

A Naturalistic, Reflexive Dispositional Approach to Perception

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This paper will investigate the basic question of the nature of perception, as theoretically approached from a purely naturalistic standpoint. An adequate theory must not only have clear application to a world full of pre-existing biological examples of perception of all kinds, from unicellular perception to conscious human perception, but it must also satisfy a series of theoretical or philosophical constraints, as enumerated and discussed in Section 1 below. A perceptual theory invoking *reflexive dispositions*--that is, dispositions directed toward the very same worldly perceived objects or properties that caused them--will be defended as one legitimate such naturalistic theory.

As a preliminary, here is a brief description of what is involved in a purely naturalistic approach to perception. A genuinely naturalistic theory of perception would seek to explain basic or low level perceptual processes of any kind, whether artificial or of natural biological kinds, including those of simple organisms such as earthworms or unicellular organisms, in purely causal and dispositional terms. The only additional concepts allowed in such a theory would be those whose associated objects, properties or structures are of a broadly mechanistic kind that are uniformly causally reducible, such as the cybernetic concept of negative feedback, whose instantiations are completely

explicable in causal terms, or various kinds of behavioral concepts associated with the manifestations of causally based dispositions.

As for any higher level kinds of perceptual activity, associated with concepts such as those of information, perceptual content, normative epistemic correctness or otherwise, normal biological function, sensation, phenomenal quality, perceptually acquired beliefs, sensorimotor interaction and so on, a naturalized theory must seek to make no use of such concepts, whose naturalistic credentials inevitably are initially suspect, until their precise relations to such lower level, purely naturalistic perceptual causal concepts have been established, whether by putative reductions to causal concepts or outright eliminations of them--in which latter case the concepts would persist only as irrealist conveniences.

To be sure, such a naturalistic program for perception is an austere one. But its methodological ideal should be embraced by all, including anti-naturalists convinced of the causal irreducibility of conscious perceptual phenomena etc., since even anti-naturalists must clearly situate their own theorizing in relation to the purely causal biological heritage that unavoidably is a continuing and primary part of human perception, even if not the whole of it. Thus the issue as to how naturalistic perception should be defined—including the issue as to whether it should be as a real definition that picks out one or more natural perceptual kind or function, or as a merely nominal definition of one or more theoretically convenient concepts--is one that should be of general interest and concern to naturalists and anti-naturalists alike.

It is perhaps surprising that there is still a place for a paper such as the present one, since it might be thought that there would already be an extensive literature on the nature of naturalized perception, i.e., of what any naturalistic theories of perception must be theories *of*, or of what they must be about, and of the theoretical standards or constraints that they must satisfy. (Any subsequent mention of perception will be about naturalized perception unless otherwise indicated). But though there is no lack of theories of perception claiming to be naturalistic theories, broader ontological and methodological issues about the nature of perception, or the concept of perception, have been comparatively neglected. The paper proceeds by specifying some plausible constraints on any adequate theory, while also showing how a recently developed, relatively simple reflexive dispositional theory, which claims that an item X is perceived just in case X causes a perceiver to acquire dispositions related to X itself, can satisfy all of the constraints--including constraints relating to deviant causal chains, which have given previous causal theories so much trouble.¹

1. Four Constraints on a Naturalistic Concept of Perception

There are at least four broad kinds of constraints or necessary conditions on a naturalistic concept² of perception, and hence on any theories incorporating the concept as well. (A fifth, intentionality-related constraint will be developed in Section 7, but it requires substantive argument to show that it is a legitimate constraint, and so it will be deferred until then).

First, a primary requirement is an *epistemic* one, namely that provided by the conditions under which we would be prepared to claim or accept that perception had occurred in an organism or device, and on the basis of what kinds of naturalistically acceptable evidence. Clearly this requirement must be handled with care, since various hidden non-naturalistic or folk-psychological factors might influence our judgments about such conditions. Also, this epistemic requirement might make the concept of perception, even in a naturalistic formulation, in some way relative to human needs or purposes, and hence, in concert with the other requirements, result in only a nominal rather than a real natural-kind definition of the concept being produced. Nevertheless the requirement is an unavoidable one, because what we seek is not some completely new concept that is entirely unrelated to traditional concepts of perception, but instead a clarified, organized and generalized version that includes the naturalistic elements already implicit in those traditional concepts.

Second, the concept must both be *biologically possible*--in the sense that organisms and processes instantiating various degrees of perceptual ability could have originated and evolved via purely natural biological processes, including those of natural selection--and *functionally effective*, in that increased perceptual abilities should generally confer some adaptive advantages on species possessing them. Thus for instance, a concept of robotic perception might be too specialized for the former purpose, even though purely naturalistic, if no clear developmental path could be made plausible as to how an equivalent biological device having the same perceptual functions could have evolved

naturally. While at the same time, a related concept of robotic information-collection might fail the latter functional effectiveness part of the test, in that mere information-collection as such, absent any useful consequences, is powerless to confer any evolutionary advantage upon a species.

Third, the concept should be capable of being instantiated or modeled in *non-biological* devices or mechanisms. In part this requirement is simply a consequence of the naturalistic viewpoint, in that presumably inorganic causally based devices or processes should be as capable of implementing purely causal perception or perceptual functions as are biological mechanisms. But there is also an epistemic or prudential methodological component to this requirement, in that it must not be forgotten that even unicellular biological organisms involve extremely complex causal processes that are not yet fully understood. Hence it is scientifically prudent, as well as necessary, to test our understanding of the concept of perception as it applies to mechanical models, whether conceptual or as implemented in hardware, of varying degrees of simplicity or complexity.

A fourth requirement or constraint on a naturalistic concept of perception is one that acknowledges the prima facie legitimacy of some standard or traditional problems concerning theories of perception that give some role to causal factors, mainly involving issues about causal chains and their possible deviancy in some cases. An adequate concept must be usable to resolve or avoid such problems, at least in principle.

Thus, to summarize, the desired naturalistic concept of perception must be epistemically continuous with naturalistic elements in more traditional concepts of perception, biologically possible and functionally effective, mechanistically realizable, and capable of resolving or avoiding, at least in principle, standard causality problems with respect to perception when incorporated into an appropriate naturalistic theory of perception. It will be argued that the reflexive dispositional theory to be presented can fully satisfy all of these requirements.

2. The Epistemic Condition: A Simple Approach

We start with consideration of the epistemic condition on perception. Recall that the relevant epistemic issue is not that of what perception itself is, but instead of the conditions *C* under which we would normally or generally agree that perception by a person *P* of some object *X* had occurred. These conditions may be divided up as *antecedent* conditions *AC*, namely those conditions obtaining up to the time at which perception of *X* occurs, plus the *subsequent* conditions *SC*, including any conditions obtaining during and after the time of perception of *X*.

If such relevant conditions *C* can be identified, then the following naturalistic tactic can be used. Since naturalism requires that nothing more than pure causal factors, including dispositions, be postulated as being involved in perception, the simplest naturalistic view of perception--an NP view or theory--of *X* that could be hypothesized, on the basis of the

available evidence C, would be one according to which some or all of the antecedent conditions AC caused a perceiver P to acquire one or more dispositions, whose manifestation-conditions include some or all of the observed subsequent conditions SC.

This epistemic approach to an NP view also has the advantage that it provides a level playing field for all theories of perception. For the same evidence is available to each theory, the only difference with the current view being that it provides a naturalistic interpretation of the underlying causal factors resulting in those observable conditions.

Admittedly, different theories might have distinctive conceptions of what should count as relevant factors in the conditions C, and hence include more, or less, observable factors in their evidential base than a purely naturalistic conception may wish to. But any such factors are available to any theory that cares to make use of them, and an appropriate naturalistic interpretation of them could also be constructed, so here too a naturalistic NP theory is not significantly limited relative to other theories. For example, Irvin Rock has an indirect theory of perception according to which prior perceptions by a person are relevant to a current perception of hers.³ But there is no reason why a purely naturalistic equivalent of this view could not be constructed, if it were thought to be desirable.

To be sure, there are also other issues concerning intuitive plausibility, explanatory power, simplicity, and so on to be considered in comparing different theories. But the basic naturalistic methodology of an NP theory is a powerful positive factor in its favor, even if some initial intuitive plausibility might be lacking. Indeed, some such losses are

only to be expected, since our usual intuitions are closely linked to folk psychology, some parts of which are likely to be undermined by a purely naturalistic view.

An attempt will now be made to initially simplify as much as possible the set of conditions C under which a perceiver, such as a person P, is claimed to perceive an object X. If such a simplified set of conditions can be shown to be epistemically convincing too, then a useful initial formulation of an NP theory will have been achieved. Thus the simplification attempt must itself be made with an eye on relevant epistemic factors, as will be illustrated below.

On the antecedent conditions side, the simplest case would be one in which perception of an object X is caused by *X itself*. (Most causal theories of perception accept this condition as at least a necessary condition of perception of X). More specifically, with respect to the actual properties F of X, such as its color or shape, it should be those properties F--or their physicalistic basis, if such a distinction needs to be made for naturalistic purposes--that cause perception of those properties of X. As for any supposed properties G, that do not include, or are not associated with, sufficient causal powers to cause perception of themselves, they must be rejected on naturalistic grounds as being non-perceivable.

At this point an epistemic constraint is relevant, namely that it is generally accepted that there are cases of *incorrect* as well as correct perception, such as perceiving a goat X as being a small horse. This would still be a case of perceiving the object X, and arguably also perceiving at least some of those of its properties that make it a goat. But those

properties are in some way incorrectly perceived. Fortunately, however, there is a naturalistic way to accommodate this epistemic constraint without spoiling the simplicity of our initial NP view. It will still be the case that those goat-related properties are perceived, and this will continue to occur because those same properties cause the person to acquire certain relevant dispositions. But the behavioral evidence produced by the manifestation of those dispositions would be evidence that the person has in fact perceived those goat-related properties as being small-horse-related properties, rather than as being goat-related properties.

Another example would be that of incorrectly perceiving the color F of object X. The simplest explanation of any subsequent color-related behavior with respect to object X, including behavior that shows incorrect perception of X's color, would be that it was the result of some manifestation of a disposition D of person P, the acquiring of which disposition D was caused by the actual color F of X. This explanation would be equally satisfactory whether the color was correctly or incorrectly perceived, in that the subsequently observed color behavior with respect to X would be causally inexplicable, unless it had been the actual color of X that had caused person P to acquire the relevant disposition D.

These epistemic considerations about correct versus incorrect perception of property F of object X have already introduced considerations sufficient to point to the simplest possible NP account of what is naturalistically involved during and subsequent to perception. Such an account of perception of property F of object X would claim that

property F causes a relevant disposition D to be perceptually acquired by person P, which disposition D is such that its manifestations are behaviorally related to, such as by being directed toward, *that property F of X itself* in some way. Thus the simplest NP account would be a *reflexive* theory of perception, claiming that perception of a property F of object X occurs just in case that property F causes a person to acquire a disposition directed toward *that very same property F itself* of X, with the behavioral evidence for this claim being that manifestations of disposition D are F-related. And similarly, in the case of object perception, perception of an object X would occur just in case X causes the person to acquire some X-related disposition.

For example, in the property case, if someone is sorting objects by color, and puts a red object in the green bin, that would provide putative evidence of incorrect perception of its red color, whereas sorting it into the red bin would instead provide putative evidence of correct perception of its color. To be sure, alternative hypotheses would have to be eliminated, such as that the person was not just randomly putting objects in bins without even looking at their color. But such scientific verification procedures are required in testing any naturalistic causal hypothesis; so assessing such kinds of behavioral evidence of perception is just as objective a procedure as with any other kind of scientific procedure.

3. A Reflexive Dispositional Theory of Perception

The current reflexive dispositional theory of perception to be presented adds just one further element to the simple theory suggested by the epistemic considerations discussed above. It is that of a *sensory subsystem z1* of a person or organism *Z*, such as one of the sensory mechanisms of human visual perception, which concept is clearly required in a more fully specified theory. This addition is also an important element in satisfying the mechanistic constraint, as discussed in Section 5, which also requires the intuitively obvious point that a sensory subsystem *z1* must exhibit some distinctive functionality with respect to the rest of *Z*. With this added element, the reflexive analysis of perception provided by the theory is as follows:

Entity *Z* perceives object or property *X* just in case *X* causes sensory subsystem *z1* of *Z* to cause *Z* to acquire some *X*-related disposition.

This basic reflexive definition or analysis may be split into two individually necessary and jointly sufficient conditions for *Z* to perceive *X*, namely:

- 1) *X* causally affects sensory subsystem *z1* of *Z*;
- 2) Sensory subsystem *z1* of *Z* causes *Z* to acquire some *X*-related disposition(s).

The first condition is similar to that of other causal theories of perception, with the important difference that the state thus produced in subsystem z_1 is never, in and of itself, a complete perceptual state, since by itself it involves no reflexive disposition formation. Indeed, this difference is one key to satisfying the fourth constraint of Section 1 on perceptual theories, namely that causal deviance etc. problems found in standard causal theories should be resolved, which is further discussed in Section 6. Such standard theories typically assume that if the relevant causation by X of z_1 is normal then the resulting state of z_1 would be a complete state of perception of X , so that any perceptual insufficiency in X 's effects on z_1 is due to some causally deviant process.

Thus condition 1, though necessary for perception of X , is not sufficient for it to occur. The second condition is also necessary, in that only causation by X -caused changes in a sensory subsystem z_1 could produce genuinely perceptually formed X -related dispositions in Z , as opposed to such dispositions produced in Z by some non-perceptual process. But equally, condition 2 by itself is not sufficient unless condition 1 is also satisfied, so that their joint satisfaction provides both necessary and sufficient conditions for perception of X to occur.

Intuitively, the basic idea behind the reflexive theory is that genuine perception of X must involve the acquisition of some state of X -related *readiness* or motivation--so that Z is ready to do something about X , or with respect to X --since without some behavioral evidence of such readiness, there would be no concrete evidence that perception of X had

occurred, and hence the epistemic constraint on perception of X being discussed would fail to be satisfied.

4. The Evolutionary Constraints on Perception

The joint evolutionary constraint on perception, of *biological possibility* of development plus *functional effectiveness*, will now be discussed and related to the provisional reflexive view of perception developed so far. To begin with the latter part of the condition, the requirement of functional effectiveness lends further support to the claim that mere causation by X cannot be sufficient for perception of X to occur by itself, since without there being appropriate consequences as well, namely the acquisition of X-related dispositions by an organism, perception would be completely functionally ineffective and hence useless as a primary mechanism for helping to explain evolutionary development.

Nevertheless, a purely naturalistic view must adopt only the weakest possible naturalistic concept of functional effectiveness for perception--merely that perceptual episodes must involve *some* X-caused dispositions having *some* X-related causal consequences, but no more than that. In particular, there must be no presupposition that every perceptual episode is necessarily evolutionarily advantageous to an organism or its species. For it has already been argued on epistemic grounds that the desired concept of perception must permit incorrect just as much as correct perceptual episodes.

Also, there is a relevant interaction with the biological possibility constraint as well, in that presumably natural selection via random genetic mutation, or similar evolutionary mechanisms, would inevitably produce all kinds of X-caused and X-related dispositions, that might be correct or incorrect, or which might even be outside the scope of our usual standards for epistemic correctness or incorrectness altogether. Hence it must be left to evolutionary competition to produce species for which, on the whole, their perceptual mechanisms tend to be evolutionarily advantageous in producing results more correct than incorrect in their normal environments.

It follows that any attempt to adopt an epistemically stronger concept of success-oriented perception would merely result in a concept that probably most organisms would be unable to instantiate or conform to as a result of purely naturalistic causal factors. To be sure, perhaps the winners of the evolutionary sweepstakes could accidentally count as being capable of perception on such a stronger concept of perception, but the concept would lose its explanatory value as a mechanism by which organisms in general can generate appropriately caused reflexive dispositions, which evolutionary selection can then operate upon to filter out all but the more successful remaining perceptual disposition-formations.

To put the matter in a broader perspective, it is acceptable to claim that high level cognitive concepts such as those of rationality and consciousness may be applicable only to very complex organisms which are the product of millions of years of development of

organisms that were themselves neither rational nor conscious. But the theoretical niche of the concept of perception, as shown by our usual epistemic standards for when cases of perception have or have not occurred (see Sections 2 and 3), is a concept of a primary way in which even the simplest kinds of organisms or mechanisms could be able to interact with their environment.

Thus perception must be simple enough, and causally basic enough, that it could be instantiated by anything at all that could qualify as being a biological organism. This is not to deny that there may be various paths of development from extremely simple, possibly instinctive or genetically hard-wired perceptual mechanisms to more sophisticated forms involving learning, conscious monitoring and so on, but all of them must be recognizably perceptual processes from the start, as befits a mechanism that is a primary causal engine driving the evolutionary process.

Nevertheless, it is important to recognize that perception cannot be the *only* causal mechanism that is relevant to evolutionary development and survival, if the reflexive view of perception is correct. For the reflexive view picks out only a limited subset of the possible causal actions or interactions of an organism with its environment, any of which presumably could have at least some limited role in natural selection. Thus, as well as the X-caused, X-related reflexive dispositions identified as defining perception on the present view, there could also be cases of some object X causing non-dispositional changes in an organism, or X causing dispositional changes which are in turn directed toward non-X objects (or to the environment generally), or self-generated, non-externally

caused dispositions of an organism that result in its affecting the environment in some way, or even just affecting itself.

Also, it is least conceivable that there could be organisms which make no actual use of perceptual processes, because it is a consistent view that all organisms have the capacity for perception, but that some do not actualize that capacity. For example, an organism, hard-wired to perform chewing operations as it moves about, might be in a suitably rich environment in which it would get adequately fed by so doing, without ever perceptually interacting with its environment at all.

Thus for such reasons the traditional epistemic idea that perception provides, for us or any other organisms, our only form of contact with the actual world must be rejected. No genuinely naturalistic, specifically defined causal mechanism could successfully claim itself to be the only possible mechanism underlying evolutionary change and maintenance. Indeed, this point provides a paradigm case in which a purely naturalistic view of perception must come into conflict with traditional or folk-psychological views about the exclusivity of perception.

Nevertheless, perception can still claim itself to be a uniquely causally effective process for producing and maintaining evolutionary fitness. In engineering or control systems terms, perception provides a *feedback* mechanism, by which threatening effects of an object X on organism Z can be damped down or eliminated by Z acquiring the appropriate X-related dispositions to do so, whereas in beneficial environments the good

effects of X on Z can be magnified by Z acquiring appropriate X-related dispositions which would increase the beneficial effects of X on Z.

As an example of the former case, the feedback that is an integral part of perception could enable Z to fend off its own possible destruction by an attacking predator X, while perceptually increasing its speed in response to the presence of a tasty shoal of fish could enable a shark to eat more of them more quickly. Since the causal mechanisms that result in organisms being able both to fend off dangers, and to capitalize on opportunities, are ubiquitous and vital to their evolutionary fitness, perception on the current reflexive view still has a primary place in the explanation of adaptive behavior by organisms, even though it cannot have an exclusive place for the reasons given.

5. The Mechanistic Constraint

As mentioned in Section 1, the mechanistic constraint is another of the four basic constraints or necessary conditions on a concept of perception. The mechanistic constraint is that the concept should be capable of being instantiated or modeled in *non-biological* devices or mechanisms. In part this requirement is simply a consequence of the naturalistic viewpoint, in that presumably inorganic causally based devices or processes should be as just as capable of implementing purely causal perception or perceptual functions as are biological mechanisms. But the point was also made that, because of the complexity of biological organisms, it is, in addition, currently

methodologically prudent to construct conceptual and actual mechanical models conforming to a putative naturalistic concept of perception, since at this stage in the development of science the complete details of the causal functioning of biological organisms are not yet adequately understood.

Another benefit of examining non-biological cases is that simple mechanical devices may be directly compared to other simple, natural causal processes, hence making an assessment of the adequacy of the reflexive theory of perception easier. It is this benefit that will be investigated here. To begin, a simplified definition of perception of X by Z, as X causing Z to acquire X-related dispositions, may be shown to be oversimplified in purely mechanistic cases, in that there are natural causal structures conforming to that definition which clearly do not involve any perception. For example, if billiard ball X collides with ball Z, Z will in turn be caused by X to reflexively cause X to acquire properties of momentum and direction it did not have prior to its collision with Z. But we do not wish to say that ball Z perceived ball X. Another such case would be that of magnetic attraction or repulsion. On standard theories of magnetism, a magnet attracts an iron bar because the magnet first induces magnetic effects in the iron bar, as a result of which the two resultant magnets attract each other. So in such a case, magnet X causes bar Z to attract X. But iron bars do not perceive magnets.

What is needed to defeat such cases is some more structure in the putative perceiving device Z. In biological cases, there is a natural distinction between the whole organism Z, and its specialized perceptual or subsystems z_1, z_2, \dots, z_n , involving sensory organs and

their associated cognitive processing mechanisms, by means of which the whole organism Z is able to perceive things. Thus, rather than an object or factor X directly causing Z to acquire X -related dispositions, instead X initially causes some sensory subsystem z_i of Z to be in a certain state, which state then in turn causes the whole organism Z to acquire the relevant X -related dispositions. (See also the discussion of this additional condition in Section 3).

Now such an account would result in no improvement unless the subsystem z_i causally functioned in some way with respect to object X that is distinctively different from how the whole organism Z functions with respect to X . Thus the previous failed example of a piece of iron Z that is caused by a magnet X to acquire X -related dispositions cannot be significantly improved simply by, for instance, gluing the piece of iron to a piece of wood. For even though magnet X causes the iron subsystem z_1 to cause the iron-plus-wood combination Z to acquire an X -related disposition to be attracted to X , this is still not a genuine case of perception, because of the lack of distinctive functioning of subsystem z_1 with respect to Z .

But if on the other hand Z itself had much stronger attractive powers with respect to X than its unaided sensor z_1 has, and if z_1 did cause the manifestation of those powers of Z , then the whole device Z would count as perceiving X . For instance, such a magnet detector z_1 might be used in a spaceship Z to detect the precise point at which the spaceship should be docked with a space station, in which case it would be generally agreed that the spaceship uses its distinctive subsystem z_1 --the piece of iron--to perceive

the magnet X, as shown by its magnet-related behavior of docking in a position that includes a precise alignment of the subsystem z1 with the magnet X.

Thus a more adequate reflexive definition of perception may be proposed as follows.

Device Z perceives object or state X just in case X causes a *functionally distinctive subsystem* z1 of Z to cause Z to acquire X-related dispositions. Because of the transitivity of causation, the simpler formulation will also remain true, though less specific, namely that X causes Z to acquire X-related dispositions--because X causes z1 to cause Z to acquire X-related dispositions.

One way in which z1 can be functionally distinctive is if it itself does not exhibit any reflexive causality with respect to X, so that in that respect it differs from Z, which necessarily must be reflexively causal with respect to X. In most biological and mechanistic cases this basic difference will hold, in that the typical output of most perceptual or sensory subsystems is not X-related, such as with the thermostat of a furnace, whose output would typically be the completion of an internal electrical circuit. Or another typical way in which z1 can be functionally distinctive is if its output, even if X-related, is used to cause Z to acquire a much stronger X-related disposition, such as in the spaceship docking example discussed above.

A similar case in which z1 is itself X-related--generally an unusual phenomenon--is as follows. The earth's magnetic lines of force X cause a compass needle z1 to point North, which event could be used to cause an airplane to travel in the same direction, with much

greater energy than that which was involved in the influence of the magnetic lines of force on the compass needle. Clearly the plane is using the compass needle as a sensory subsystem in such a case, whereas if no such power amplification is involved, but instead Z were just created by adding inert material to the compass needle, equally clearly no perception would be involved.

6. Standard Causal Problem Constraints

This Section will discuss the fourth and last of the constraints on a naturalistic concept of perception outlined in Section 1, namely that standard or traditional problems concerning theories of perception that give some role to causal factors, mainly involving issues about causal chains and their possible deviancy in some cases, should be resolvable or avoidable by use of the relevant naturalistic concept. Broadly speaking, the problems may roughly be grouped into chain of causation problems and causal deviancy problems.

As a preliminary, the issue of the status of conscious perceptual states should be briefly discussed. In the reflexive theory, a perceptual state of perception of an object X includes at least a physical state of the acquisition of some X-related disposition. But such a theory need take no immediate stand on the issue of the relation of such dispositional states to conscious experiential states, in terms of which causal theories of perception are usually discussed. The basic issues as to the relations between perceptual states of perception of some item X, and of their causes and effects, remain the same

however those perceptual states themselves may further be analyzed or characterized. Thus there is no loss of generality or explanatory power in the present account, just because it does not here directly address issues concerning the nature of conscious experiential states.⁴

A basic causal chain problem, even for normal or non-deviant causal chains, is that if some causal factor Y is a necessary condition of Z perceiving something, what justifies the selection of one such factor Y in the chain of necessary causal conditions rather than any other? Thus, if we are able to perceive an object X because X is a necessary causal condition of that perceptual state, why do we not also, or instead, perceive any other items in the relevant causal chain, including, more remotely, whatever items caused X to be in its present state, or more proximately, any of the subsequent stages in cognitive processing of the X-related causal stimulus, up to and including the final concrete perceptual state itself? Why is not all visual perception perception of our retinal stimulation-patterns, or even of the final perceptual brain states that causally result from them?

It is a fundamental advantage of the current reflexive, disposition-based theory that it can provide a convincing solution to the above kinds of causal chain problems. On the reflexive view, the relevant item X in a normal causal chain which is perceived is the one which causes dispositions specifically directed toward *it itself*--i.e., X itself--to be acquired by organism Z. Thus on the current view, the reason why it is, e.g., a cup X on a table that one perceives, rather than the retinal stimulation Y1 that it causes, or a

subsequent sensory classification Y2 of it, and so on, is because in normal perception it is only dispositions toward the cup X itself, and not toward one's retinal stimulations, or later classifications, that one actually perceptually acquires. Also, since the relevant X-related dispositions are broadly behavioral dispositions, whose manifestations are overt behavioral events such as someone picking up a cup X immediately subsequent to perceiving it, the reflexive view as to what is actually perceived is readily testable in particular cases by normal third person observational methods. Hence, in sum, the reflexive theory can readily resolve the apparently threatening perceptual indeterminacy problems associated with causal chains in perception.

As for deviant causal chain problems, the reflexive theory can avoid such problems altogether because it rejects a fundamental presupposition upon which such cases are assumed to exist.⁵ As already noted in Section 3, standard causal theories require causation of a perceptual state S by object X as a necessary condition of perception of X. But such theories typically also assume that causation of state S by X would also be sufficient in cases of normal causation, so that any insufficiency in causation by X must be due to a deviant causal chain between X and S.

However, also as noted in Section 3, on the reflexive analysis of the conditions of perception, the necessary condition that X directly causally affects sensory subsystem z1 of Z--where the state of z1 is functionally equivalent to state S in standard analyses--is *never* a sufficient condition of perception of X by Z, no matter how normal or ideal the

causal conditions are, simply because state z1 does not itself involve any acquisition of X-related dispositions.

Or in other words, the reflexive theory can simply refuse to engage in a fruitless hunt for a supposed distinction between normal versus deviant perceptual causation, because it has its own independent, dispositional condition for turning necessary causality by X into a sufficient condition for perception of X, namely that X-caused state z1 causes organism Z to acquire some X-related disposition.

To be sure, there are *unusual*, as opposed to deviant, ways in which objects X can be perceived, such as by someone using some kind of prosthetic aid to achieve normal perception. Also, there are causal arrangements under which something X can seem to be perceived in front of the perceiver, but which is in fact located elsewhere and actually seen via a mirror in the line of sight.⁶ But the causality involved in such cases must meet exactly the same reflexive causal standards as more usual cases, if genuine perception is to be achieved.

Thus, to summarize this Section, the reflexive analysis can satisfactorily resolve causal chain indeterminacy problems via dispositional specification of the relevant perceived item X, while it can also avoid altogether issues of normal versus deviant causal chains, as being based on an inadequate, disposition-lacking conception of what is involved in causal sufficiency for perception of X.

7. Intentionality Issues Dispositionally Grounded

When people have conscious perceptual experiences of some object X as having property F, those experiences are *about* the object X, while at the same time the experienced F-ness of X may fail to correspond to any actual property of F-ness of object X. These features of *aboutness*, and of the possible non-veridicality, or distinctness of the 'intentional content' of perception from the actual properties of objects, are central to traditional issues about the intentionality of perception.⁷

However, such issues concerning the intentionality or aboutness of conscious perceptual experiences as such have not been mentioned so far for a very simple reason, namely that they cannot be necessary features of all cases of perception whatsoever, since many cases of perception, including lower biological and mechanistic kinds, do not involve conscious experiential perceptual episodes at all. Nevertheless, it is possible to recover at least a minimal, causally functional core of intentionality phenomena for any and all kinds of perception, whether conscious or not, as will now briefly be shown. Most of the basic materials for doing so have already been presented, so the task is not an arduous one given those resources.

The significance of this issue is twofold. First, because an ability to theoretically handle such intentionality phenomena can then be added as an optional extra to the basic four

constraints on adequate naturalistic theories of perception as previously discussed, and second--though not to be further investigated here--that any discovered functional core of intentionality could then be used in arguments for the reducibility of conscious perceptual intentionality to purely causal-dispositional, functional kinds of intentionality.⁸

To begin with the issue of *aboutness*, this issue has already appeared in the guise of an issue about the possible indeterminacy of perceptual causal chains, as discussed in Section 6. The solution given there was that what determines which specific object X is perceived, out of the various objects or states in the relevant causal chain, is which of those items X itself causes X-related dispositions to be acquired by perceiver Z, as evidenced by subsequent X-related behavior exhibited by Z. This solution can also potentially serve as a general solution to perceptual aboutness or reference issues, whether in cases of conscious or unconscious perception, since in all cases the same basic analysis applies.

To put the issue in more traditional terms, what makes perception of a person Peter a perception of that particular person, or *about* Peter, is not simply that one subsequently provide evidence for that conclusion by behaving in a Peter-related way, but, more fully, that the person Peter himself causes one, by sensory means, to acquire a Peter-related disposition to do things such as thus behaving toward him. But clearly nothing in that account requires that the person, entity or organism perceiving Peter is itself conscious, and so it does indeed provide a completely general account of perceptual aboutness with respect to objects.

To be sure, this account does presuppose the legitimacy of a concept of a purely causal dispositional structure whose behavioral manifestations are related to a *particular* individual X. Such a concept may be legitimized by considering particular cases of dispositional properties and their activation conditions. For present purposes it is the special subclass of *reflexive dispositions*, in which objects X cause other objects Z to acquire X-related dispositions, that are of particular interest. Now the relevant scientific dispositional laws would cover all such cases, but in the study of perception our interest is in the details of particular such cases, in which a unique individual X causes another unique individual Z to acquire some disposition toward that very individual X itself.

This way of describing the situation is legitimate because object X is the only object that caused Z to acquire the disposition, and also the only closely enough located object to be the object that actually activates object Z's acquired disposition toward Z-like objects. Hence it is the causal particularity involved in reflexive cases that ensures that in fact it is, for all practical purposes, a particular object X toward which Z's disposition is directed, rather than any other object that could, in the abstract, equally activate the disposition's manifestation conditions.

This analysis does not depend on some special, and not explicitly explained, characteristic of reflexive dispositions as such. A simpler non-reflexive example exhibiting the same characteristics would be as follows. If a person James is looking for someone to marry, and if his marriage-related dispositions would be activated by any

person having characteristics F, then if Janice both has characteristics F, and is the first person met by James with those characteristics, then James would marry, in particular, Janice herself, rather than any other equally qualified but non-first-encountered person. Thus, again, it is the causal particularity of the relations of the individuals involved, in this case depending on which first-met person in fact activates James' dispositions, which secures the particular reference and aboutness of the dispositions, even though this reference is empirically contingent rather than being based on any necessary dispositional property relations.⁹

This concludes the present discussion of the first intentionality issue of perceptual aboutness with respect to particular objects. We turn now to the second intentionality issue, which concerns possible cases of incorrect intentional content, or non-veridical perception, with respect to some property F of an object. The issue is commonly discussed as one concerning conscious perceptual experiences, namely that an object can be perceptually experienced as having a property G that it does not in fact have. This issue also initially seems to be an issue primarily concerning conscious perception, but it too can be functionally generalized to cover all perceptual cases, including unconscious ones, as in the case of aboutness issues.

The key to doing so is, as with aboutness, to make use of the dispositional structures involved in the reflexive analysis of perception, with its being specifically perception of some property F of an object X that is relevant in the present case. Recall from Section 2 that the basic reflexive conception of property perception involves a claim that perception

of a property F of object X occurs just in case that property F causes a person Z to acquire a disposition directed toward that same property F itself of X, with the behavioral evidence for this claim being that manifestations of disposition D are F-related.

But, as shown in Section 2, that account is general enough to cover both veridical and non-veridical perceptual cases. When the color F of an object X causes a color-related disposition to be acquired toward X, the behavioral evidence for the disposition may involve either correct or incorrect behaviors, depending on the actual color of the object. Thus if the perceiver puts a red object in a green bin, that would provide putative evidence of incorrect perception of its red color, whereas if instead he sorts it into the red bin, that would provide putative evidence of correct perception of its color.

Now presumably, in the case of conscious color perception, the former incorrect case would involve the person experiencing X's color as being green, even though it is in fact red. But that conscious mismatch between experienced and actual color is not itself essential to characterizing the case as one of incorrect perception, because the dispositional analysis provides, in purely functional terms, at least a basic behavioral analysis of what is involved in incorrect perception of a property by a perceiver, whether conscious or not. Also, it does so without any appeal to special 'conscious intentionality' factors possessed only by conscious perceivers. (Which is not to deny that more sophisticated kinds of intentionality may additionally be involved in cases of conscious perception).

Hence, to sum up this Section, it may be concluded that an ability to theoretically handle non-conscious perceptual intentionality phenomena of aboutness and non-veridical content, after appropriate naturalistic reductions of them, constitutes at least a desirable, if not required, addition to the basic four constraints on adequate naturalistic theories of perception as discussed in Section 1.

8. Conclusion

A brief summary of the argument of the paper will now be provided. It has been argued that there are at least four necessary conditions, or non-negotiable requirements, that a genuinely naturalistic theory of perception must satisfy. A theory that failed to satisfy any one of those four main constraints would either fail to be a naturalistic theory of perception at all, or be significantly limited in its applicability. The four conditions are that the desired naturalistic concept of perception must be epistemically continuous with naturalistic elements in more traditional concepts of perception, biologically possible and functionally effective, mechanistically realizable, and capable of resolving or avoiding, at least in principle, standard causality problems with respect to perception when incorporated into an appropriate naturalistic theory of perception.

In Section 7 an additional intentionality condition, concerning aboutness and non-veridical perceptual content was added, which perhaps is optional for naturalistic theories, since such intentionality phenomena might be argued to be inextricably bound

up with conscious perception, and hence part of the 'hard problem' of consciousness, rather than being integral factors that must be addressed by any theory of perception as such. However, the simple naturalistic reflexive theory of perception provided can, as has been shown, incorporate functional equivalents of some basic intentionality factors for any putative cases of perception, whether conscious or otherwise, so arguably such a significant increase in explanatory power is at least desirable, if not absolutely required, in any acceptable naturalistic theory of perception.

Nevertheless, the point should also be made, as suggested in the Introduction, that an adequate naturalistic theory as here characterized could be regarded as one that primarily addresses lower level, non-conscious kinds of perception, so that even philosophical anti-naturalists could accept some such theory, while providing some quite different favored account for conscious perceptual experience. Thus controversial issues about such conscious experiences should not be allowed to impede the search for an adequate theory invoking only lower level naturalistic perceptual concepts, such as the reflexive theory defended here.¹⁰

Notes

¹ For a useful summary of relevant problems see Paul Coates, "Deviant Causal Chains and Hallucinations," *Philosophical Quarterly* 50 (2000): 320-331.

² Or concepts: the possibility of plurality is open, even if not explicitly mentioned.

³ Irvin Rock, *Indirect Perception* (Cambridge, MA: MIT Press, 1997).

⁴ This view is supported by the occurrence of various doxastic causal theories of perception, which make no essential reference to perceptual experiences. See, e.g., Gerald Vision, "Animadversions on the Causal Theory of Perception," *Philosophical Quarterly* 43 (1993): 344-357, esp. p. 345.

⁵ See Coates, "Deviant Causal Chains and Hallucinations".

⁶ As discussed in H.P. Grice's classic paper "The Causal Theory of Perception," *Proceedings of the Aristotelian Society*, Supp. Vol. 35 (1961):121-168.

⁷ For various articles on the topic see ed. Alva Noë and Evan Thompson, *Vision and Mind* (Cambridge, MA: MIT Press, 2002).

⁸ To be sure, such a procedure would not necessarily reduce consciousness itself, but it would remove a significant impediment to such a reduction, by depriving consciousness of its traditional association with a supposedly unique kind of conscious intentionality.

⁹ Gareth Evans supports a similar view specifically for non-reflexive relations such as marriage cases in his paper "The Causal Theory of Names," *Proceedings of the Aristotelian Society*, Supp. Vol. 47 (1973): 187-208.

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