing proposal to understand organismic purposiveness and behavioral norms as correlates to the design and intentional *stances*. Attributions of purposes to organismic functioning and reasons for organismic behavior are real patterns because and to the extent that they enhance human abilities to predict those patterns from those stances. Dennett's line of reasoning for both the objectivity of those patterns and their dependence on explanatory stances has since been codified by Brandom as a distinction between two different forms of dependence on human practices and norms. On Brandom's distinction, Dennett is arguing that organisms having reasons for what they do is "sense-dependent" on human reasoning, but not "reference-dependent."[8] Non-human organisms are only *intelligible* in relation to human practices of reason-giving, such that one can only understand why they act and function as they do through evolutionary explanations that only we can give. That intelligibility is an objective

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[8]. Brandom's classification was prefigured by Dennett's (1993, 324) distinction between the objectivity of how a vista can be "lovely" by human perceptual standards even if never actually viewed by humans (sense-dependence), whereas a person cannot be a "suspect" for a crime unless someone actually suspects that person (reference-dependence).

feature of the organisms, however; even if humans and our discursive practices and norms had never evolved, it would still be true, counterfactually, that other organisms *would* have been intelligible by our evolutionary reasoning.

The difficulty with Dennett's insistence that other organisms *have* reasons for their physiology and behavior even though they do not *give* reasons or act *from* reasons is that he conflates at least three different senses in which there are reasons for some phenomenon. Dennett himself recognizes two of those senses, which he colloquially designates as "how come" and "what for," and which I will instead describe as "reasons why" and "reasons for." This reformulation accommodates a third distinct category of "reasons to" that complicates the transition from purposive animal physiology and behavior to reason-giving in the human lineage. Reasons why are the kinds of reasons provided in scientific understanding of some phenomenon. There are reasons why chemical bonds form in some interactions among molecules and not others, but these are not reasons for the molecules to form those chemical bonds. They simply explicate what molecules do under relevantly different circumstances. Reasons for (and against) are justifying reasons, which not only explain why something did (or did not) happen, but also indicate why it ought (not) to happen. Reasons to are the normative concerns that are at issue in providing reasons for some phenomenon, i.e., how the outcome of some process *matters.* A reason *for* a chess player to move a piece under threat by an opponent is to avoid having the piece captured. A reason *to* move that piece is that avoiding its capture contributes to the goal of winning the game, and the ways winning, trying to win, and losing matter in players' lives.

It is important to note at the outset that even reasons why some phenomena occur are *sense*-dependent on people's discursive practices and normative concerns. Reasons why a phenomenon occurs gain their authority from their place in a conceptually articulated domain. Situated within such domains, phenomena display patterns of intelligible counterfactual and subjunctive invariance (physical necessity, biological necessity, psychological necessity, etc.), with more limited mutual normative accountability to other domains. Understanding a scientific explanation is dependent on understanding the role of the conceptual relationships it invokes within an ongoing research practice (Rouse 2015, ch. 8-10). Dennett is then arguing that evolutionary explanations are reasons why organismic processes and behavior occur as they do, which turn on reasons for how those processes and behavior contribute to the constitutive goal of sustaining and reproducing that organismic lineage.

Several conjoined considerations show why Dennett has conflated several different aspects of reasons and reasoning. The first consideration is that evolutionary explanations are population-level explanations for the variance within that population on selectively relevant considerations. Just as probabilistic explanations explain improbable outcomes as well as the more likely ones, so evolutionary explanations provide reasons why some functional and behavioral patterns within the population leave fewer or no descendants in subsequent generations. Explaining why some complex functional patterns failed to sustain themselves over time is integral to the evolutionary explanation, but that explanation does not provide reasons *for* those less reproductively successful individuals to function in these less successful ways. One might still argue that earlier adaptations provide reasons for those functions, when conjoined with the opacity to the organism of countervailing environmental changes. Moreover, sometimes, those reproductive failures do seem to provide *populational* reasons for their characteristic traits. The standard explanation for the persistence of the genetic alleles whose recessive combination causes sickle-cell anemia is that it protects heterozygotes for that trait from malaria, and thereby seems to provide reasons for the population to converge on a percentage of the population having the recessive allele as "ideal" in its environment. It seems to provide reasons for the population to display a pattern of variance without thereby providing reasons for an individual to have both recessive alleles. A population with genetic variance at that allele has greater reproductive "fitness" than one with only the dominant allele. Similarly, R.A. Fisher's classic explanation for the sex ratios at birth of a sexually reproducing population seems to provide reasons for the population to converge on that ratio, even though it provides no reason for any particular embryo to develop as male or female.

We need to consider further the central explanatory category of reproductive fitness. Susan Mills and John Beatty (1979) emphasize that adaptive fitness is not the *actual* reproductive success of individuals, populations, or phenotypic traits. Success might result from factors other than fitness, and equating fitness with success would also trivialize its explanatory power. Fitness is instead a *propensity* to produce offspring which is normally assessed with optimization models (Maynard Smith 1979). Key assumptions in these models are the range of phenotypic variation, the aim or goal to maximize, the population structure, and its mode of inheritance (Maynard-Smith 1979, 52). What is maximized is not itself a functional role, but the continuation of the life of an organism and its reproduction in subsequent generations. Models often address a component of fitness, such as rates of energy intake while foraging, which might itself be understood functionally (Maynard-Smith 1979, 52). The modeled component of fitness is nevertheless functional only to the extent that it contributes positively to maintenance and reproduction of the lives of organisms and their descendants. Whether it does so contribute, however, depends on how it interacts holistically with other interdependent "components" of fitness. The models are only as good as the many assumptions that frame its presumption of a functional role for the traits analyzed in the models.

The assumptions that frame evolutionary models are empirically accountable. To that extent, when they have some predictive or explanatory success, they are real patterns in the world as Dennett insists. Nevertheless, the reasons for making those assumptions rather than others are integral to the research practices in evolutionary biology, which incorporate some of the causal factors in complex situations into their models and relegate others to confounding noise. Moreover, the counterfactual and subjunctive reliability of the conceptual patterns analyzed in those models is context-sensitive, depending on which factors are held constant in the relevant counterfactual reasoning (Lange 2007). The relevant contexts conjoin the disciplinary purposes of the scientific research domain involved with its "heteronomic" accountability to what other research domains disclose empirically about the actual situations targeted by the models (Rouse 2015, ch. 10), where those actual situations are the only-partial intersections among different patterns of counterfactually robust models assessed for different purposes. Evolutionary models typically analyze organismic functioning and behavior into component traits whose contributions to fitness can be modeled separately with suitable framing assumptions. These many possible partial models of the fitness propensities of particular traits or behaviors enable "artful modeling" of those aspects of an organism's way of life for our varied purposes (Cartwright 2019), but do not combine vectorially into a "Perfect Model" of the organism's actual behavior (Teller 2001).[9] To that extent, although the counterfactually robust models provided by evolutionary explanations are real patterns in the world, they are not the same patterns as the characteristic purposiveness of organismic ways of life.[10]

This point can be seen from another direction. One of our significant differences from the ways of life of other organisms is that we live a practice-differentiated way of life. Those practices provide people with a plurality of constitutive goals that provide "reasons to" undertake various patterns of activity that govern particular reasons for that behavior, which we then attempt to reconcile. Other organisms have but one "reason to," which is only specifiable deictically and anaphorically. In providing "reasons for" organisms to behave or change their environments in order to sustain themselves, we hold their current physiology and way of life constant and consider what would be required to sustain it in *that* way under changing environmental circumstances. Organismic purposiveness is not stable in that way, however; organismic lineages often sustain themselves by replacing some of their previous ways of life with different patterns of populational variation.

This difference between the one-dimensional normativity of other organismic ways of life and the two-dimensional normativity of our practice-differentiated way of life also shows up

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[9] . The mutual incompatibility of alternative models of the same situation for different scientific purposes is not unique to evolutionary modeling, but also shows up in other scientific domains, including mechanics (Wilson 2006, Cartwright 2001, Teller 2001). Similar considerations lead Bechtel (2005) to argue that the mechanistic models that play an explanatory role in many of the life sciences are epistemic *rather than* ontological characterizations of their explanandum.

[10] . Haugeland (1998, ch. 10-13) has also argued, on related but distinct grounds, that the patterns discernible from the intentional stance are real patterns, but not the same patterns as intentionality, which would be characterized by a stance toward stance-*taking*.

within how we understand the organism/environment nexus in each lineage. Organisms do not encounter objects “in” an environment, or reasons for one behavior or functionality. They do not analyze their environmental circumstances into noisy patterns of interactive components which must then be reconciled to comprise the whole, but instead already incorporate the noise as part of the environmental “signal” they confront as a field of behavioral affordances and solicitations. Not only do they not encounter, recognize, or respond to particular reasons for their behavior. The absence of such symbolic reduction and goal-differentiation is conducive to more flexible responsiveness to their environments. In Dennett’s terms, in analyzing situations into components and rationales, we have not discovered a “good trick” that other organisms have failed to discover, but instead a trick that only works in conjunction with many others, at significant cost. We can now understand why, in our terms, there are reasons for other organisms not to have reasons for particular components of their behavior, even though we legitimately make sense of them in that way for our purposes in our practice-differentiated, discursively articulated ways of life.

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