

Perception¹

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The article is an overview of some central philosophical problems associated with perception. It discusses what distinguishes perception from other sensory capacities and from conception. It discusses anti-individualism, a view according to which the nature of a perceptual state is dependent not just causally but for its identity or 'essence' on relations to a normal environment in which systems containing that state were formed. It discusses different views about epistemic warrant. By emphasising the deep ways in which human and animal perceptual systems, especially visual systems, are similar, it criticises a dominant view of the last century, in both philosophy and large parts of psychology, according to which a range of sophisticated supplementary abilities have to be learned before a child can perceive objective features of the physical world.

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Sense perception is our primary epistemic access to an objective, mind-independent world. Partly because of this central status, many intellectuals have sought to include as types of perception a variety of other real and alleged capabilities. Thus knowledge of mathematical objects and structures, introspection and other types of ordinary self-knowledge, insight through therapy into one's unconscious, mystical experience, revelation and apprehension of truth generally have been counted as types of perception. I think that each of these competencies, and alleged competencies, is different from the others. It serves only confusion to count them all types of perception. I shall discuss ordinary sense perception.

Even thus delimited, our topic is difficult to specify with any rigour. Roughly, I have in mind a capacity associated with vision, hearing, touch. But what of the radar of bats, or the system in fish for detecting oxygen? Is the feedback mechanism involved in the regulation of heartbeat to be assimilated to proprioception? Is the sensing of physical pain to be counted as a perception of some bodily damage?

There is a traditional distinction, in psychology and in philosophy, between mere *sensory systems* and *sense-perceptual systems*. I think that this is a distinction worth respecting. Drawing it clearly is, however, difficult. There are some intuitive guides that help. One is that perception takes as its referents (its perceptual objects) physical objects, properties and relations that are objective. To be objective in this sense is to be perspective- or mind-independent. Thus the sensation of pain does not in itself count as perception (though this alone does not rule out counting the sensation of pain as perception of damage in the body).

The objectivity of perception may well be a matter of degree. Intuitively, taste and smell

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provide information that is more dependent on the state of the perceiver than does vision. What one tastes is perhaps not as perceiver-independent as what one sees.

The role of objectivity in determining a capacity to be a perceptual capacity is highlighted by what are commonly called '*perceptual constancies*'. A perceptual constancy is a capacity of a system to filter out stimuli that are relevant only to the idiosyncratic perspective, angle or contribution of the perceiver, in order to home in on an objective property. For example, size constancy is the capacity of the visual system to represent an object's size as the same even as the stimulus from the object takes up a smaller or larger proportion of the visual field while it moves further away or closer to the viewer. Motion constancy is (or involves) the ability to distinguish motion of a perceived object from one's own motion. The adjustments that allow for perceptual constancies are, for the most part, automatic, unconscious adjustments made within perceptual systems. There are perceptual constancies for colour, size, shape, distance, location, motion and so on, not only in humans but in a wide array of animals throughout the animal kingdom (see Walsh & Kulikowski, 1998). I believe that perceptual constancies are a necessary feature of any perceptual system.

Another central—I believe necessary—feature of perceptual systems, as distinguished from other sensory systems, is that perception—the output of a perceptual system—is attributable to the whole animal. The animal perceives. Moreover, perception is available to the whole animal in the sense that it can guide activity or other responses by the whole animal. Many sensory systems are entirely *modular* in their output. Their output is not attributable to the whole animal. And it does not guide activity by the whole animal, as opposed to processes within the animal's sub-systems. For example, although the system for regulating heartbeat is sensitive to a variety of stimulations, no product of the system is immediately attributable to the whole animal, and the system does not guide any activity by the whole animal, as opposed to the animal's coronary sub-system.

The distinction between the activities of the whole animal and processes within its sub-systems is again a difficult one to draw in a systematic and rigorous way. Intuitively, activities of the whole animal are ones like navigation, eating, fleeing predators, catching prey, mating—and, in higher animals, inference, forming plans, making decisions and so on. Processes in an animal's sub-systems are ones like digestion, heartbeat, secretion of enzymes, transforming information about light from the retina into perceptual representations and so on. Processes in the Freudian unconscious are an intermediate case. They are not immediately available to the whole person, but they are in principle available to therapy and reflection. (For a discussion of modularity, see Fodor, 1983.)

To delimit what counts as perception, one must clarify relations between perception and other psychological phenomena. Traditionally, *perception* has been distinguished from *sensation* and from *conception*. These distinctions have also been challenged. I believe that they are genuine distinctions, however, so I shall say a word about them.

There are two mutually consistent but importantly different *conceptions of sensation* in the history of psychology and philosophy. One may regard them as associated with different uses of the theoretical term 'sensation'. One conception takes sensation to be the first *psychological* (or psychologically described) state in the psychologically relevant causal chain beginning with stimulation. Stimulation, even proximal stimulation, is not itself usually counted as a psychological state. So the picture is that there is stimulation of the sense organs that causes a sensation. There may or may not be a number of intervening physical processes between proximal stimulation and sensation, but any such intervening processes are not distinctively psychological (or psychologically described) states. A perception may be constituted of sensations, or it may be the product of further transformations on the initial sensations, or

sensory states. In any case, the sensory state will, in sufficiently complex animals, be followed by a train of further psychological states in addition to a perceptual state—for example, perceptual belief, inference, intention, action sets and so on. In some sense, these psychological states overlay a physical chain of events from stimulation through the neural system to bodily movement. (Many philosophers believe psychological states just *are* physical states under a special description. I take no position here on the mind–body relation. I take ‘psychological state’ to gain its sense and use within the practice of ordinary psychological explanation and the practice of a reasonable, scientific psychology.) Psychology is concerned with a train of events that begins with physical stimulations which, in turn, cause a sequence and network of psychologically described events. Sensation, conceived in the first way, is identified by its place in the psychological sequence.

On this first conception, the notion of a sensation does not itself entail that a sensation is either representational or conscious. Considered as sensation, sensation is simply the first psychological product of physical impacts on the body. Its role in the psychological system, its relation to perception and whether it is conscious are further matters.

The second conception of sensation centres not on the position of sensation in a psychological system but on a phenomenological feature. On this conception, sensations are felt qualities. They are often called ‘*qualia*’. On this conception, sensations have a ‘what it is like to have them’ quality. They are identified by the felt affect for the individual subject. The felt quality of pain and that of an auditory image are common examples. According to this conception, sensations are necessarily conscious, or at least bear some necessary relation to consciousness—phenomenal consciousness.

There is a controversy in philosophy over whether qualitative features of sensations, on this conception, are themselves representational, or whether, on the contrary, qualitative features are distinct from representational features. (For defences of the first view, see Dretske, 1995, and Tye, 1995; for defences of the second view, see Siewart, 1998, and Block, forthcoming; for a fascinating discussion of phenomenal qualities, see Nagel, 1979.) I believe that the latter view is the correct one, although qualitative features of most sensations in perceptual systems do in fact have representational functions or features. Partly from considerations associated with inverted spectra, partly from reflection on the apparent fact that some qualitative feels have no function or representational use (perhaps they are aspects of granularity, blurring or other distortion), and partly from considerations associated with the view that *qualia* depend purely on the nature of the underlying neural processes, whereas representational processes depend on a broader array of causal relations (see below), I believe that qualitative features of sensations are not themselves representational features. I also believe that the notion ‘representational’ tends to straddle very different phenomena illegitimately—and to be systematically misleading—when it is stretched to cover all cases of phenomenal consciousness.

The notion of representation is basic to psychological explanation. I take it to be equivalent to the notion of representational content. So, for example, perceptual states involve representations or representational content, inasmuch as they function to represent the world in a certain way, and inasmuch as the perceptual states are either accurate or inaccurate in representing purported objects perceived. Representations normally represent their referents (their representeds) as independent of themselves. They presuppose some objectifying functions and powers. Belief states involve representations or representational contents, which are propositional in form and which are either true or false. Representations function to be about, or to refer to, objects, properties, relations. They are the aspect of a psychological state that can be accurate or inaccurate, true or false.

In my usage, and arguably in that of psychology, there is no definite commitment as to whether representations are concrete entities 'in the individual'. Psychology and common sense take representational content, representations, to be shareable among different individuals. Thus you and I can both perceive a sofa as green. The representation of the colour green is thus taken to be abstract and shared, or at least shareable, between us. (The representation is not the green colour itself, for it can represent the sofa as green even if the sofa is not green.) There are also perceptual states instantiated in each of our psychologies. You have your psychological state, with its particular causal relations, and I have mine. Most psychologists would assume that you and I also have our particular perceptual representations of green. But in my view this is still a matter of philosophical debate, not something established by psychology. Although I have views on the matter, I do not build any particular commitment into my usage of 'representation'.

In most instances, representational content can be counted mental content. But for the purposes of this article, I focus more on psychology than on mind. There is no question that, for example, bees have perceptions in my fairly robust sense, and perceptual psychology as applied to their perception is in concrete ways the same sort of enterprise as perceptual psychology for humans. Plants, bacteria, protozoa, molluscs and probably many other animals do not have perception in my sense, though plants have sensitivity to light, and molluscs have simple sensory systems for sensing light or heat. Bees and spiders do have perceptual systems, but whether they should count as having minds is a question in need of more clarification. For many, it is natural to think that saying that they do have minds would be to stretch the term 'mind' unduly, even looking the evidence from perceptual psychology full in the face. One might want to reserve the term 'mind' for systems that involve belief or imagination. In this sense of 'mind', only higher animals—though still, certainly, non-linguistic animals such as apes—have minds. These are issues that go beyond the scope of this article.

'Representation' is a term that is sometimes used very loosely, often conflated with the more general term 'information'. Nearly any system, psychological or not, can be usefully and scientifically treated as an informational system. Thus tree rings carry information about the age of a tree. But tree rings do not represent anything, in the sense in which representation is important in psychology. Delimiting the scope of the term 'representation' is part of what this discussion is about. I believe that genuine representation is present only when genuinely perceptual systems, or higher-level psychological systems, such as systems of belief, are present.²

In the seventeenth and eighteenth centuries, and the early part of the twentieth century, many philosophers thought of sensations (conceived in both ways) as the objects of perception and the basic evidence for perceptual belief. The idea was that since sensation is the first psychological step in the relevant causal chain, and since sensations are phenomenologically conscious, sensations are the primary and most basic objects of perceptual reference and the data for all empirical belief. Thus sensations were conceived as *sense data*, data that are foundations for empirical knowledge.

This view has been rightly discredited. Few philosophers or psychologists hold it now. The discrediting reasons are various. There is a difficulty in explaining how sensations, as purely qualitative entities, *could* provide a reason to think anything about anything else. It was part of

²I am grateful to Marcia Cavell for remarks that motivated this discussion of the term 'representation'.

the sense-data view that they have no representational content in themselves. So they cannot bear any representational relation to a physical world beyond them. It is therefore hard to see how they could provide any epistemic warrant for a belief. Inasmuch as they are not propositional representations, they certainly could provide no reason for a belief. Reasons are propositional. Attempts to work out some internally available inference from them to something about the nature of the physical world were never successful, or even richly developed. It appears that sensations, conceived in these ways, cannot provide evidence or 'data' about the physical world.

Sense-data views have commonly been charged with making the problem of answering scepticism even more difficult than it already is. They present us as having to get beyond an initial 'veil of ideas' (sensations), which is all that we are supposed to know immediately, to a physical world behind them. There are parallel problems in explaining how perceptual reference to sensations can be converted in any systematic and regular way into reference to the physical world. Finally, there is the sheer implausibility of claiming that we perceive something internal rather than or even prior to perceiving ordinary physical objects and properties.

A key mistake in the sense-data view lies in failure to reflect on what perception is *for*, and on how nature follows function. Perception functions to enable animals to negotiate their environment—to navigate around obstacles, to flee predators and find prey or other sustenance, to find and connect with mates. Perceptual constancies enable the animal to centre on environmental objects and properties that are relevant to its needs, screening out internal or merely perspectival 'noise' in the perceptual system. Perceptual systems surely evolved to serve these ends.

The natures of perceptual states and their representational content are individuated partly through interaction with those elements in the environment that the animal has perceptual constancies for discriminating and that are relevant to the basic needs and activities of the animal. Part of what it is to *be* a certain sort of perceptual state is to enter into a network of causal relations with the physical environment represented by the perceptual states, where some of these states are successful in their representation of aspects of that environment. Perceptual state natures and perceptual representations are explicated in terms of, and are necessarily associated with, some perceptual successes. This view is called '*anti-individualism*' or '*externalism*' about the nature of perceptual states: the perceptions or the representational contents associated with a perceptual state are partly individuated by reference to relations that the perceptual system (and the animal or animal species) bears to the wider environment. *Perceptual anti-individualism* is widely accepted in philosophy and nearly universally presupposed in perceptual psychology. I believe that it is surely true (see Marr, 1982; Burge, 1986a, 1986b; Davidson, 2001).

Thus it is important to distinguish between the phenomenal consciousness associated with sensations that is subliminally present in perception and the objectual awareness that is directed to the objects that are perceived. To conflate the two amounts to missing the point of perception. Perception, through perceptual constancies, consists in the perceptual system's filtering past the purely subjective, purely perspectival aspects of perceptual experience, the better to centre on the features of the environment that the animal needs to be in a position to respond to. Perceptual representations, perceptual content, represents physical objects and properties directly: nothing else is represented prior to them. Physical objects and properties are what we are perceptually aware of. They are what perceptions are perceptions of. We do not perceive them by first perceiving something else—a sense datum or a qualitative sensation. They are the first referents of perception. Thus sensations, in the second qualitative sense, are

not the objects of perceptual awareness. At best, they are normally aspects or elements in that awareness.

Moreover, in the order of evidence, a perceptual presentation of a physical object or property is the normal beginning of the evidential chain. As a matter of developmental psychology, we come to be able to refer to sensations, conceived even in the second way, only after we have reflected on perception of physical objects and properties. No argument that dispenses with perceptual representation of physical objects and that begins with reference to sensations as such will serve to explain our empirical knowledge of the physical world. No doubt the feel or phenomenological awareness involved in perceptual experience plays a key role in perception, at least for more complex animals. But it does not amount to perception of such sensations, reference to them or use of them as data for empirical knowledge. Sensations on this conception *are* feelings or aspects of consciousness; they are not things that are perceived by means of that consciousness. They are the elements of awareness, not normally objects of representations. They are aspects of being awake. They constitute the phenomenological consciousness present in perception of other things.

Perception is to be distinguished from *conception*, as well as from *sensation*. Concepts are here to be understood as components in propositional representations or propositional representational thought contents. These sorts of representations help mark propositional attitudes and propositional inferences. The distinction between perception and conception is occasionally disputed. Explicating the distinction in a systematic and sharp way is both difficult and beyond the scope of this article. There are strong empirical reasons, however, to believe that the distinction must be drawn. The reason easiest to appreciate is this. Perceptual psychology provides massive evidence that perception, as characterised above, appears in a very wide range of animals—from goldfish, spiders, bees, octopuses, baby chicks, pigeons, frogs and turtles to rats, monkeys, apes, dolphins and humans (see Mazokhin-Porshnjakov, 1966; Granada & Dvorak, 1977; Gallistel, 1990, 1996; Spelke, 1990; Ingle, 1998). But many of these animals do not have propositional attitudes—propositional thoughts, beliefs, intentions, inferences. There is no explanatory need to attribute beliefs and inferences to goldfish, frogs, bees, baby chicks and there is no value in doing so. There is no explanatory need to attribute inferences, propositional transformations, by the whole animal. Psychology can account for their activities in terms of processing of perception, perceptual memory and a variety of reflexes and action sets geared to these capacities. Learning can be accounted for in terms of adjustments of these sets in response to perception. The full apparatus of belief-intention psychology is simply not needed for psychological explanation of the activities of these lower animals. Moreover, perception seems more plausibly accounted for in topological, map-like terms than in terms of sentence-like, propositional structures.

So there is empirical reason to believe (what common sense already suggests) that these animals do not *have* propositional attitudes, or indeed propositional representational contents in their perceptual systems. They lack concepts in our sense. But, as noted, there is overwhelming empirical reason to think that they have perception, in the rich sense that I have sketched. The organisation of perceptual representation in these animals does not appear to be itself propositional. Perceptual constancy and availability to the activities of the whole animal—marks of a perceptual system—do not need to be constitutively (or otherwise) associated with propositional inferences or beliefs by the whole animal, as opposed to computations in the animal's sub-systems, in psychological accounts of these lower animals. The computational processing need not be characterised as involving the processing of propositions. And the activities of the animal need not be explained as the products of beliefs,

intentions or propositional inferences. Yet the products of the computations are perceptions, available to the whole animal.

Thus an adequate account of belief formation will have to distinguish sensations, perceptions and concepts. What might be termed 'perceptual concepts' are concepts that depend on perceptual representations both for their referents—the objects or properties that form their ranges of applications—and for their way of presenting those referents within the individual's cognitive perspective. Perceptual concepts differ from perceptions in their form and function. They function as parts of a system of propositional attitudes and inferences among such attitudes. They are part of a system of representations governed by norms of propositional inference. The norms of inference operate on propositional forms. Such forms can be counted logical forms in that they provide a basis for logical inferences: Such a structure supports reasons and propositional inference. By contrast, perception is not in general, or in its own right, bound up in a system of reasons and rational inference.

The development of an impressive perceptual psychology for lower animals, combined with an even more impressive perceptual psychology for human infants, strongly suggests that one of the most widespread assumptions about objective representation—common to philosophy and psychology in the twentieth century—is mistaken. The assumption is what I call '*ontogenetic subjectivism*'. It is the view that, both phylogenetically among animals and developmentally (ontogenetically) among human children, the individual begins at a stage of representation that does not represent physical objects and properties. On this view, the individual begins imprisoned in a subjective world. Or at any rate, the individual initially fails to segment out *any* of the objects and properties in the environment that human adults do. The individual must acquire representations of physical objects and properties by acquiring a relatively sophisticated supplementary apparatus for individuating those objects and properties, and for locating those objects within a wider system of objective entities. The wider system might be a causal system, or a spatial system, or a system of quantification and cross-reference. This general view is mistaken.

Of course, almost anyone would agree that an individual can come to represent some sorts of things only by undergoing some maturation. Representing symphonies, infinite cardinals, transference syndromes, even tea cups as such, surely requires some background learning and conceptual maturation. But the views I am describing are more committal. These views hold that children and non-human animals cannot represent *any* common, discrete physical objects, or those macro-physical properties of them that we adults think of as rudimentary. In particular, they hold that such animals and children cannot represent ordinary physical objects in terms of their shape, location or trajectories in motion.

Thus Piaget took children initially to have only phenomenalist representations—representations of their own internal images. He thought that, by going through a series of maturational stages, the child breaks through to a less egocentric, more objective representation of the world (1954). Strawson held that children go through an initial feature-placing stage. Such a stage allegedly involves representing properties as instantiated. But it lacks genuine spatial representation and lacks any representation of physical objects. He thought that only by acquiring an ability to represent a comprehensive spatial system with non-egocentric origins and an ability to place oneself within such a system can one come to represent physical objects (1959, 1963). Quine held a view similar to Strawson's. He also invoked a feature-placing stage, though he tended to describe it in mass terms (taking the child's representation to attribute undifferentiated stuff-like properties, but with no representation of ordinary physical individuals). He held that only with the acquisition of language and an apparatus of quantifiers, pronouns, sortal predicates, negation and the identity predicate—and corresponding abilities to

differentiate and reidentify objects in a relatively context-free way—does it make sense to attribute to a child representations of physical objects (1960, ch. 2, 1990, pp. 2–6, 40–4).³

I cannot discuss these views here. I will simply say that I believe that the philosophical or a priori bases for such views are not strong. Empirically, such views have been undermined by a flood of evidence from developmental and animal psychology over the last two decades. The correct view is that representation of physical objects and properties is a very primitive ability—present in perception through a wide range of the animals that have genuine perception, including animals that do not have propositional attitudes, much less language. Such a representation is available to human infants at birth. It certainly does not depend on language or on having a mature conception of one's place in the world. Perceptual representation of physical reality appears to be much less in need of 'top-down' support than intellectual culture of the last century acknowledged.

Ontogenetic subjectivism was a common view in psychology because of the behaviourism and the phenomenalism that dominated psychological thinking in the first half of the twentieth century. In my view, it was a common position in philosophy because of too much focus on language and insufficient knowledge of perception and its role in determining belief.

The view that perceptual reference to distal physical objects, properties and relations is a very primitive ability, both developmentally and phylogenetically, should not be surprising following simple reflection on what perception is for. It is certainly to the advantage of an animal to be able to perceive physical bodies that move towards it and threaten it, or that it must grasp or eat, or that it must navigate around or mate with. Perceptual anti-individualism indicates that—and in a general way how—perceptual representation is what it is because of the animal's ability to discriminate elements of the environment that are relevant to its fundamental needs and activities. In view of the prominence of physical objects in the animal's basic needs and activities, the ability of perceptual systems to discriminate them in ways that exhibit fundamental perceptual constancies spells an ability to represent basic perceivable physical objects, properties and relations. Perception of physical phenomena—and representation of them with physical categories (such as shape, colour, position, motion and so on)—requires a less high-level set of supporting abilities than has been traditionally supposed.

We have been discussing the meaning, or representational content, and the reference of perceptual states. There is a parallel set of issues regarding the content of perceptual beliefs. Perceptual beliefs depend for their content on an array of inferences that mere perceptions do not depend on. It lies in the nature of belief to be constitutively dependent on inference. The propositional form of belief serves to mark inferential abilities that make use of that form. But the fundamental content of the simplest perceptual beliefs is derivative from the content of the perceptions that they are dependent on.

Let me turn now briefly to some questions about the *epistemic warrant* for perceptual belief. A traditional philosophical view is that the warrant, or the justification, for perceptual belief requires either that the belief be infallibly and self-evidently warranted (as the beliefs about sense data were supposed to be) or that the belief be supported by a reason. Reasons could derive either from the perceptual belief's fitting into a coherent overall theory of the world, or from some ability on the part of the person to explain their reliability under normal circumstances. The sense-data approaches are discredited. The still-current approaches that

³Quine's views are part of a much more complex view about the supposed lack of fully objective status for all reference. So, in some respects, reading him is a much more complex enterprise than reading Strawson or Piaget. Still, I think I have isolated one important and well-known strand in his views.

insist on perceptual beliefs being backed by reasons tend to leave the perceptual beliefs of children and higher animals out of account. In fact, such approaches make demands on adults that are too high to be credible. Few adults have reasons that support their perceptual beliefs. And mere coherence hardly does justice to the role of perception in the warrant for perceptual beliefs. All of these approaches can be termed epistemically 'internalist' approaches. They all require that an adequate epistemic warrant for a perceptual belief be in principle accessible to the believer.

Epistemically internalist approaches are opposed by *epistemically externalist approaches* that deny this requirement. It is important to keep firmly in mind that epistemic externalism concerns the nature of epistemic warrant. It is to be distinguished from anti-individualism or externalism in the philosophy of psychology or philosophy of mind. Anti-individualism concerns the conditions under which the natures of psychological states (e.g. perceptual states), and their representational content, are individuated.

One form of epistemic externalism is out and out. It maintains that epistemic warrant just *is* reliability. (Some versions of epistemic externalism add a further ambition—to give up on epistemology, with its attendant interest in normative notions like warrant, altogether. They propose to replace warrant with reliability, rather than explain it in terms of reliability. I shall ignore them.) This form of epistemic externalism is not plausible. Accidental reliability—as for example, if one were struck by lightning, and one's neurons were suddenly and unwittingly put in reliable touch with events—does not seem to confer warrant on perceptual beliefs.

A more plausible externalist view requires a combination of two conditions: inner competence in producing perceptual constancies and in forming perceptual beliefs, and the sort of reliable connection to the environment that helped form the representational content of the perceptual states. The warrant for perceptual belief is to be understood, on this view, in terms of the way the belief is systematically and reliably connected both to the environment and to the believer's discriminative and practical competence. Such a view is externalist in that it does not require that, to be warranted, the believer have, or be capable of conceiving, an account of the warrant. The warranted individual need not have a reason for the belief. Most perceptual beliefs are not reasoned. Most adult humans do not have adequate reasons for them. Children and higher animals certainly do not. Yet perceptual belief is a paradigm of warranted belief. A moderate epistemic externalism helps explain these facts. (For traditional defences of epistemic internalism, see Sellars, 1963; Chisholm, 1966; Bonjour, 1985; for epistemic externalist views, see Armstrong, 1973; Dretske, 1981; Goldman, 1986; Plantinga, 1993; for my approach, see Burge, forthcoming.)

None of this is to say that top-down mechanisms play no role in perception. Most or all animals capable of perception supplement their abilities to represent physical objects and properties with various feedback learning mechanisms. In humans, the interaction between conceptual background information and perceptual input is especially complex. Humans connect their visual representations of shapes with concepts of the 'meaning' or function of such shapes. Thus with training or experience one can see a subtle shape on an x-ray picture as cancer, or a certain tension in a face as an expression of self-consciousness, or a series of marks on paper as a sonnet. The visual system itself does not have the categories *cancer*, *self-consciousness* or *sonnet*. The basic visual categories for humans are centred on shape, location, motion, colour and so on. The relation between the basic perceptual categories and concepts applied in perception that draw on a much wider fund of background knowledge is the focal point for what is called high-level perception. It is also a focal point for studies of concept formation in cognitive psychology. Understanding the ways that background propositional attitudes can supplement, guide or distort basic perceptual competence, and perceptual

memory, is a task that must engage a fully successful psychology and philosophy of perception.

Similar points apply to the epistemology of perceptual belief. As adults, we acquire information about conditions under which perceptual belief can mislead. This information complicates conditions for being warranted in holding a perceptual belief. One might be aware of biases or abnormal circumstances that might lead one rationally to doubt what one would otherwise be inclined to believe in response to a perceptual presentation. Such background information bears on whether one would be warranted in forming a perceptual belief. Being warranted can grow harder as one knows more.

The study of perceptual meaning and reference and the study of the epistemology of perceptual belief will each make more rapid progress if they begin with a healthy appreciation of the degree to which basic perceptual abilities and the formation of basic perceptual beliefs are very primitive, largely wired-in abilities. Our highly socialised, scientific and culturally enriched representation of the world—and the epistemic norms that underlie warrant for perceptual belief—rest largely on a basis of perception of macro-physical objects that we share with a great many other members of the animal kingdom.

Translations of summary

Wahrnehmung. Der Artikel ist ein Überblick über einige zentrale philosophische Probleme, die mit Wahrnehmung assoziiert werden. Es wird erörtert, was Wahrnehmung von anderen Sinnesfähigkeiten und vom Auffassungsvermögen unterscheidet. Es wird Antiindividualismus diskutiert, eine Anschauung, dergemäss die Art eines Wahrnehmungszustands nicht nur zufällig, sondern auch für seine Identität oder „Essenz“ von Beziehungen zu einer normalen Umgebung abhängen, in der Systeme, die diesen Zustand enthalten, gebildet wurden. Es wird erörtert verschiedene Ansichten über epistemische Vollmacht. Indem er die tiefliegenden Art und Weise betont, in denen menschliche und tierische Wahrnehmungssysteme, vor allem die visuellen Systeme, ähnlich sind, kritisiert der Artikel die vorherrschende Ansicht des letzten Jahrhunderts sowohl in der Philosophie wie in grossen Teilen der Psychologie, gemäss denen eine Reihe von komplizierten Ergänzungsfähigkeiten gelernt werden müssen, bevor ein Kind objektive Eigenschaften der physischen Welt wahrnehmen kann.

La percepción. El artículo es un repaso de algunos problemas filosóficos centrales asociados con la percepción. Examina qué es lo que distingue a la percepción de otras capacidades sensoriales, y de la concepción. Discute el anti-individualismo, un punto de vista que considera que la naturaleza de un estado perceptivo depende, no sólo causalmente sino en cuanto a su identidad o 'esencia', de las relaciones con un ambiente normal en el que se formaron los sistemas que contienen ese estado. Discute diferentes opiniones sobre la justificación de lo que se conoce (*epistemic warrant*). Enfatizar las maneras profundas en que los sistemas perceptivos humanos y animales (especialmente los visuales) son similares, lo lleva a criticar la opinión dominante del siglo pasado—en la filosofía y partes importantes de la psicología— que el niño tiene que aprender una gama de habilidades suplementarias sofisticadas antes de poder percibir los rasgos objetivos del mundo físico.

Perception. Le présent article passe en revue quelques problèmes philosophiques centraux à la perception. Il examine ce qui distingue la perception des autres capacités sensorielles et aussi de la conception. Il discute l'anti-individualisme, un point de vue selon laquelle la nature d'un état perceptif est dépendante, pas seulement de manière causale mais pour son identité ou son 'essence', sur rapports avec un environnement normal dans lequel les systèmes contenant cet état ont été formés. Il traite différents points de vue sur une 'justification épistémique'. En soulignant les moyens de base dans lesquels les systèmes perceptifs animal et humain, particulièrement les systèmes visuels, sont similaires, l'article dispute une opinion dominante du siècle dernier, répandu dans le domaine de philosophie et dans beaucoup des disciplines psychologiques, selon laquelle toute une gamme d'aptitudes sophistiquées supplémentaires doivent être apprises avant qu'un enfant puisse percevoir les aspects objectifs du monde physique.

La percezione. L'articolo passa in rassegna alcuni problemi filosofici fondamentali associati alla percezione, discutendo ciò che distingue la percezione da altre capacità sensoriali e dalla concezione. Discute inoltre l'anti

memory, is a task that must engage a fully successful psychology and philosophy of perception.

Similar points apply to the epistemology of perceptual belief. As adults, we acquire information about conditions under which perceptual belief can mislead. This information complicates conditions for being warranted in holding a perceptual belief. One might be aware of biases or abnormal circumstances that might lead one rationally to doubt what one would otherwise be inclined to believe in response to a perceptual presentation. Such background information bears on whether one would be warranted in forming a perceptual belief. Being warranted can grow harder as one knows more.

The study of perceptual meaning and reference and the study of the epistemology of perceptual belief will each make more rapid progress if they begin with a healthy appreciation of the degree to which basic perceptual abilities and the formation of basic perceptual beliefs are very primitive, largely wired-in abilities. Our highly socialised, scientific and culturally enriched representation of the world—and the epistemic norms that underlie warrant for perceptual belief—rest largely on a basis of perception of macro-physical objects that we share with a great many other members of the animal kingdom.

Translations of summary

Wahrnehmung. Der Artikel ist ein Überblick über einige zentrale philosophische Probleme, die mit Wahrnehmung assoziiert werden. Es wird erörtert, was Wahrnehmung von anderen Sinnesfähigkeiten und vom Auffassungsvermögen unterscheidet. Es wird Antiindividualismus diskutiert, eine Anschauung, dergemäss die Art eines Wahrnehmungszustands nicht nur zufällig, sondern auch für seine Identität oder „Essenz“ von Beziehungen zu einer normalen Umgebung abhängen, in der Systeme, die diesen Zustand enthalten, gebildet wurden. Es wird erörtert verschiedene Ansichten über epistemische Vollmacht. Indem er die tiefliegenden Art und Weise betont, in denen menschliche und tierische Wahrnehmungssysteme, vor allem die visuellen Systeme, ähnlich sind, kritisiert der Artikel die vorherrschende Ansicht des letzten Jahrhunderts sowohl in der Philosophie wie in grossen Teilen der Psychologie, gemäss denen eine Reihe von komplizierten Ergänzungsfähigkeiten gelernt werden müssen, bevor ein Kind objektive Eigenschaften der physischen Welt wahrnehmen kann.

La percepción. El artículo es un repaso de algunos problemas filosóficos centrales asociados con la percepción. Examina qué es lo que distingue a la percepción de otras capacidades sensoriales, y de la concepción. Discute el anti-individualismo, un punto de vista que considera que la naturaleza de un estado perceptivo depende, no sólo causalmente sino en cuanto a su identidad o 'esencia', de las relaciones con un ambiente normal en el que se formaron los sistemas que contienen ese estado. Discute diferentes opiniones sobre la justificación de lo que se conoce (*epistemic warrant*). Enfatizar las maneras profundas en que los sistemas perceptivos humanos y animales (especialmente los visuales) son similares, lo lleva a criticar la opinión dominante del siglo pasado—en la filosofía y partes importantes de la psicología— que el niño tiene que aprender una gama de habilidades suplementarias sofisticadas antes de poder percibir los rasgos objetivos del mundo físico.

Perception. Le présent article passe en revue quelques problèmes philosophiques centraux à la perception. Il examine ce qui distingue la perception des autres capacités sensorielles et aussi de la conception. Il discute l'anti-individualisme, un point de vue selon laquelle la nature d'un état perceptif est dépendante, pas seulement de manière causale mais pour son identité ou son 'essence', sur rapports avec un environnement normal dans lequel les systèmes contenant cet état ont été formés. Il traite différents points de vue sur une 'justification épistémique'. En soulignant les moyens de base dans lesquels les systèmes perceptifs animal et humain, particulièrement les systèmes visuels, sont similaires, l'article dispute une opinion dominante du siècle dernier, répandu dans le domaine de philosophie et dans beaucoup des disciplines psychologiques, selon laquelle toute une gamme d'aptitudes sophistiquées supplémentaires doivent être apprises avant qu'un enfant puisse percevoir les aspects objectifs du monde physique.

La percezione. L'articolo passa in rassegna alcuni problemi filosofici fondamentali associati alla percezione, discutendo ciò che distingue la percezione da altre capacità sensoriali e dalla concezione. Discute inoltre l'anti

individualismo, una visione secondo la quale la natura di uno stato percettivo dipende non solo causalmente, ma per la sua stessa identità o "essenza", dai rapporti con l'ambiente normale in cui si sono formati i sistemi contenenti tale stato. Analizza anche i diversi punti di vista sulla giustificazione epistemica. Sottolineando la profonda rassomiglianza tra i sistemi di percezione nell'uomo e negli animali, specialmente tra i sistemi visivi, l'autore critica la visione predominante nel secolo scorso, sia in campo filosofico sia in gran parte di quello psicologico, secondo la quale un bambino deve impadronirsi di tutta una gamma di sofisticate abilità supplementari prima di poter percepire i tratti oggettivi del mondo fisico.

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