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How DOORKNOB Gets Its Meaning

Jerry A. Fodor, *Concepts: Where cognitive science went wrong,* Oxford, England: Oxford University Press, 1998, 174 pp., ISBN 0–19–823636–0 (paper).

Geoffrey C. Bowker and Susan Leigh Star, *Sorting things out: Classification and its consequences,* Cambridge, MA: MIT Press, 1999, 377 pp., ISBN 0–262–02461–6 (hard).

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Jerry Fodor's (1998) *Concepts: Where Cognitive Science Went Wrong* (hereafter referred to as *Concepts*) and Geoffrey C. Bowker and Susan Leigh Star's (1999) *Sorting Things Out: Classification and its Consequences* (hereafter referred to as *Sorting*) represent orthogonal views of concepts and categories stemming from two very different philosophical traditions. Fodor focuses on theories of concepts, whereas Bowker and Star discuss what categories and classification systems are. For Fodor, concepts are mental particulars that apply to things in the world (p. 23). According to Bowker and Star, "classifications are both conceptual (in the sense of persistent patterns of change and action, resources for organizing abstractions) and material (in the sense of being inscribed, transported, and affixed to staff)" (p. 289). Both can be construed as in agreement with the correspondence between categories and concepts maintained by cognitive scientists: Categories are used to refer classes of things in the world, and concepts are mental correspondents of the categories (Medin & Waxman, 1998; Ross & Spalding, 1994).

A central problem occupying these books is how people establish the correspondences between things in the world and mental representations—or the

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mind's abstractions. In the extremes of philosophical thinking, it is either the mind that becomes subordinate to the world or vice versa. An idealist view would assume that everything in the world, including members of classes, are mind-dependent and thus there is no external reality. A pure constructivist view would assume that everything is mind-dependent in the sense that all we can know about reality is constructed by the mind. A strict empiricist view would assume that mental representations are just imprints of an external reality, so our mental representations are fully world-dependent. Neither *Concepts* nor *Sorting* question the reality of a mind-independent world or claim that minds are subordinate. Instead, they both argue that we impose a mind-dependent order on an external reality. They argue this position, however, from two completely different perspectives. Having given up his earlier nativist views on the origin of all concepts, Fodor's latest quest is in search of universal mental capacities and the law-like relations that establish the correspondences between mind and world, whereas Bowker and Star investigate the specific ways in which human social and cultural systems construct these correspondences and the why and how of those cases in which the correspondences break.

In our commentary, we attempt a comparative overview of what we see as theoretical issues common to the concerns of the two books. We begin by placing the books within their respective philosophical traditions. We than address the issue of concepts and categorizations in the light of their philosophical positions. Finally, we discuss the implications of their theories of concepts and categories for learning.

PHILOSOPHICAL POSITIONS

Concepts: Nativist and Metaphysical Realist Philosophy

Fodor repeatedly criticizes empiricism and cognitive theories that are "tainted" by empiricism. Empiricism maintains that all concepts (or at least most) are acquired through experience and through inductive learning. Concepts are epistemic capacities, with their contents determined by the inferential relations into which they enter. In opposition to empiricism, Fodor outlines a version of nativism that is as hard to fathom here as it was in its earlier, more radical version (Fodor, 1975). The 1975 Fodor assumed that *all* lexical concepts have to be innate, primarily because there are no inductive learning mechanisms that can account for conceptual knowledge. The Fodor of *Concepts* assumes that it is only the mental mechanisms that establish the content of the mental representations that are innate and not concepts themselves. Here, Fodor remains committed to the idea that concepts have to be mental particulars and not mental capacities. His theory of concepts is based on "psychological atomism." Psychological atomism assumes that concepts are mental entities whose content is independent of their relations to other concepts; that is,

they are semantically primitive. This assumption constitutes the core of his theory of "informational semantics," which stands in opposition to the standard empiricist inferential semantics widespread in cognitive science.

In Fodor's view, the mind is neither a passive receptor of environmental stimuli nor a tabula rasa on which the environment makes its imprint, as radical empiricism would have it. Human mental-cum-neural states seek to "resonate" with the environment and not the other way around. This may sound like metaphysical idealism, as "Auntie" points out, but Fodor wants to distance himself from idealism as much as he tries to distance himself from empiricism—which brings us to doorknobs. According to Fodor, the concept DOORKNOB gets its meaning by the human mental mechanism reliably "locking" onto doorknob stimuli. The locking mechanism provides a direct connection to reality without connection to other concepts or the mediation of theories. This locking process, however, remains mysterious throughout *Concepts*. Fodor maintains that everyone has at least the potential of having the same primitive concepts, such as DOORKNOB and RED. Further, "[t]he mind-dependence of *doorknobhood* is not an argument for there not being doorknobs" (p. 148), as Fodor points out in opposition to what he refers to as "Department of English Literature" views such as those of George Lakoff (who, in fact, is neither in a such a department nor is an idealist), who argues that "realities (like Tuesdays) reside in human minds and not in the external world" (p. 148). Fodor argues that such views are flawed in that they fail to take notice of the fact that human minds reside in the world. There are doorknobs because of the way *both* human neurology and the world are.

There are at least two major problems with Fodor's position. First, Fodor's nativist philosophy, either the radical form or the new nativism of mechanisms, implies a kind of "preestablished harmony" between the mind and the world at the expense of ignoring the mismatches and tension between the way we think about the world and how the world responds. Second, Fodor cannot account for the cultural diversity in, and historical development of, doorknobs (or anything else) and their classification.

Sorting: Philosophical Pragmatism

Bowker and Star are not philosophers, but they do situate their philosophical position with pragmatism and maintain that "we know that things *perceived* as real are real in their consequences" (p. 53). Clearly for Bowker and Star there is no "preestablished harmony" between classification systems and the world. "Mismatch" is the operative word here, and they provide several rich examples. Consider, for example, their discussion of why it is so difficult to classify tuberculosis. According to their analysis, tuberculosis classification is located at the intersections of nature, culture, discourse, and infrastructure. Such classification systems force people to fit their experiences to the structure of constructed systems, which creates a

"torquing" in their lives. It is at these moments of torquing that the relation between formal systems of knowledge representation and informal, situated experience become more visible, and both the constructed nature and consequences of classification systems become apparent. Following Bruno Latour (1987), Bowker and Star (p. 49) claim that the real resists its definition, and so it is at those moments when classification touches the surface of the reality, that is, the moments of torques and twists, that humans most intensely feel the role of an external reality in the process. Their position is clearly constructivist, but not of the radical form that denies a role to an external reality.

Classification systems shape human reality in two ways: first by shaping experience and second by shaping memory. When Bowker and Star discuss the development of the International Classification of Diseases (ICD), their analysis starts from the position that the ICD encapsulates stories—narratives in the form of names of diseases. In the constructive process, these names eventually fade away and are replaced by more abstract, generic representations. This process of the removal of particulars from descriptions creates what they call "a kindness of strangers"; that is, "the classification system operates a shift away from our being individuals experiencing the world to our being kinds of people experiencing kinds of places" (p. 81). In this process of convergence, informational artifacts and social worlds are mutually constituted.

Conceptual Universalism Versus Conceptual Relativism

Fodor's nativism and Bowker and Star's pragmatism differ from one another in two significant aspects. Fodor's philosophical position assumes a harmonious relationship with the world and a universality in the way reality is understood. Bowker and Star's position assumes mismatches more than harmony and relativity and diversity more than universality.

According to Fodor, the main argument against conceptual relativism is that it does not allow intentional generalizations, and, in his construal of it, intentional explanation lies at the center of the representational theory of mind:

> If everybody else's concept of WATER is different from mine, then it is literally true that only I have ever wanted a drink of water, and that the intentional generalization "Thirsty people seek water" applies only to me (p. 29).

Concepts, though not innate, are universal in their meaning because they derive from shared, innate mental mechanisms. This answer, however, does not explain why we have the kind of concepts that we have or how we acquire those specific concepts. It simply reverses the argument. We have the concepts that we have because we are constrained by our innate mechanisms. This of course does not ex-

plain anything. It simply says that the bull gets angry when it sees the red, because, being the kind of being that bull it is, red resonates anger in the bull.

According to Bowker and Star, classifications are bound to be relative because they are products of negotiations, because reality changes, because our conceptions change, and because what is at stake differs from person to person and culture to culture. Their analysis of the classification of tuberculosis in chapter 5 draws from the ICD, from Thomas Mann's *Magic Mountain*, and from Julius Roth's observations of sanatoriums to illustrate the negotiations between patients and physicians in developing the category, and thus the meaning of TUBERCULOSIS. One can imagine a similar analysis for how we have come to develop the classification of doorknobhood. Classifications and standards are attempts to achieve universality, but such universality is based on social agreement and negotiation. Once constructed, we allow classifications to control and guide our lives as if they were universal.

CONCEPTS AND CATEGORIES

Cognitive Science

How *Sorting* and *Concept*s are situated with respect to cognitive science further deepens the divide between them. Fodor does not consider anything from "Southern California" as worth taking seriously. His main targets, of course, are certain University of California–San Diego philosophers, and the tone of his critique provides a flavor of the writing in the book:

> I'm aware there are those (mostly in Southern California, of course) who think that intentional explanation is all at best pro tem, and that theories of mind will (or anyhow should) eventually be couched in the putatively purely extensional idiom of neuroscience. But there isn't any reason in the world to take that idea seriously and, in what follows, I don't . (p. 7)

Fodor assumes that the reductionist theory of mind is the only game in town (p. 23). In so doing, he is unaware of—or purposefully avoids—whole literatures, more longitudinally distributed along the California coast and elsewhere, concerning distributed cognition, situated cognition, and dynamic systems. Bowker and Star do not discuss the cognitive literature but only mention that they are closer to views in cognitive science that put emphasis on social aspects of cognition and that question the very necessity of mental representations (Hutchins, 1995; Keller & Keller, 1996; Lave, 1988; Suchman, 1987). They are especially against cognitive idealism (p. 39) and supportive of research in distributed and situated cognition (p. 158).

Both books fail to pay sufficient attention to current research in cognitive science. Given that Fodor's agenda is to reform cognitive science, it is a major deficiency that he does not address the current state of the field. Bowker and Star's analysis is sociological and historical and, although not dependent on cognitive science, could have benefited from dealing more substantively with the cognitive research they allude to, especially in the areas of situated cognition and learning. For example, it is not indisputable that one needs to abandon mental representations to accommodate the insights they provide into categorization practices.

Concepts on Concepts

Fodor reviews three views of concepts: the definition view, the probabilistic view, and the theory theory view. He spends pages and pages refuting the definition view of concepts. However, his battle is largely beside the point for cognitive science. Among current cognitive scientists it is nearly impossible to find anyone favoring a completely definitional view of concepts (Komatsu, 1992). The prototype view has challenged the definition view (Rosch & Mervis, 1975), and it has been challenged by new views of concepts such as the exemplar view (Medin & Schaffer, 1978) and the theory theory view (Gopnik & Meltzoff, 1998), yet Fodor's discussion of these positions is limited. The main point of his analysis is his contention that all three assume that "primitive concepts, and (hence) their possession conditions are at least partly constituted by their inferential relations" (p. 35). But, Fodor argues, because computation is described in terms of mental representations, it would be circular to describe mental representations in terms of inferences, which is basically computation.

As discussed earlier, Fodor rejects the inferential view and wishes to reform cognitive science, instead, with the alternative of informational semantics. He claims that just as the primitive concept RED is constituted by red appearances, so too the contents of all lexical concepts, such as DOORKNOB are constituted by nomic-cum-causal relations to the things in the world. We acquire the concept DOORKNOB by lockings based on doorknob appearances, just as we acquire the concept RED based on red appearances. The fact that RED is one of the primary colors, for instance, is not constitutive of red, because it is not an appearance quality and it is based on information derived through inferences.

Taking another example, it is because of the reliable experiential connection between dogs and DOG-tokens that we know what DOG means. The concept DOG is not constituted by the fact that seeing dogs causes tokens of DOG in one's belief box; to the contrary, "one's conception of that concept is constituted by there being the appropriate, meaning-making lawful relations between instantiated *doghood* and one's neural-cum-mental states" (p. 76). So, "being dogs" and "being causes of actual and possible DOG tokenings in us" is a nomic connection between two properties of dogs (p. 73).

Fodor does not deny that there are relations among concepts, only that the connections are constitutive. DOORKNOB means what it means because of the meaning-giving relations between tokens of it and actual doorknobs extracted by the locking mechanism. It does not derive any of its meaning from its relations to other concepts, such as THUMB LATCH, whose instantiations were replaced by doorknobs in specific cultures in the 19th century, or to aspects of the social and cultural context that gave birth to the category.

Sorting on Classification Systems

Sorting opens with a statement: "to classify is human" (p. 1), with which Fodor would agree. However, for Bowker and Star there is much more to "human" than neurology. In the first chapter, Bowker and Star introduce the three main points of their analysis. First, classification systems constitute an interdependent and integrated web. Second, they are material as well as symbolic—they are not solely properties of mind. Third, classification systems are products of negotiations between different stakeholders with different priorities.

Social and cultural factors are central to the classifications humans make, but these are ordinarily invisible in the end product and lead to them being mistakenly viewed as natural. Thus, *Sorting* aims to render visible that which is invisible and does so by demonstration rather than by a priori argument for the necessity of their view. It aims to create an "infrastructural inversion" that will make the historical development that which looks natural, and the final product constructed. Infrastructure can only be recovered by looking at processes of development and laying bare the interdependence of technical networks, standards, and politics in creating human representations of the world. Clearly, in this view, DOORKNOB gets its meaning through such constructive processes, and residuals of the process inform the product. Furthermore, no category stands alone. All categories are in relation, and a single new entry to the system may change the whole (p. 60).

Bowker and Star hold that classification systems are a mixture of Aristotelian—that is, definitional or formal—and prototype representations. There is always a tension between typological and topological information; topological information is about keeping the multiplicity of meanings, and typological is about abstraction and generalization. Classification systems do not mirror reality; they illustrate the fluidity of reality. The ICD example they give illustrates how once a classification system is finalized, the information related to the process and uncertainties is deleted from the final product, and classifiers attempt to make the world fit the categories. The ICD, for example, was first published in 1893 in Paris and was based on the existing classification systems of deaths in Paris. It was imposed on the colonies, and citizens were asked to comply with it even though their health problems were substantially different. This resulted in an under-representation of tropical and local diseases, which hindered their proper medical treatment.

Bowker and Star's purpose is proscriptive as well as descriptive. Once the contingent nature of classification systems is understood, rules of thumb can be suggested for how to make them better. According to Bowker and Star, our aim as researchers should be to explore, constantly, what is left out. Thus, the design of classification systems should involve organizational, political, and historical analysis as part of the constructive process. These kinds of analyses will aid in the retrieval of different voices, exclusions, and ambiguities.

Universality Versus Polysemy

The striking difference between the books is *Concepts*' view of meaning as universal and univocal and *Sortings*' view of meaning as situated, negotiated, and mutable. According to Bowker and Star, for any classification system to be successful it needs to be able to deal with ambiguities and polysemy and not deny them. The polysemy inherent in classifications arises because they are products of negotiations. Classification systems respond to conflicting interests, and, in the end, different stakeholders can interpret or use categories in different ways (p. 148).

How does Fodor deal with the fact that, in use, even lexical concepts seem to allow variations in meaning? According to Fodor, none of the parts of the sentence will be actually polysemic; it is the relations concepts enter into that are changing and not the content of concepts. Thus, it is the relations a concept has to other parts of a sentence that change, not its own meaning. One is reminded of the famous artist and art teacher Joseph Albers. In the early sixties Albers (1963) experimented with colors and studied how the perceptual qualities of colors change when embedded in different colors. Neither the embedded color nor the embedding one itself has the perceptual qualities that it has when they are juxtaposed, yet this does not mean that the colors do not have unique properties. Albers argued that relational properties of a color emerge in interaction with another color's properties.

HOW DOORKNOB IS ACQUIRED: CONCEPT/CATEGORY ACQUISITION AS THE KEY ISSUE FOR LEARNING

Fodor's View of Learning

Concepts is the more explicit of the two books about the problem of how concepts are acquired. By opting in favor of a less radical nativist view, Fodor trades the traditional difficulty of explaining the relation between our concepts and the external world for a traditional empiricist issue: the acquisition of primitive concepts. According to Fodor, the standard argument in cognitive science and learning sciences sees learning as an inductive process, involving designing and testing hypotheses. The problem for Fodor, however, is that we cannot learn primitive concepts

through inductive processes because primitive concepts have no structure. To form and test hypotheses about them, we must already be in possession of them. Thus, the Meno paradox arises. Plato's problem in the *Meno* was how we can learn, and how we can know that what we learned is what we were seeking, if we do not already know what we are looking for. His answer was that learning is a process of remembering. The standard argument's answer to this problem is that learning requires mediating hypotheses, involving, in part, the same concepts that are being learned. Fodor sees this as viciously circular.

How do we acquire concepts if not through induction from experience, as empiricists argue? Recall that for Fodor, nativists need not deny the role of experience in concept acquisition. The difference between nativism and empiricism is that nativists think that concepts are *occasioned by* experiences, whereas empiricists think that they are *abstracted from* experiences. Fodor contends that his is the better answer to the central problem of concept acquisition, which he frames as "the doorknob/DOORKNOB problem": Why it is that doorknobs always evoke DOORKNOB, and not some other experiences? Fodor's answer is ontological and not epistemic. That is, experience is not evidential, but constitutive. The meaning of the concept of DOORKNOB is an appearance quality, just like the concept of RED: "what doorknobs have in common qua doorknobs *is being the kind of thing that our kind of minds (do or would) lock to from experience with instances of the doorknob stereotype*" (p. 137). The content of DOORKNOB is metaphysically necessary, and it is this content that we learn when our minds "resonate" to doorknob experiences.

A major drawback of Fodor's critique of the empiricist view of learning is that he considers only inductive processes, which necessitate mediating hypotheses for the learning of concepts, as the only game in town. There are, however, more ways of learning than Fodor can conceive, obviating the need for his resort to metaphysical necessity. For instance, analogy and metaphor are two sources of learning that do not necessitate an inductive process, traditionally construed. The literature on child learning (see, e.g., Carey, 1999) and on scientific change (see, e.g., Nersessian, 1992, 1999) provide ample examples of bootstrapping procedures for concept acquisition and conceptual change.

Bowker and Star's View of Learning

Sorting does not pay much attention to how concepts are learned, except to endorse in passing the idea of learning through community membership as it is investigated by Lave (1988) and others: "categories are historically situated artifacts and, like all artifacts, are learned as part of membership in communities of practice" (p. 287). For Bowker and Star, a community is defined in terms of its categories, so people who become familiar with those categories become members of that community. By becoming members of communities, novices are exposed to three major aspects of the

particular community. First they are exposed to skills that are related to that community. Second they are exposed to the body of knowledge of that community. Third they acquire the social and cultural norms of that community.

Becoming a member of a community is a process of "naturalization" in which the learner becomes more and more familiar with categories and norms of a practice and with the objects countenanced by the community. What is learned is not a metaphysical necessity. It also is not stored in memory in a ready-to-be-used form. It is constructed and reconstructed again and again according to present needs. This view, thus, favors a constructivist learning theory according to which knowledge is not absolute and universal but personal (Petraglia, 1998). Learning, then, does not necessarily result in the desired outcomes (Brooks, Norman, & Allen, 1991).

Community membership and naturalization are never straightforward. According to Bowker and Star, membership in a community is graded. One can either be a full member or borderline or a monster. "Borderlines" are those members who inhabit more than one community of practice, and "monsters" are those who, though in one community, are still strange in some manner. People, in general, belong to multiple communities, and the issue for *Sorting* is not so much how they become members but how information science should respond to this multiplicity of membership and to the multiplicity of marginality of people living along boundaries.

CONCLUDING REMARKS

On the whole, *Sorting* fulfills its agenda by developing several rich historical cases that demonstrate how reality and our conceptualizations of it change in time and in space. It presents a thought-provoking and persuasive demonstration that there are not and cannot be universal laws about categorizations. The only "law" is that they are products of negotiations between different groups, which, in response to contextual issues, end up giving voice to some while silencing some others. To understand what categories are employed and why, one has to look at history and study how negotiations have evolved to produce certain categories rather than other ones. Bowker and Star's analysis leads to the conclusion that classifications are mind-dependent in that they are human constructs, and classifications correspond to things in the world because it plays a role in the partitioning processes. The main issue is how to understand the match and mismatch between what and how we classify and what there is, which requires detailed case-study analyses of origins.

Concepts, on the other hand, falls short in its efforts to convince the reader that it has found the universal laws—or even that Fodor's methodology gives a promise of doing so. Fodor simply assumes, a priori, that humans are the kinds of beings that possess the ability to lock onto the salient perceptual and experiential properties of things in the world, thus giving concepts meaning. His argument reduces to the claim that we establish the correspondences we do because it is metaphysically

necessary that we do it that way. Even if we grant that a major objective of the book is to establish the philosophical foundations of a particular theory of concepts, showing its consistency with the representational theory of mind and revealing its explanatory power, it is hard to see how Fodor could hope to redirect cognitive science from its "false" path to a more "correct" one without offering any significant psychological or neuroscience research to substantiate his sweeping claims. Fodor simply presents metaphysical speculation about what is fundamentally an empirical question: how the human brain functions. Not only does Fodor fail to explain the nature of the purported mental mechanism, he also fails to present a single convincing exemplary case.

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