

Two Dimensions of Perceptual Theory Ladenness

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1. Introduction

This paper explores debates over theory ladenness of perception conducted in 1980's between Paul Churchland and Jerry Fodor. The concept of theory ladenness was initially developed by Hanson in 1950's in the context of philosophy of science to emphasize that observation is not, as has been assumed, neutral to theories which purport to explain it. The same consideration gives rise to debates over theory ladenness of perception in 1980's in the philosophy of mind. Theory ladenness of perception is debated at two different dimensions: one over perceptual judgment and the other over perceptual experience. We call them *observation* and *perception* respectively in this paper.¹ Fodor is skeptical about theory ladenness at both dimensions, whereas Churchland fully embraces both. Meanwhile, we suggest that theory ladenness of observation is likely to be true, whilst theory ladenness of perception is not.

2. The Problem of Perceptual Theory Ladenness

Motorbike professionals can hear from what is for ignorant people random noise the occurrence of abnormalities in engine adjustments. Archaeologists see from what is for ignorant people scattered clay a portion of pottery from Neolithic era. As these examples illustrate², experts *know* more than what ignorant people know when perceiving some physical phenomenon. This is an uncontroversial fact. Then, do experts perceive more than what ignorant people perceive or do they perceive something different from what ignorant people perceive? Since experts have a good idea about what is to be attended to, it is conceivable that even if they look at the same object, they are simply looking at a different aspect of the same object. Or is the object experts perceive distinct from that of ignorant people? More generally, does the object of perception differ according to the subject's background beliefs? In what follows, we will call this problem "the problem of theory ladenness of perception."

Perception intuitively involves judgmental components as well as phenomenological

components. The debates over theory ladenness of perception can, therefore, naturally occur at two different levels, one at a judgmental level, the other at a phenomenological level, each requiring completely different treatments. We will call perception that involves judgmental components *observation* and the perception that involves phenomenological components simply *perception*. *Observation* is a form of judgment about events occurring at a particular place and time elicited by direct activation of a sense modality or sense modalities³. *Perception* is the phenomenology of objects presented to us through visual/auditory/tactile/olfactory environments. If we break down perception in this way, the problem of perceptual theory ladenness can be formulated more accurately as the following.⁴

First, is the observation theory laden? And if so how far is it theory laden? To put it somewhat differently, the question is whether and to what extent it is possible to draw a substantial distinction between perceptual judgments and theoretical statements such that the former doesn't change according to the changes involved in the latter. Second, is the perception theory laden? And if so how far does it go? This is the question of whether and to what extent the perceptual quality of our experience can be cognitively penetrated by background beliefs of the perceiving subject. In the next section, we will tackle the first problem, and in section 3, we take up the second problem, each based on the debates by Churchland and Fodor.

3. Is Observation Theory Laden?

3.1 Churchland's Case for Theory Ladenness

Churchland argues for theory ladenness of observation based on semantic consideration of observational terms. He starts from Quine's idea that our beliefs constitute a web of belief, and that a theory is identified with such a web. But unlike Quine, Churchland does not give up the idea that we can meaningfully talk about the identity of meaning. He rather claims that the semantic identity of terms is assigned by the whole theory. Against the backdrop of this general view on semantics, Churchland now argues that observation judgments presuppose theory, namely, that observation judgments are theory laden.⁵

- (i) Any judgment consists in the application of terms (e.g., "*a* is *F*.").
- (ii) Any term is a node in the web of belief (= theory), and its meaning is determined

by its peculiar place in that web.

- (iii) Therefore, any judgment presupposes a theory.
- (iv) Since observation judgment is a kind of judgment, any observation judgment presupposes a theory.

Churchland concedes that this argument is too quick. But for a moment, let's suppose that it is valid. Premises (i) and (iii) are definitions of judgment and theory, and this is no place to argue against them.⁶ Then, the premise that plays a key role in Churchland's arguments is (ii), which is often called Meaning Holism. In order to defend (ii), Churchland makes many SF thought experiments. In what follows, we take up just one of them.

Imagine organisms physiologically similar to humans except that they are equipped with a faculty of perceiving temperature *visually* at the cost of color perception and tactile sense of temperature.⁷ They speak a language similar to English whose vocabulary lacks color terms. Instead, they use the terms regarding temperature to make visual perceptual judgments. Suppose further that the observation judgments they make are reliable, that is, they are veridical in most occasions. Then, it is natural to think that they perceive temperature visually, and that they make observational judgments about what is hot and what is cold based on visual perception. Now, the key question is this: In this situation, what the translation manual of their language into English should be? In particular, how should we interpret their uses of "hot" and "cold"? Should we adopt homophonic translation manual?

Churchland argues, plausibly, that the phenomenal character of visual experience is outside of the issue. For instance, it is imaginable that the organisms are having a visual experience which we would regard as of an experience of a B&W photo taken with an infrared ray film camera. In this case, what it is like for us to have a visual experience as of black is exactly the same as what it is like for them to have a visual experience as of cold. Then, if the meanings of observation terms are given by the phenomenal characters, we must conclude that their words of "cold" and "warm" correspond to our words "black" and "white" respectively. Translated this way, their beliefs which contain these predicates turn out to be systematically false, unless, by sheer *luck*, white object is hot or black object is cold. However, such a methodology of translation is uncharitable, in the sense that it does not treat seriously the sense modality of temperature vision. If we are to interpret this way, they will do the same and our beliefs regarding color will then be filled intolerably

with fallacies. They will find, for instance, a belief such as “snow is hot” in our judgment. Beliefs like this are absurd. But in order to say that, we must take it as a proper strategy to make use of homophonic translation upon consideration for the background beliefs and perceptual capacities of perceivers. Thus, the meanings of even the apparent observational terms should be determined by the entire theory which the organisms or the community he belongs endorse.

According to Churchland, this thought experiment suggests that it is one thing to understand the meaning of observational terms, but it is quite another to apply observation terms non-inferentially based on visual experiences.⁸ It is impossible to draw a precise line between observation terms and theoretical ones. The best we can do is to classify the terms that are applied non-inferentially by a subject into the observational one for her language.

After arguing for theory ladenness of observation, Churchland tries to combine that claim with scientific realism, which makes his position interestingly different from those who endorse theory ladenness of observation such as Thomas Kuhn. Unlike Kuhn, Churchland does not believe that theory ladenness of observation entails any kind of relativism. Rather he believes that the stronger theory we have, the better we understand the external world. In order to defend his position, Churchland proposes to distinguish two kinds of intentionality regarding perceptual experiences.

Subjective Intentionality: The subject *S* has a perceptual experience as of *F* iff *S* is to non-inferentially judge “it is *F*” under normal circumstances.

Objective Intentionality: The subject *S* has a perceptual experience as of *F* only if there is an *F* around his neighborhood under normal circumstances.⁹

This distinction comes from his endorsement of scientific realism. Once we admit there is objective intentionality as such, we naturally admit that there is a way of utilizing sense information of which we are not currently aware. That is to say, our sense contains richer information than we think it does at the present stage, and the sense information has the potential to be exploited in a more efficient and refined way. If we utilize current physical theory and deploy technologies it has to offer, we may be able to make a sophisticated observation judgment we have never achieved before. Thus, it follows from the combination of scientific realism and theory ladenness of observation that the stronger

theory we have, the better observers we become.

What Churchland is saying here is easy to understand by looking at an extreme case he illustrates. Auditory sense is an indicator for wavelength of air longitudinal wave and vibration frequency. An observer who acquires absolute pitch can learn to map a pitch of a sound (for example, middle-C) onto frequency (262 Hertz, etc) upon learning elementary wave mechanics. What's more, if she learns further that Doppler effect changes the wave of vibration frequency, she will be able to know the velocity of an automobile only by hearing a siren of the automobile that drives the street. According to Churchland, if this observer is able to make a judgment for the automobile velocity non-inferentially, then that judgment is to be counted as observational.

3. 2 Fodor against Theory Ladenness

Some may find Churchland's thought experiment about auditory sense of velocity bizarre, since it is counter-intuitive to say that the subject who learns the physical theory of velocity acquires the ability to *perceive* the velocity auditorily. They would say that, after all, all we perceive through auditory sense is nothing more than sound, and the velocity is extraneous information at best inferred from it. Churchland must have gone wrong somewhere in his argument, they would say. As indicated above, Churchland endorses both the theory ladenness of observation and scientific realism. If the opponents are proponents of scientific realism, they would reject the soundness of Churchland's argument for theory ladenness of observation. In particular, the premise (ii) would be the most dubious part of the argument if it is valid.

Indeed, Fodor rejects (ii). Fodor is famous for his skepticism about Meaning Holism. For him, denying theory ladenness of observation is a direct consequence of his rejection of Meaning Holism. In fact, Fodor raises other reasons than theory ladenness of observation for why Meaning Holism is too radical to accept (*e.g.*, If Meaning Holism is correct, it seems impossible to explain how we do learn languages).¹⁰ Thus, we interpret that as far as the theory ladenness of observation is concerned, the dispute between Churchland and Fodor hinges on the plausibility of Meaning Holism, which is supposed to be discussed within the domain of philosophy of language.

We cannot help leaving this issue of Meaning Holism open in this paper. However, two points are worth noting here. First, it seems less likely that the plausibility of theory ladenness of observation *exclusively* depends on Meaning Holism. There might be an

independent argument for theory ladenness without carrying the heavy load of Meaning Holism. We will consider whether there is such a possibility in section 5. Second, it may be argued that Churchland's conception of theory ladenness of observation sets the bar too high. Perhaps the proponents of theory ladenness need not to assert that observational judgments must contain theoretical terms, but assert only that observation is influenced by the theory we endorse, irrespective of whether theoretical terms appear in the observation judgment. Section 5 also discusses whether such a moderate conception of theory ladenness is tenable or not.

4. Is Perception Theory Laden?

The dispute between Churchland and Fodor goes beyond the issue of theory ladenness of observation. When Hanson and Kuhn discussed theory ladenness of observation, the subject attached to philosophy of science. But Since Fodor (1984) brings in the issue to philosophy of mind, another dimension of theory ladenness became manifest, namely, theory ladenness of perception. In this section, we examine the issue. We start from Fodor's argument for theory neutrality of perceptual experience based on his modularity thesis of mind.

4. 1 Fodor's case for Theory Neutrality of Perception

Computational theory about visual perception has been developed from the late 1970's. Its basic idea is that perception involves a kind of problem solving. Stimuli that reached retinas are transduced into electric signals, and the distribution of two dimensional light intensity end up with the 3D images owing to the complex information processing. Here the problem for the visual system is to assign the probable distal causes to the proximal stimuli. But the proponents of the computational theory have widespread agreement that the information entering from eyes *underdetermines* the visual experience. In order to deal with this problem, our visual systems are said to posit several empirical assumptions about external worlds. For instance, they assume that radical alteration of light intensity corresponds to the contour of a physical body, objects perceived are seamlessly continuous spatio-temporally, constancy of shape and color across changes in the visual orientation, and so on.¹¹ Having such assumptions as background information, our visual systems can eliminate alternative possibilities.

Then, what does it mean to say that perceptual system is module? Fodor (1983) enumerates a number of theses that the module has to meet, but for our present purpose, it is sufficient to refer to “informational encapsulation.” This thesis states that if a sub-system of a certain cognitive system is a module, information processing of its functional unit is independent of higher cognitive functions including the belief system. According to Fodor, perceptual system meets this criterion for modularity.¹² Perceptual experience includes various examples of resisted illusion such as Ames’s distorted room, Müller-Lyer illusion, and Phi Phenomenon.¹³ These are the paradigmatic examples in which phenomenal character of visual experience does not change for a perceiving subject even after learning that she is under an illusion.

Now Fodor argues for theory neutrality of perception in the following way.¹⁴

- (i) If perceptual experience is theory laden, a perceptual system can retrieve any background information retained by the perceiving subject.
- (ii) Perceptual systems are informationally encapsulated.
- (iii) Therefore, perceptual experience is not theory laden (via modus tollens).

Churchland criticizes both premises (i) and (ii) as wrong. We will take a look in turn.

4.2 Churchland’s criticism and Fodor’s reply

First, according to Churchland, theory ladenness of perceptual experience and informational encapsulation of a perceptual system are totally distinct matters and are compatible with one another. Surely, if we assume that empirical assumptions about external world deployed by a perceptual system are hard-wired, all humans who grow up in the ordinary circumstances are expected to have similar visual experiences. However, if Fodor is right in this regard, is the fact that a visual system deploys “empirical” assumptions not sufficient to show that visual experience is theory laden? As a matter of fact, assumptions deployed by a visual system are not always correct in every occasion. That is why we have an illusory experience of seeing a 3D image drawn in a piece of paper. In the event that neurophysiology radically develops, it is conceivable to revise our perceptual system in such a way that one does not have to go through with illusions of this sort. Therefore, the alleged fact that the same perceptual system is hard-wired does not imply theory neutrality of our perceptual system. It rather implies “universal dogmatism”

in the sense that every human is a slave of the hard-wired theory.¹⁵

Fodor's response to this objection is obscure. But we think that he does not mind being called a dogmatist in that sense. In the end, what matters for him is not that our perceptual system employs empirical assumptions. Unless we are infallibilists, we need not expect our perceptual systems to offer indubitable data about the external world. What matters is rather that a kind of universal dogmatism enables us to compare competing theories, which gives rise to theory neutrality.

Second, we take up Churchland's critique of modularity thesis of perceptual system which we think is not as articulated. He lists examples that seem to support his standpoint, but they should not be treated on par. Fodor (1988) discusses Churchland's examples by dividing into (1) ambiguous figures such as a Necker cube, and (2) diachronic penetration observed in inverted glasses. We will also discuss them in turn according to this classification.

(1) Ambiguous Figures

Churchland points out that a lot of examples of illusion can be controlled according to changes in the system of beliefs. For example, when we face figures such as the rabbit/duck figure or Necker cube, a perceiving subject can change her visual experience with good intention. Thus, he argues that even visual experience is up to us.

But the effectiveness of this objection is highly suspect. First, ambiguous figures are unrelated to instances Fodor focuses on when arguing for modularity thesis. Second, as Fodor himself points out, when confronting an ambiguous figure, it is one thing to be able to have an alternate visual experience momentarily and quite another to say that altered experience is caused by the change in belief states. To take rabbit/duck figure for example, if alteration is involved when experience shifts from an experience as of a rabbit to that of a duck, that may well be because the subject change the fixation point.

It may be objected that the way to change fixation point may be learnable verbally. But it is one thing to focus on some aspect of an picture, and quite another to see the picture. The existence of ambiguous figures does not show that what we see is influenced by subject's background beliefs, but only shows that we can deliberately change where we direct our attention.

(2) Diachronic Penetration

Ambiguous figures proved not to be effective to argue for theory ladenness of perceptual experience. Still, examples like Müller-lyer could be inert to show the theory neutrality. Churchland points out that the illusory experience of Müller-lyer is often explained as the effect of our having *learned* to make automatic corrections for the variation of an object's angular size with distance. The same thing can be said of inverted glasses. Subjects need only one week or so to adapt to them. Thus, the general claim of impenetrability of perceptual system is not warranted by these cases. It is true that learning is obviously a long-term process. But Churchland rhetorically asks, “[w]ho ever claimed that the character of a scientist's perception is changed simply and directly by his embracing a novel belief?” Admittedly, proponents of theory ladenness permits diachronic penetration. So he argues.

However, Churchland's verdict may be unfair to Fodor. Fodor replies that New Look psychology in fact used to think that there is a lot of evidence for relatively *short-term* effects of beliefs and expectation, such as Bruner's classical experiment on color/suit correlations of playing cards. This is why Fodor seems to think that the appeal to diachronic penetration is misguided for the purpose of rebutting the general claim of impenetrability.

Fodor's reply might be supported conceptually, too. In general, beliefs can be acquired or changed in an instant. This point suggests that if our perceptual experiences change only diachronically, the plasticity of perceptual experiences should be explained not at the level of intentional psychology, but rather at the level of physiological concern. At least in some cases, changes in presentational character of perceptual experiences are properly explained within physiology. For instance, people with poor eyesight will recover their sharpness of vision to some extent if they stay in Mongolian grassland for a long period. Such a change in presentational character of experience is irrelevant to intentional psychology.

Adaptation to inverted glasses is more complicated than the case above. But what Fodor needs to say is the same in spirit. He argues that we have good ecological reasons why there must be perceptual plasticity.¹⁶ Organisms must correlate bodily gestures with perceived spatial positions. In the human case, hand/eye coordination is highly important to survive. Thus, recalibration seems necessary to raise organisms' fitness. Smooth adaptation to inverted glasses would be seen as an extreme case of recalibration.

We think this kind of strategy to explain the change of perceptual experience is general

enough, and is extendable to other types of adaptations, such as color adaptation. Fodor concludes that Churchland should have found perceptual plasticity where nobody would expect it on specific ecological grounds, whose existence is doubtful.

5. Considerations

On balance, Churchland's argument for theory ladenness seems far from decisive in the case of either perceptual judgments or perceptual experiences. In particular, we bet odds are against his argument for theory ladenness of perceptual experiences. Compared with this issue, whether the perceptual judgments are theory laden or not is subtle and needs further elaboration. In this final section, we will give some constructive criticisms against Fodor.

Perhaps there is an independent argument for theory ladenness without carrying the heavy load of Meaning Holism. Think of resisted illusions. After learning that a stick immersed in water is not bent, we would no longer say, "this stick is bent." Instead we would say, "this stick *looks* bent but it is *not* bent as a matter of fact." Thus, our background beliefs trivially affect what judgments are elicited by sensory stimuli in some meaningful sense.

Fodor is well aware of this issue, and his suggestion is that we can divide the perceptual processes into two stages and two judgments. The first stage is what can be characterized by the use of the verb "look" as in "this stick looks bent."¹⁷ The second stage involves endorsement or rejection of the judgment made in the first stage as in "this is not bent as a matter of fact." Ultimately, it is only the former judgment that Fodor acknowledges to be a genuine perceptual judgment.

We have two issues with Fodor's diagnosis: the first point is epistemological, and the second one is related to philosophy of language. First, to say that only judgments of the kind which can be characterized by the term "look" are perceptual is to neglect important epistemological implication traditionally attributed to the role of observation judgments. That is to provide information about external world. Observation judgments are supposed to describe not the character of our experience but the properties of objects in the world. Fodor, by restricting the scope of perceptual judgment too narrowly, deprives perceptual judgment of the epistemic significance which motivates philosophers to draw a distinction between the perceptual and the theoretical in the first place.

Second, Fodor allows the judgment made in the second stage to be theory laden. But it seems he does not allow, unlike Churchland, *any* judgment to be a candidate for the second judgment. In fact, the consideration that prompts him to embrace the two stage view of perceptual processing is from examples where perceptual illusion occurs, such as bent stick and Necker cube, etc. However, the second judgment, no matter how heavily it is affected by background knowledge, is too cheap to buy us theory ladenness, since both “bent” and “not bent” are paradigmatic perceptual terms. One standard way to characterize perceptual judgment is to use the following expression: “S has a [visual / olfactory / auditory,...] perception as of a property *F*.” The point here is that philosophers have different opinions about the range of objects that can occupy *F* and it is central to the current concern over theory ladenness of perceptual judgments what term can occupy *F*. “Bent” and “not bent” are hardly theoretical terms, therefore, the judgment cannot be regarded as theoretical after all.

We think that it is plausible that some such theoretical terms as velocity enter into a perceptual judgment. After all, there are a lot of reported cases where perceptual judgments are improved upon training as when doctors learn to make better perceptual judgments on seeing X-ray images. But we think it is highly implausible that there is, in principle, no constraint in the terms that enter into a perceptual judgment as Meaning Holism seems to entail it. In the end, semantic consideration should sneak in the problem of perceptual theory ladenness. In order to successfully address the issues of perceptual theory ladenness, we must investigate the nature of concept, because it is at least partly a conceptual problem involving a difficult question of concept individuation and concept acquisition.

6. Conclusion

As we have seen, in the case of perception, both empirical and conceptual consideration is in Fodor’s favor. Both cases of ambiguous figure and diachronic penetration do not establish that perception is cognitively penetrated by background assumptions, pace Churchland. In the case of observation, the matter is a little more complicated. We don’t think that Churchland’s argument from Meaning Holism is in any way decisive. But the way Fodor construes perceptual judgment fails in its own terms by depriving itself of any epistemological significance. If anything, it is the second judgment in Fodor’s analysis that

can be the candidate for genuine perceptual judgment. Whether such judgment is theory laden or not is a matter of employing theoretical concept in the judgment, and we don't think that any theoretical concept is involved in that judgment. The case is not closed, however. For there is a great possibility that with some restriction theoretical concepts can enter into perceptual judgments.

¹ Thus, when we say that conception of perceptual theory ladenness accommodates both perceptual judgment and perceptual experience, we use the concept of perception broadly. On the other hand, when we say perception to refer to perceptual experience, we use that concept narrowly.

² Instances are adopted from Hacking (1975).

³ Although perceptual judgments, in most cases, take the form of singular statements about a particular, they could take impersonal constructions, such as "it rains."

⁴ This way of drawing the line between perceptual judgment and visual experience is fairly common. See Chalmers (1982) Ch.3.

⁵ Churchland (1988) p.181f

⁶ The question can be posed of how the words are related to concepts. It might be objected that we have associated words with concepts too closely without argument. This is very true and we do not have the immediate answer to this objection. Nonetheless, we think it plausible, for the purpose of this paper at least, to assume that making judgment involves activating a language like system, and sometimes language itself when we express a judgment verbally.

⁷ How is visual perception of temperature possible? Churchland explains in the following way. Suppose that the organisms have big eyeballs sensitive to far infrared region (FIR) in the spectrum of electromagnetic radiation. Since the intensity of radiation emitted from a physical object is a function of temperature, the distribution of temperature is mapped onto the retinal surface.

⁸ In this regard, Churchland is loyal to his mentor Wilfrid Sellars. According to Sellars, the pattern (habit) of conceptual responses to the sensory stimuli is reliable if the subject who acquires the habit becomes a reliable indicator of a specific aspect of the surrounding environment.

⁹ These two formulations are due to our own reconstruction. Note that the statement of the objective intentionality is not biconditional.

¹⁰ See Fodor and Lepore (1992) chap. 1.

¹¹ See Donald Hoffman (1998) for the number of presuppositions our visual system makes to enable visual experience.

¹² It is controversial whether there is a functional unit which meets the requirement of informational encapsulation other than what Fodor calls "input system."

¹³ Fodor (1983), p. 66.

¹⁴ This formulation of Fodor's argument owes a lot to Churchland (1988), p. 169.

¹⁵ Churchland (1988), p. 170. Note that Churchland seems to mean something different from the contemporary epistemologists by "dogmatism."

¹⁶ Fodor (1988), p. 193.

¹⁷ As long as we know, Sellars is the first philosopher who deploys the term "look" to suggest that two judgments are involved in perceptual processing. The difference with Fodor is that whilst Sellars considers the first judgment as an incomplete perceptual judgment and the second judgment as a full-brown perceptual judgment, Fodor considers only the first judgment to be a genuine perceptual judgment.

[References]

- Brown, Harold I. 1977. *Perception, Theory and Commitment*, Chicago University Press.
- Chalmers, Alan F. 1982. *What is This Thing Called Science*, 2nd edition, Queensland University Press.
- Churchland, Paul M. 1979. *Scientific Realism and Plasticity of Mind*, Cambridge University Press.
- . 1988. “Perceptual Plasticity and Theoretical Neutrality,” in *Philosophy of Science*: 167-87.
- Crane, Tim. 1992. “The nonconceptual content of experience” in Crane (ed.) *The Contents of Experience*, Cambridge University Press: 136-57.
- Fish, William. 2010. *Philosophy of Perception*, Routledge.
- Fodor, Jerry. 1983. *The Modularity of Mind*, MIT Press.
- . 1984. “Observation reconsidered,” in *Philosophy of Science*: 23-43.
- . 1988. “A reply to Churchland’s “Perceptual plasticity and theoretical neutrality”,” in *Philosophy of Science*: 188-98.
- Hacking, Ian. 1975. *Why Does Language Matter to Philosophy*, Cambridge University Press.
- Hanson, Norwood R. 1958. *Patterns of Discovery: An Inquiry into the Conceptual Foundations of Science*, Cambridge University Press.
- Hoffman, Donald. 1998. *Visual Intelligence: how we create what we see*, W.W. Norton.
- Jackson, Frank. 1977. *Perception*, Cambridge University Press.