Is Perception Theory-Dependent? Fodor contra Churchland

Sean Fujimori
Hamilton College

Epistemology, the study of knowledge, remains relevant to philosophy even as the scientific study of the mind increasingly informs and motivates this formerly purely philosophical area of inquiry. A particularly contentious point throughout the Twentieth Century was the question of foundationalism which is the focus of this essay, specifically the contemporary debate between Paul Churchland and Jerry Fodor.

The conceptual lineage of Churchland's anti-foundationalism can be distinctly traced through the work of Wilfred Sellars, W.V. Quine, Thomas Kuhn and Richard Rorty. These thinkers are united in their resistance to foundationalist epistemology. In contrast, Jerry Fodor continues to push for foundationalism in the form of encapsulated perceptual modules and marshals a host of logical arguments and pieces of psychological evidence to support his position. In this essay I will review a series of publications including the opening salvo of the debate between Churchland and Fodor as well as a paper by Robert McCauley and Joseph Henrich that interrogates both positions in the light of empirical evidence.

In Scientific Realism and the Plasticity of the Mind (1979), Paul Churchland put forth a theory that includes as a crucial aspect the claim that there are no theory-neutral perceptual judgments. In his essay, Observation Reconsidered (1984), Jerry Fodor rejects this claim, arguing that while inferential beliefs may be theory-dependent, observational beliefs are in fact theory-neutral because of the impenetrable encapsulation of sensory systems. In Perceptual Plasticity and
Is Perception Theory-Dependent? Fodor contra Churchland

Theoretical Neutrality: A Reply to Jerry Fodor (1988), Churchland provides arguments from the etiology of perceptual beliefs and from semantic holism against Fodor’s claims. In the same year Fodor offered a blunt reply dismissing Churchland’s rebuttals (Fodor, 1988). Robert McCauley and Joseph Henrich provide a robust analysis of cross-cultural experimentation on perceptual plasticity, concluding that Fodor’s claims for theory-neutral perceptual judgments lack empirical support but that Churchland may exaggerate the plasticity of perception (McCauley & Henrich, 2006). My own view is that the available evidence weighs heavily against Fodor and I propose reasons to abandon Fodor's implausible view in favor of Churchland's more relevant and fruitful approach.

Observation Reconsidered

Fodor begins his assault on Churchland’s position by insisting on an observation/inference distinction. For Fodor the observation/inference distinction implies two fundamentally different routes to belief fixation. Belief fixation by observation involves judgments based on sensory perception, and nothing else. Belief fixation can also be the result of theoretical inference from previously held beliefs. Beliefs that cannot be fixed through observation are necessarily inferential, e.g. beliefs about light with wavelengths above or below the visible spectrum. On the other hand some inferential beliefs are merely accidentally so, e.g. beliefs about life on other planets.

Observationally fixed beliefs, according to Fodor, are central to epistemology because they are more reliable than inferentially fixed beliefs. He supports this hierarchy of epistemic weight mainly on the premise that “the etiological route from the fact that P to the belief that P is metaphorically — and maybe literally — shorter
in observation than in inference.” Therefore, he claims, we validate our claims to knowledge via assessment of commonly shared observations. Inferentially fixed beliefs cannot be as easily adjudicated as observationally fixed beliefs since they rest on idiosyncratic, often tacit, premises rather than intersubjective observations. Fodor argues that running observation and theory together conflates these epistemically necessary distinctions between inferential and observational beliefs. If it holds, Fodor’s claim that we need foundational knowledge in the form of observationally fixed beliefs is a compelling argument against Churchland’s view of perceptual beliefs as theory-laden.

Fodor claims that observational beliefs are theory-neutral in the sense that “… given the same stimulations, two organisms with the same sensory/perceptual psychology will quite generally observe the same things, and hence arrive at the same observational beliefs, however much their theoretical commitments may differ.” He notes that there are three ways of arguing against an observation/inference distinction, namely, “ordinary language arguments, meaning holism arguments, and de facto psychological arguments” (24). He attempts to defang these arguments in turn.

Arguments that the ordinary science use of the terms “observed” and “inferred” is theory-laden are dismissed as irrelevant. He contends that the specifically scientific distinction between observation and inference as deployed by the ordinary language argument is a mere sociolinguistic straw-man. In other words, the ordinary science use of “observed” and “inferred” is unrelated to his observation/inference distinction and hence misses his point.

Fodor appreciates that although meaning holism does not necessarily entail the dismissal of the distinction between observation and inference, it does imply that
Is Perception Theory-Dependent? Fodor contra Churchland

observation cannot be theory-neutral because “what your observation sentences mean depends comprehensively on what theories you hold” (12). Here Fodor attacks Churchland directly, arguing that this interpretation of meaning holism is equivalent to the claim that “anything might be observed depending upon theoretical context" (28). Fodor doesn't explain how he reaches this incongruous conclusion. He concludes that meaning holism contradicts the theory-neutrality of observation only if the meaning of beliefs is determined entirely by their theoretical context. Thus, as long as there remains the possibility that the semantic content of a belief could be purely and directly representational, meaning holism does not contradict the possibility of theory-neutral observations. In short, arguments against theory-neutral observations from meaning holism rest on the contentious premise that all beliefs are semantically linked to other beliefs.

The philosophical distinction between observation and inference and the psychological distinction between perception and cognition are in some sense analogous according to Fodor. Cognition is a component of perception in that perception involves the inference of probable distal cause based on proximal stimulation. Thus cognition can be considered an embedded aspect of perception just as inference can be considered an embedded aspect of observation. Fodor points out that this is a common philosophical interpretation of the psychological evidence for intertwined perception and cognition such as when Kuhn suggests that “… something like a paradigm is prerequisite to perception itself…” ("Structures" 113).

Obviously Fodor must contest the legitimacy of this interpretation, and he does so by striking at its empirical root. He contends that psychological evidence does not clearly support the conclusion drawn by Goodman, Kuhn, Sellars and Churchland, among others, that even observational beliefs are theory-laden. There
may be evidence that perception is sometimes malleable but, Fodor protests, “we surely ought also to be impressed by the degree to which it is often bull headed and recalcitrant” (33). To this end he introduces the well-known *Müller-Lyer Illusion*.

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When the arrow heads are turned outwards the connecting line looks shorter than when the arrow heads are turned inwards.\(^2\) The theory is that when the arrow heads are turned outwards the image implies a convex corner that is pointed towards the perceiver while when the arrow heads are turned inwards, the image seems pointed away from the perceiver. Since the connecting line of the arrow heads would be closer in the case of a corner pointing towards the perceiver and further away in the case of a corner pointed away, the connecting lines are perceived as different sizes as an effect of preconscious compensation for visual perspective.

Fodor leaps on the ubiquity of this illusion to make his point. The effect of the illusion, and a compelling theory for its cause, are well established. If perception were altered by theory then people familiar with the theoretical explanation of the illusion would not experience its perceptual effects. But people who are well aware of explanations still perceive the lines to be different lengths; therefore, observation


\(^2\) The italicized looks is used in the Sellarsian sense of an ascribed but not necessarily endorsed claim. See DeVries’ and Triplett’s account of Sellars’ distinctions between “is,” “looks,” and “sees,” locutions. DeVries, W., Triplett, T., (2000) Knowledge, Mind, and the Given. Hackett. (p. 25)
is theory-neutral. He goes on to claim that all perceptual illusions support this claim in the same fashion.

From this argument Fodor concludes that the “idea that perception is a kind of problem solving does not, all by itself, imply the theory-dependence of observation” (35). Rather, he asserts, to get the theory-dependence of observation this idea needs to be conjoined with the premise that the perceptual modules of the mind have access to the perceiver’s conceptual theories. He contends that his analysis of the Müller-Lyer illusion and its theory-independent properties renders the second premise implausible.

Here Fodor pauses to distill two relevant questions from his discussion: “Whether observation is inferential?” and “Whether perception is comprehensively penetrated by background beliefs?” (35) The first he concedes is a non-issue for the theory-independence of observation. To the second he answers no: our sensations, if not our perceptions, are radically isolated from our theoretical beliefs, and therein lies the theory-independence of observation. Fodor’s crucial and controversial move here requires careful explication. He begins with an account of perception as problem solving. In his account, sensory processes register non-inferential sensory stimulations from the environment, and then cognitive perceptual processes infer causes from these sensory stimulations. He then resolves this problematic arrangement of inferential processes informed by theory-independent observational mechanisms by assuming “…that the access to background theory that such mechanisms have is sharply delimited; indeed, delimited by the intrinsic character of the mechanisms” (36). Thus Fodor deploys his theory of modular mental mechanisms defined as “inferential but encapsulated.” He leverages this account of the modularity of the mind to gain another major philosophical point, that something
like a neutral observation language might be possible based. This point is gained if the language parsing system of the mind is modularly encapsulated and thus noninferential and theory-neutral. Fodor backtracks from positively asserting the modularity of the language parsing system, and leaves it as simply a reason to doubt the certainty of the claim that all beliefs are theory-dependent.

In the last section of his paper Fodor poses the distinction between synchronic and diachronic impenetrability. His modular processes are synchronically impenetrable by theory, that is, the perceiver's theories have no effect on modular perceptual processes. The question remains whether perception is diachronically penetrable, that is, whether experience over time could insert theory-dependent changes into perceptual mechanisms. This distinction corresponds with the level of endogenous or biological determination of perceptual systems.

A diachronically penetrable module is more endogenously determined and could be altered only over the long term while a synchronically penetrable module is less determined and could thus be altered relatively quickly. Thus Fodor’s point that perceptual illusions persist as illusions even when the perceiver is aware of the explanation only supports a claim of synchronic impenetrability of perceptual modules. Fodor concludes by returning to the motivation for his arguments for theory-neutral observation, arguing that without an objective epistemological foundation such as observationally fixed beliefs, there would be no rational way to gain knowledge.
Perceptual Plasticity and Theoretical Neutrality

Churchland opens his rejoinder to Fodor by stating three goals: [1] to show that the alleged modular impenetrability of perceptual processes does not imply a theory-neutral foundation for knowledge; [2] to show that the modular impenetrability of perceptual processes is false; and [3] to provide more evidence that all observation judgments are theory-dependent. He summarizes in brief the case he makes in Scientific Realism and the Plasticity of the Mind that the theory-dependence of even observational knowledge undermines any hope for a foundational epistemology; instead it opens the possibility of beneficial revisions to outdated ontologies. After summarizing the debate about the relation of higher cognitive centers to lower level perception, he addresses Fodor's attempt to deploy the modularity of mind theory in support of claims about theory-neutral perceptual systems.

He sees Fodor’s paper as a rejection, based on the modularity of perceptual systems, of the actuality of the “theory-laden character of perceptual knowledge and the holistic nature of the human epistemic enterprise” (168). Churchland suggests that Fodor’s argument is irrelevant to most of the epistemological issues significant to the debate. He lists three central ways in which perceptual beliefs can be understood to be theory-dependent: by etiology, by semantics and by the “extensional structure of the ontology [a perceptual judgment] presupposes” (168). Churchland claims that Fodor substantially addresses only the first and second but ignores the third.

3 Here Churchland is deeply indebted to Kuhn's vision of scientific paradigms.
The paper’s rebuttal proper begins by isolating what Churchland takes to be two key premises of Fodor's argument. According to Churchland, Fodor claims both that the assumptions on which perceptual judgments rests are “endogenously fixed in all of us” (169) and also that those endogenously fixed assumptions are encapsulated and thus impenetrable to theory. Churchland correctly takes Fodor to be arguing that human perception of reality is on some level neutral between competing theories about that reality.

Churchland is quick to reply that an endogenous or genetically determined way of perceiving the world “may be a recipe for a certain limited consensus among human perceivers, but it is hardly a recipe for theoretical neutrality…” (170). Thus, Fodor’s move to encapsulate aspects of perceptual processes does not necessarily speak against Churchland’s argument that all observation judgments are theory-laden. Churchland argues that Fodor misunderstands the point of emphasizing the theory-laden nature of perceptual judgments which is that “the truth of our perceptual beliefs is contingent upon the truth of those background empirical assumptions or theories in which they are semantically embedded.” Fodor mistakenly believes that a common biological basis of cognition entails the theory-neutrality of perception in an epistemic sense when in fact it implies only approximately consistent perceptions for most humans.

Churchland rejects Fodor’s use of the Müller-Lyer illusion to argue that perception is synchronically impenetrable. He provides a slew of illusions that seem cognitively penetrable to theory and as the coup de grâce points out that to function as it does the Müller-Lyer illusion requires concepts that are most likely developmentally learned. This is an important piece of empirical evidence against Fodor that we will return to later.
Here Churchland notes that it is important to remember that the changes in perception he postulates could result from changes in theory are long term and indefinite. To hold that perception changes in direct and immediate response to changes in theory is a strawman. As Kuhn points out, a theory becomes tangible in the context of experimentation, interpretation of data and other enactive experiences. Churchland questions Fodor’s claim that perceptual processing is in some sense determined by impenetrable modules. There is significant neuroscientific evidence for perceptual plasticity that would certainly constitute diachronic penetrability. Furthermore, the existence of neuronal pathways from the higher visual cortex to the retina and its functional effects on vision is extremely well documented (M. Bar, 449). Thus, it is far from clear that the sort of modularity of mind that Fodor needs to support his claim is plausible.

Churchland also reaffirms the semantic aspect of the theory-laden nature of observation judgments. Recall that in his critique of Churchland's meaning holism Fodor simply claimed without supporting argumentation that Churchland’s use of it entailed that “anything might be observed depending upon theoretical context” ("Reconsidered" 28). Churchland responds, predictably, that “I do not hold that, given normal human senses, anything might be observed” (182) He also denies that, as Fodor claims, the existence of at least some observational beliefs with causal connections of meaning supports claims of the theory-neutrality of beliefs. Even observational beliefs are enmeshed in interconnected semantic networks.

Churchland concludes by noting that Fodor seems to be claiming merely the theory-neutrality of sensations, not perceptions. However, as Churchland points out, drawing from Karl Popper, “sensations belong to the wrong logical space: it is only an observation, judgment or belief or report that can be logically consistent or
inconsistent with any theory” (184). Thus, the plasticity of sensation is irrelevant to Churchland’s epistemological conclusions.

**Fodor’s Reply**

Fodor opens his response with an assertion that he will show that Churchland’s arguments “…are no good whether or not their conclusions are true” (1). A unique style of argumentation characterizes Fodor’s reply. He states that he is attempting to answer the question, “What are the psychological conditions under which differences among the theories that observers hold are not impediments to perceptual consensus among the observers?” The answer, Fodor claims, is the impenetrable modular encapsulation of perceptual systems which he submits is both “empirically necessary” and “apparently satisfied.” He does grant that some “background information” may penetrate perception but contends that this bias has no epistemically significant effect on perception; he reaffirms that “there seems no reason to doubt that this very restricted sort of bias might be compatible with more than enough perceptual neutrality to ‘secure for us any theory-neutral foundation for knowledge’.” In fact, Fodor maintains that theory-neutral observation enabled by perceptual encapsulation then allows correction of any remaining trivial perceptual biases; “This sort of boot strapping is complicated to describe but often routinely easy to perform,” (189) he asserts without hinting at the kinds of routines he is referring to. Fodor may be thinking of such phenomena as confirmation bias which has been well-documented in psychological research and for which there may be preventative measures (W.R. Shadish, 2007).

Fodor argues that Churchland’s appeal to gestalt switches and other visual illusions does not support his thesis of theory-dependent perception. He agrees “It
may be that you can resolve an ambiguous figure by deciding what to attend to.”

But, he contends, one cannot decide which figures are ambiguous, or the terms of
the ambiguity, or the psychological consequences of the resolution of the ambiguity.

“This all sounds pretty unpenetrated” (191) to Fodor. This critique brings to mind
the Sellarsian distinction between “is,” “looks” and “sees” locutions mentioned in
note 2 supra. Fodor is in effect pointing out that given an adequate parsing of claims
about gestalt illusions, their relevance to the theory-neutrality of perceptions
dissolves. That is to say, when Fodor suggests the possibility that “If you fix the
perceptual apparatus and you fix the object of attention, then you fix the
appearances for all normal observers even in the case of ambiguous figures,” he is
suggesting that a mature epistemology would include the necessary conditions for
theory-neutral observation. As he puts it referring to the context of science, “Part of
arriving at a consensus as to what experiment to perform to choose among rival
theories is agreeing about what part of the experimental environment to attend to”
(191). This point is likely valid as long as it applies only to ambiguous
images, e.g. gestalt switching illusions. The Müller-Lyer image does not fall under
category because as Fodor himself insists, the illusion remains regardless of the
fixation of perceptual apparatus and object of attention.

In addressing Churchland’s discussion of synchronic and diachronic
penetrability, Fodor unravels several different threads of contention. Here
\textit{synchronic} can be taken to mean short-term changes and \textit{diachronic} long-term
changes. He notes that evidence for local, short-term effects of beliefs on perceptual
effects would be deeply problematic for his position because “insensitivity to local
alterations in beliefs ... is ... a \textit{necessary} condition for the theory-neutrality of
observation” (192). However, he asserts that what was formerly taken to be
evidence of this problematic sort must be conceded to be compatible with his position.

Fodor claims that it is unreasonable to expect diachronic encapsulation to entail “cast-iron insensitivity of perceptual processes to training.” Furthermore, if training affects perceptual acuity, then that would be a kind of failure of diachronic encapsulation; but it wouldn’t be anything that an epistemologist need worry about since observational consensus doesn’t generally depend on the observers all having perceptual acuity to the same degree (192).

Here emerges a significant problem for Fodor’s account. Observational consensus may not depend on all observers having equal perceptual acuity but what if training has diachronically penetrated perceptions such that it alters interpretations to the point that they fundamentally disagree about the nature of observations under exactly the same conditions? His presumption that only perceptual acuity is empirically relevant begs the question by assuming that there is only one proper referent of observation as opposed to referents relative to holistically competing ontologies. This suggests a commitment to a view of philosophy as a “mirror of nature,” as Rorty puts it.

**Diachronic Penetrability**

Churchland and Fodor too often talk past each other in their struggle to score broad ideological points so it is both refreshing and necessary to explore third person interventions in the debate on the possibility of theory-neutral observation. Robert McCauley and Joseph Henrich provide a relatively balanced voice, well informed by directly relevant empirical evidence.
McCauley and Henrich looked back to research across seventeen cultures that measured responses to Müller-Lyer stimuli and applied the results to the Churchland-Fodor debate over theory-dependence/neutrality of perception. They also emphasize the vital insight that Fodor intends to distinguish “observation, which is constituted by the rigid outputs of the perceptual modules, from the fixation of perceptual belief, which is a global process that our central systems carry out by assessing those modules’ outputs in the light of our relevant knowledge” (4).

Fodor draws this distinction so that he can more plausibly contend that observation is theory-neutral because of its cognitive impenetrability. Cognitive impenetrability is a constitutive feature of endogenous cognitive modules that are fixed by or soon after birth. These modules are characterized by domain specificity, mandatory operation, limited access to representations, fast informational encapsulation (impenetrability), shallowness of output, fixed neural architecture and they fail in particular detailed patterns and develop with a “characteristic pace and sequencing.”

McCauley and Henrich point out that in fact the empirical results on diachronic penetrability of the Müller-Lyer illusion were established two decades prior to the debate. In 1966 Segall, Campbell and Herskovits published the results of “one of the most extensive, rigorously controlled, cross-cultural experimental projects in the history of collaboration between psychologists and anthropologists.” That project involved testing the perceptual responses of five different illusions, including the Müller-Lyer image, across seventeen cultures including African agriculturalists, African foragers, Australian Aboriginal foragers, Philippino horticulturalists, South African miners and Westerners. The results showed that people who grew up in certain environments do not perceive the Müller-Lyer image
as illusory. This seems to imply just the sort of diachronic penetrability, i.e. long term perceptual plasticity, Fodor assumed wasn't the case, so there is strong evidence that “Fodor’s favorite example of cognitive impenetrability is diachronically penetrable after all” (22). McCauley and Henrich conclude that these findings raise significant doubts about Fodor’s use of the Müller-Lyer illusion to suggest informational encapsulation of the visual system, his contention that the perceptual mechanism giving rise to the Müller-Lyer illusion is endogenous and his case for a theory-neutral observational epistemological foundation. They do note that this provides no evidence for synchronic penetrability or that the adult visual system is diachronically penetrable, only that there is a period of development from birth to about the age of twenty where something like diachronic alterations in visual responses to the Müller-Lyer illusion occur.

Conclusions

The arguments of Churchland and Fodor are unmistakably, self-consciously embedded in two different sorts of epistemological language-games. Recognizing this, both base their strongest arguments on appeals to empirical validation of their claims. Both appreciate the primacy of scientific validation for their philosophical milieu. McCauley and Henrich’s work is illuminating precisely because they look at the empirical basis of many claims made by Churchland and Fodor and provide a sober analysis of its philosophical import.

Neither Fodor nor Churchland are entirely vindicated. Visual perceptions stabilize after about twenty years from birth so Churchland’s commitment to broad plasticity of perceptions is developmentally constrained. On the other hand, his position is in much better shape than Fodor’s. It is clear that a central cog in Fodor’s
argument simply does not fit the machinery. He has to provide an adequate account for this anomaly or provide a revised account of theory-neutrality. Of course, Fodor can always fall back on the modularity of the mind -- his own “foundational” belief.

References


