Chapter 6

The Ecology of Psychology

The idea of environment is a necessity to the idea of organism, and with the conception of environment comes the impossibility of considering psychical life as an individual isolated thing developing in a vacuum.
—*John Dewey*

When was the last time you danced? Maybe it was at a party or a nightclub or a wedding. Maybe you simply danced around your kitchen while doing the dishes, or perhaps you dance for a living, in front of thousands of people. Maybe you hated every minute; maybe you had the time of your life. Now, as you think of yourself dancing, think also about where dance is located. A weird question, right? What does it even mean? Well, let's get more specific. Is the dance inside you? Is it some kind of state that you're in? Or is the dance something simply that happens to you?[1] Makes even less sense, now, doesn't it? Because dances just aren't like that. And that is precisely the point: a dance is a something we do, not a thing we possess, or a state we occupy.

When we dance, we're coordinating our movements with our environment, in the moment; the dance doesn't sit inside us, and it isn't dependent on us alone, but on the music as well, its rhythm and tempo, and also on our partner, if we have one. It simply makes no sense at all to ask where a dance "is." The philosopher Alva Noë uses this dancing metaphor to explain his view of human consciousness; like a dance, consciousness is something we do, not an object we possess. As he suggests, "our ability to dance depends on all sorts of things going on inside of us, but that we are dancing is fundamentally an attunement to the world around us."[2]

We can extend Noë's dancing metaphor to include all psychological phenomena as a whole—not just conscious experience—and we can extend it to all other animals as well.[3] We can, in other words, adopt what is known as the "ecological" approach to psychology.[4] According to this theory, developed by the late James Gibson, psychological phenomena are not things that happen "inside" animals, but are found in the relations between animals and their environments; hence they are "ecological."[5] The idea of psychology as ecological phenomena, along with Noë's dancing metaphor, pins down precisely the mutuality of organism and environment we identified in the previous chapter. In this chapter, we're going to explore the benefits of an ecological approach to psychology, and so the argument from here on gets a little more technical. The ideas we're going to consider are important and interesting, but they do require a bit of effort to understand, not least because they completely turn many of our everyday assumptions on their head, and their unfamiliarity alone may make them difficult to grasp. It is, however, well worth the effort, so bear with me.

Affordances and the "Loopiness" of Behavior

> The agent does not merely receive input passively and then process it. Rather the agent immediately sees things from some perspective and sees them affording a certain action.
> —*Maurice Merleau-Ponty*

> The verb to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal in a way that no existing term does. It implies the complementarity of the animal and the environment.
> —*James Gibson*

As we've seen, even fairly simple animals explore and regulate their encounters with the environment in highly active ways, exploiting the structure of their bodies and the habitat in order to make their tasks simpler, more effective, or both. The idea of an active organism is key to understanding many of Gibson's arguments because it completely undercuts many of the assumptions we hold about sensation, perception, and action.

For example, one of the first questions Gibson asks is "What are the senses?"[6] We usually assume that our senses are "channels of sensation,"[7] but Gibson's view is that our senses are systems for perception. This perhaps seems odd at first, because the conventional view is that sensations are the "raw materials" from which we then form our perceptions. But, as Gibson points out, the verb "to sense" has two meanings. The first is the one we've just described, "to have a sensation," but the second is "to detect something," and it is this second sense that Gibson uses: for him, perception is based not on sensation, but on detecting information. What is striking, then, about Gibson's approach is that it separates the input to the nervous system that leads us to experience sensations from that which leads to perception. Gibson gives the example of the "obstacle sense" of blind people, who can sense objects as a kind of "facial vision." In fact, such people are detecting objects using echolocation, and so it is their auditory system that they are using. Blind people therefore have a particular kind of perceptual experience without realizing which of their senses has been stimulated. As Gibson describes it, this perception is "sensationless," meaning that the sensations experienced do not actually reflect the mechanism by which the information was detected.

Gibson also questioned the classic psychological categories of "stimulus" and "response." In the laboratory, these categories are appropriate because we can "impose" discrete and individual stimuli on the sense organs in isolation (a pure tone, a flash of light), and the specific response to such stimuli is noted: how intense must the stimulus be to produce a response? How long must it last? How intense is the response? Outside the laboratory, however, individual, independent stimuli of this kind don't exist: they overlap in space and time; they merge together; they change position. What we have in the real world is a "flowing array of stimulus energy"[8] from which animals can obtain information for perception: animals act, move around, change their position, and so alter the nature of the stimulus information available to them as a consequence. In the natural environment, unlike the laboratory, animals are not limited to passively receiving whatever happens to come their way; they can actively seek out the information they need. In other words, their "responses" may often precede any given "stimulus" (although, of course, calling it a response is completely wrong because it's not a "response" to anything). Perception, then, is a matter of active exploration of, and attention to, the environment, and as such, it calls into question the existence of two independent categories of stimulus and response. Instead, it seems more accurate to talk about an ongoing process of "sensorimotor coordination," as the philosopher, John Dewey, called it, with behavior viewed as a continuous, integrated loop of action and perception.[9]

The idea that perception involves the active detection of information also means that we need to think about the senses rather differently. We are used to thinking of the senses as passive receptors for various kinds of stimulation—light energy in the case of our eyes, sound waves in hearing—and so we study "the eye" or "the ear" accordingly, working out the various mechanisms by which, say, sound waves are detected by the hair cells in the cochlea, or the rods and cones of the eye are stimulated by photons. There is nothing wrong with all this—it is fascinating to discover how our receptors work—but, as Gibson noted, the perceptual apparatus by which animals pick up information in the world around them is not achieved by these receptors in isolation. That is, the perceptual system we use to detect sounds in the world is not "the ear" but both of our ears, positioned on either side of a mobile head, attached to a mobile body, connected to our entire nervous system. To detect the source and identity of a sound, we have to move our heads and often our bodies because—as we saw with the crickets in chapter 3—localizing sound depends on the relation between the sound waves that arrive at each ear (sound takes longer to reach the ear that is farther away from the source). An ear can't do this alone; only the whole perceptual system of the active organism can do so. A "perceptual system," then, is not simply a receptor attached to a nerve; it involves the entire nervous system because it requires the whole body to pick up information, not just the sense receptors. Gibson suggested that we should think metaphorically about the senses acting like tentacles or feelers[10] that seek out information through exploration as a means to help get us away from the idea of the senses simply as passive receivers.

Once we think of animals as explorers of their environments—as active seekers of information, rather than simply passive receivers—it raises the question of what it is they seek. Gibson's answer is that organisms seek out information and regulate their behavior with respect to the "affordances" of the environment: the opportunities and possibilities for action that particular objects and resources offer to an animal.[11]

So what exactly are affordances? For a human, of a certain size, with two legs that bend in the middle and a squashy bottom, a chair affords the possibility of sitting, as does a tree stump, but such objects do not afford sitting to a giraffe or a cow; similarly, a fork offers the possibility of feeding oneself for a human, but not for a fish, a dog, or a crow, all of which lack hands. A fig tree affords climbing for a chimpanzee, whereas for an elephant it affords scratching its bottom or pushing over. Perception is, then, "written in the language of action"[12] so that we see not chairs but places to sit; the spider sees not a vertical pole but a place to climb; the woodpecker finch sees not a stick but something to poke with, and it sees not a hole but a place to poke.

The concept of affordance means that what goes on in an animal's head (whatever that might turn out to be) cannot be separated from how it moves its body about in the world.[13] The "loopy" cyclical nature of exploratory behavior forces the realization that perception and motor action do not form two discrete categories, but instead they work together as a single tightly coordinated, fully integrated unit to detect and exploit affordances, and so produce highly specific adaptive behavior. This in turn means that the same environmental resources will offer different possibilities (different affordances) to different organisms, because they possess different kinds of bodies that differ in their sensorimotor capacities.

This ties the notion of affordances to that of the umwelt very nicely. Affordances are "organism-dependent," like the umwelt, because they reflect the degree to which an animal with a particular kind of nervous system can detect and make use of particular kinds of environmental opportunities. This doesn't mean that affordances are purely "subjective," however. As Gibson puts it:

> an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective-objective and helps us to understand its inadequacy. It is equally a fact of the environment and a fact of behavior. It is both physical and psychical, yet neither. An affordance points both ways, to the environment and to the observer.[14]

So a rigid horizontal surface affords walking for animals with legs, regardless of whether there are any animals actually present to walk on it, but, at the same time, the affordance is realized only when an animal with legs exploits that structure in that way.[15] Another nice example is the "Thank God" hold,[16] a term used in rock climbing to describe an attached object on a cliff that affords a safe, secure, and easy grasp. A climber who encounters one of these at the end of a long climb, or during a particularly strenuous stretch, is likely to be enormously pleased, hence its name. Nevertheless, even though there is a relationship between the nature of the hold and the feelings of the climber, the aspects of the hold that specify its "Thank God" qualities are present whether or not anyone is there to use it, and the hold is always there to be perceived and used.

Taking Control

The concept of affordances reinforces the point made in the previous chapter that animals act on their environments, and are not merely acted on by them. The *Portia* spider actively mimics the movements of other spider prey with its web-twanging antics because the web affords such a possibility. Arguing in this way doesn't mean that spiders have any knowledge of why they are bothering to twang another spider's web, or any understanding of why web twanging results in a meal, but it does mean that, as we noted above, we can't make any hard-and-fast distinctions between "instinctive" and "intelligent" behavior. It also reinforces the idea that behavior is not the result of a one-way link that goes from stimulus to response, but a loopy process of "sensorimotor coupling" in which action and movement often precede sensory stimulation. This reversal of our usual way of thinking allows us to recognize that, ultimately, behavior is about controlling one's perceptions.[17]

Consider driving a car within an area with a strict speed limit of 60 mph. To keep your perception of this intended speed constant (whether by looking at the speedometer, or by ensuring that objects to the side move past at a constant rate), you have to continually adjust your behavior by varying the pressure of your foot on the accelerator and brake as you encounter differences in the road surface and gradient. Your action in response to the sight of the speedometer needle climbing will be to increase pressure on the brake, and the reason you do this is that you want your next perception to be the speedometer falling again. This should sound familiar, as it is the same kind of negative feedback mechanism that Grey Walter used in his tortoise robots; in Elsie's and Elmer's case, they were attempting to control their perception of light—not too bright and not too dim—and so their actions in the environment constituted an attempt to produce the right level of sensory stimulus, not the right response. Similarly, your actions with respect to speed are also an attempt to produce the right stimulus, and not the right response, because placing your foot on the brake is "right" only in the context of controlling how the speedometer needle looks to you. When you are going uphill, placing your foot on the accelerator will become the response that produces the right stimulus.

It is much easier to work out what the "right" stimulus will be for an animal (generally that which promotes survival, e.g., the perception of a full stomach, not an empty one; the perception of safety, not fear) in a given situation than it is to decide on the "right" response, because this could vary from moment to moment.[18] Perceptual control theory (PCT)—as this field of research is called—therefore argues that the reason why behavior varies is that animals are trying to maintain stability in their perceptions of the world. So, like Gibson's and Dewey's theories, PCT is also a theory of behavior that considers animals to be "purposeful": an organism controls its own behavior, and hence its own fate, by its actions in the world. Its "purpose" is to defend its internal states (i.e., to sustain homeostasis) and the external state of the perceived world, so that it remains within certain limits that are conducive to its survival.

From the perspective we are developing here, PCT is also an attractive theory of behavior because, like Gibson's theory of ecological perception, it links well to the idea of the umwelt. A controlling organism can know only its own sensory signals or perceptions—it can't look back at itself and know the world outside of its own perception of it.[19] As with the umwelt, then, PCT forces us to remain aware that our observations of an animal's behavior from the outside will necessarily be very different from the behavior as seen from the inside, and we shouldn't assume that, just because we can see and assess certain aspects of an animal's actions, these actions are relevant to the animal itself in terms of achieving its goals.

Take a gymnast, for example. People assessing a gymnast's performance can attend to the outward appearance of her actions, but the gymnast herself is not directly aware of how she appears to others; she controls only her own perceptions (of pressure, effort, sound, sight) that the judges cannot experience or assess.[20] From a classic stimulus-response perspective, however, it is very tempting to explain aspects of the gymnast's outward appearance and behavior that do not exist in the perceptual world of the gymnast herself, so we are then, in effect, explaining what the gymnast is not doing, rather than what she is.[21]

The Environment as Illusion

> [T]he real problem is how the cortex uses the messages it gets from the retina to answer its questions and to ask others. This is the serial process we call visual perception.
> —*J. Z. Young*

> And if the brain, why not the kidney?
> —*Peter Hacker*

Another aspect of Gibson's theory that links to his rejection of perception and action as two separate systems is the rejection of the conventional idea that all the sensory inputs we receive from the world need to be processed, via internal representations, in order to produce a rich and detailed view of our environment.[22] To understand how and why Gibson's theory differs, we first need to understand a little about the standard view of perception as a process. We'll take visual perception as our example.

The conventional view of visual perception originates with the mathematician and astronomer Johannes Kepler, who worked out the optics of the eye (based on the assumption that the eye functioned as a camera does, or in Kepler's day, a camera obscura), and demonstrated that, as a consequence of the way that light rays were refracted by the lens, the image formed on the retina would be both upside-down and reversed.[23] This, of course, raises an interesting question: if perception of the environment begins with the formation of an image on the retina, and the retinal image is inverted, static, and two-dimensional, how can we perceive our environment as three-dimensional, upright, and dynamic? Not only this, but we have two eyes, so there are two retinal images, and these aren't identical, so why don't we see double? Clearly the two upside-down, static, nonidentical images must get converted into a three-dimensional view of the environment, but how? This problem taxed Kepler, but his solutions to it were, it has been suggested "futile and ad hoc"; they made little sense and were highly unsatisfactory.[24]

The French philosopher René Descartes (more of him anon) later conducted experiments with dissected bulls' eyes, and revealed the upside-down image on the retina just as Kepler had predicted. Descartes, however, came up with a solution to the problem of the retinal image that seems entirely reasonable. His argument was that the stimulation provided by the retinal image, and the images then formed on the pineal gland (the part of the brain where Descartes assumed the images from the retina were sent), were simply that: patterns of stimulation that could be processed in various ways to produce our visual experience. Descartes, in other words, played down the problem of the upside-down retinal image by arguing that the stimulation on the retina received from an object in the world didn't actually have to resemble that object, just as the two-dimensional picture or painting of an object in the world doesn't completely resemble the real three-dimensional object it depicts. All that matters in both cases is that the same mental activity is aroused by both.

In the 1800s Hermann von Helmholtz, who is often described (quite rightly) as the Newton of psychology, extended this by arguing that visual perception was a matter of "unconscious inference" by the brain.[25] According to Helmholtz, nerve impulses sent from the retina were transformed into sensations in the brain[26] and acted as the "raw material" from which our perceptions could then be "inferred" by the unconscious mind. Helmholtz reasoned that perception had to be a process of inference because the information sent from the retina was so scanty; it couldn't possibly provide an accurate representation of what the world looks like, and so our brains had to fill in the missing parts. Following Helmholtz, the distinguished neurophysiologist-psychologist Richard Gregory also suggested that our perceptions were "hypotheses" that our brains form about the world, based on the impoverished data received from incoming neural signals.[27] The equally distinguished neuroscientist Colin Blakemore similarly argued that "neurons present arguments to the brain . . . arguments on which the brain constructs its hypothesis of perception."[28] Most famously of all, David Marr, in his seminal book, *Vision*, stated quite emphatically that vision was a process of information analysis conducted by the brain.[29] In essence, then, and as

Noë puts it, the conventional view is that, because it seems that we are given much less than we think we are (the flat retinal image), what we see is not the world itself, but the world we create inside us, using our brains.[30] In other words, we contact the world only indirectly, because we have to construct a detailed, faithful representation inside our heads, and we then act on the basis of this reconstruction, rather than acting directly on the world itself.[31] The environment as we see it is, therefore, an illusion.[32]

As the neurophysiologist Max Bennett and the philosopher Peter Hacker point out, there are several conceptual problems with this approach to perception.[33] Perhaps the most prominent is that it commits the "mereological fallacy": put crudely, this means to treat parts as though they were wholes. To say that the brain "infers" and "hypothesizes" or that neurons "present arguments" is to treat the brain as though it were a person in its own right—one that sits inside your head and then tells "you" things[34]—instead of being only a part of you.[35] Another way to put this is to say that we anthropomorphize our brains. This is inappropriate because the brain is an organ with cells that generate action potentials, and, although it is obviously involved in the process of perception, it does not itself perceive; only the animal as a whole can do that.[36]

Another problem with the conventional view is the persistence of the idea that we see not the objects of the world before us, but only a picture in our brain or an image on our retina. Colin Blakemore again: "the subjects of seeing are not objects themselves, but the flat images of them which hide within the pupil of the eye."[37] As Peter Hacker suggests, "To argue that since we can see nothing without having a retinal image therefore what we see is the retinal image is like arguing that since we can buy nothing without money what we buy is money."[38] A combination of the above two misconceptions also explains why the upside-down retinal image is seen as a "problem": to worry about a flat, upside-down image is to assume that the brain can "see" this image, just as we can see the retinal image when we look into another person's eye, with the right kinds of instruments. But, of course, brains can't see anything, and "we" don't see our own retinal image either (because we could do so only by virtue of another little person in our head), so there is no reason to think that its being upside-down has any relevance at all (what does upside-down even mean, if there is nothing or no one looking at the image? Upside-down relative to what?).[39] The formation of a retinal image is simply incidental to what really matters as far as seeing is concerned—that an array of light has been reflected from objects in our visual field.[40]

There for the Taking

> [T]he senses can obtain information about objects without the intervention of an intellectual process.
> —*James Gibson*

Gibson's ecological theory stands in complete opposition to the conventional view of perception as an illusion. Gibson argued that perception starts not with the retinal image, but with the structure of light in the environment (the "ambient optic array": see below), which provides information to animals with a perceptual system capable of picking it up.[41] As animals are able to perceive this information directly—that is, without having to transform, enhance, or enrich it in some way—they act on the basis of what is in the environment, and not on the basis of a reconstruction inside their heads. In this way, Gibson rejected the conventional dualistic view of an "inner" mental world of perception by which we construct what the "outer" world looks like. For Gibson, there is just one world, in which animals can detect the information—the affordances—available and exploit them.[42] In Gibson's theory, then, the "problem" of the retinal image simply doesn't enter into things because this isn't the basis of perception. Instead, he identified another kind of problem that needs to be solved.

As Gibson pointed out, unless one is performing an experiment in a laboratory—where one can impose various kinds of stimulus energy on an animal's receptors in a controlled fashion—the intensity of light, sound, odor it encounters, and the things it can touch are highly variable from place to place and moment to moment as an animal moves about. The stimulation of its receptors, and the accompanying sensations, will similarly vary enormously. So, for Gibson, the big question of visual perception was: "How do humans and other animals obtain constant perceptions given that they are faced with such continual variability?"

Gibson's answer was to suggest that there are certain "higher-order" variables—"invariants"—present in the stimulus energy that do not change over time and place, despite the movements of the observing animal and the changes in the intensity of stimulation it receives. These invariants correspond to certain permanent properties of the environment (which is why they are invariant), and, as such, they constitute information about the environment that the organism can detect or "pick up."[43] For example, when you look at a rectangular table, you usually don't actually see it as a perfect rectangle because you can do that only if you look at it directly from above. Rather, you see a set of different and constantly varying trapezoid forms with different angles and proportions as projected to our moving point of observation. What doesn't change, however, is the relationship between the angles that sit diagonally across from each other (the cross-ratio), and these uniquely specify a rectangular surface (and also a rigid one).[44] Perception, then, is the activity by which animals and humans detect environmental invariants.

To get this point across, let's consider in more detail what Gibson refers to as the "optic array"[45] (most of Gibson's work was concerned with visual perception, but the same principles apply to other sensory modalities). Light rays travel through a transparent medium—air—and are reflected from the surfaces of objects. This light is available for a perceiver to use, providing its eyes are looking in the right place. The places at which light is available are termed points of observation (also called "station points"). At any of these points, light converges from all directions and forms three-dimensional angles (called "solid angles" to distinguish them from 2-D or plane angles) that are nested within each other at different scales (i.e., small solid angles are nested within ever larger ones), and these solid angles correspond to differences in the intensity of light. As the intensity and mixture of wavelengths of light from one angle is different from that coming from another, it forms a contrast. The arrangement of these contrasts is independent of the exact intensity or wavelength of the light that produces them; it is just the relative difference between them that matters. The structure or pattern made by these contrasts forms the optic array, and this is why light itself carries information: the structure of the optic array is determined by the kinds of surfaces, and their positioning in the environment, from which light has been reflected, and so the optic array is specific to a particular environment and (quite literally) reflects what it contains.

So, to put this in concrete terms, if you begin reading a newspaper on a sunny porch but move into a shady room as you get too hot what you find is that, as you move indoors, the paper doesn't suddenly change color to you, even though less light is now being reflected from the paper. The conventional view is that our nervous system corrects for the changing nature of the input, exchanging one illusory image of a newspaper for another, whereas the ecological approach suggests that we do not need to compensate internally in this way because the structure of the optic array itself remains unchanged despite the absolute change in light intensity (because it is the relative spatial patterning of the contrasts that matters, rather than their absolute values).

Action for Perception

The key to Gibson's theory is that animals must actively explore and attend to their environments to pick up the available information. This also means that, if environmental information should happen to become impoverished, so that perception suffers, an animal can take direct physical action to increase the quality of the information it gathers. Think of what you do when you want to see the label on a bottle that is turned away from you, or when you want to read a sign with very small writing: you turn the bottle toward you; you move closer to the sign. By moving around in the world, then, an organism transforms the optic array, and these transformations reveal the shapes, sizes, and locations of objects in the world. For Gibson, visual perception is not the reception of stimuli from the environment followed by the construction of internal representations, but an active sampling of the optic array that allows an animal to detect the information present in the world. This active sampling allows animals to perceive not only the "invariant structure" we described above, but also "perspective structure."[46]

When an animal moves and transforms the optical array, this provides information about its own locomotion—this is perspective structure. A flowing perspective structure indicates movement, whereas an arrested perspective structure indicates that the organism is at rest. In Gibson's theory, then, perception of the environment is always and simultaneously

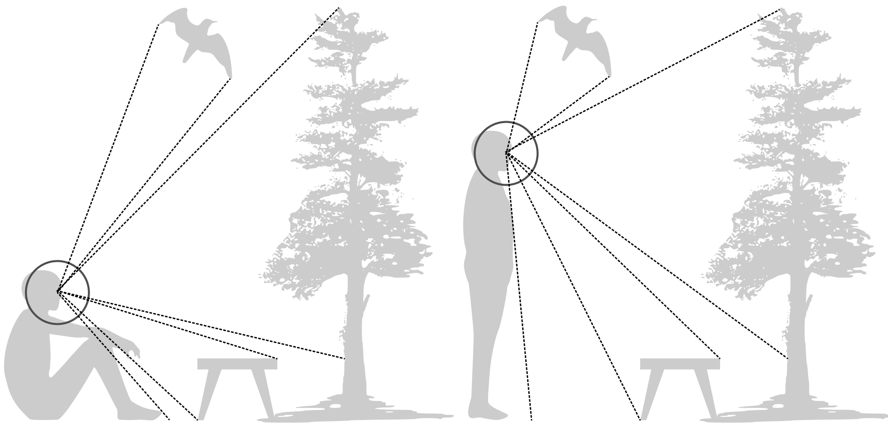

Figure 6.1. The optic array. Light is reflected from objects in the environment, and the "solid angles" so produced form contrasts that specify uniquely those objects.

a form of self-perception (nicely embedding the animal in its environment in a mutualistic way). Conversely, as we already noted, when an animal moves and transforms the optical array, there will be some aspects that do not change but remain constant over all transformations. This is the invariant structure that specifies the kinds of objects are present in the environment. This should now make clear where affordances come into play—they are the terms in which perceptual information is made available. That is, they are the invariants that are significant for a particular kind of organism—the ground's invariant of solidity affords walking for us, for example, while a wall's invariants of verticality and solidity afford leaning. We can bring in the umwelt here too, because, while the invariants are always present, they will matter more for some organisms than for others. A shoe affords protection of the foot to a human, but affords chewing to a dog: the invariants of shape are crucial for foot protection, but, obviously, they don't matter quite so much for chewing, whereas the invariants of resistance and texture may matter equally to both.

The most crucial point to take away from all this, however, is that the detection of invariant structure—and hence perception—is utterly dependent on the active manipulation of the optic array, so that the organism makes information available to itself. That is, perceptual information is available only to animals that are actively exploring in some or other way. We can link this back to our salticid spiders. If you recall, salticids can move their eye tubes, sweeping them over their cornea in complex patterns, and their bodily movements are guided by the detection of horizontal lines in their visual field. If we think of this in Gibsonian terms, the active sweeping of the eye tubes is the means by which the spiders detect the affordances—the horizontal invariants—of their environment and can then act on them accordingly.

Along similar lines, Alva Noë considers perception to be a form of "skilled access" to the world, in which animals are directly coupled to their environments.[47] Perception is not "in" us and it doesn't happen "to" us; it is something in which we actively participate. It is, to return to the beginning of the chapter, like a dance. Transforming the optical array so as to perceive invariants is also the strongest way to make the case that perception is a function of the mutual organism-environment relationship and can't be considered as something internal to the organism: whatever "cognition" is taking place, it is taking place not solely in the animal's head, but out in the world: action in the world can, justifiably, be considered to be just as "cognitive" as things that happen inside an animal's head.

Gibson and the "Denial of the Mental"

Arguments like this have led (quite frequently) to accusations that ecological psychology is "antirepresentationalist" or "antimentalist"[48] because Gibson argued strongly that there was always sufficient information in the optic array to specify the nature of the environment, relieving the organism of the need to internally process information.[49] On the one hand, this is a misrepresentation of Gibson's arguments. First, Gibson's theory was focused on perception and was never aimed at explaining other kinds of processes that (supposedly) involve representations. Gibson explicitly stated, in fact, that his theory "isn't to deny that reminiscence, expectation, imagination, fantasy and dreaming occur. It is only to deny that they have an essential role to play in perceiving."[50] Second, he said, again explicitly, that his theory "also admits the existence of internal loops more or less contained within the nervous system. . . . There is no doubt but what the brain alone can generate is experience of a sort."[51] What Gibson questioned was the usefulness of terms like "mental images" that people use to describe mental representations, mainly because it was unclear what such a term really meant: "we certainly do not conjure up pictures inside our head for they would have to be looked at by a little man in the head. . . . Moreover, the little man would have eyes in his head to see with, and then a still littler man and so ad infinitum."[52]

On the other hand, so what if Gibson's theory of perception is antimentalistic in the conventional "perception is an illusion" sense? Why should that automatically be regarded as a devastating criticism? After all, we have seen that there are conceptual problems with the conventional view, and there is a large body of empirical support for Gibson's theory.[53] We should also remember that mental representations are theoretical constructs that we use to try to better understand certain aspects of our own and other animals' lives. This doesn't necessarily make them "real," or even necessary to psychology (we discuss this more in chapter 10).

Finally, it simply doesn't follow that an argument in favor of direct, rather than indirect, perception is also an argument that everything happens outside the animal and nothing happens inside it (which is what these antimentalist arguments tend to imply). Gibson's argument was simply that the senses are not conduits by which "signals" or "messages" are sent to the brain, and that the brain is not a device that decodes and interprets these signals in order to construct static cognitive structures, or some kind of picture of the environment. In other words, there is nothing at all in Gibson's argument to suggest that we can or should exclude brains from the process of perception. Instead, it is an argument for changing the way we think about the brain. After all, if active exploration is the means by which perception is achieved, the brain simply must form an important part of that behavioral loop because—quite obviously—the brain is involved in controlling and orienting the perceptual organs in ways that permit information pickup.

In other words, it doesn't make sense to talk about "the brain" at all when discussing perception, in just the same way that it doesn't make sense to talk about "the eye" or "the ear."[54] Rather, we should think about the central nervous system as a fully integrated part of the means by which animals seek and extract information from the array of energy that surrounds them. In Gibson's view, the brain doesn't sit aloof from the senses, waiting to receive data on which it can put its inferential capacities to work. Instead, the central nervous system and perceptual systems "resonate" (metaphorically speaking) to the stimulus information in the environment. The analogy here is not one of constructing the world but tuning into it, as a radio receiver can be tuned to pick up certain frequencies (although, as Gibson notes, it must be a self-tuning receiver; otherwise we have the problem of the little man in the head, the homunculus).[55] The perceptual systems "hunt" for information until they achieve clarity, like picking up a radio station rather than noise, and this is self-reinforcing: the pickup of information reinforces exactly those exploratory actions of the perceptual organs that made the pickup possible, and the registering of information reinforces whatever neural activity in the central nervous system brings this about. This is very far from saying that "nothing" happens inside the organism in the ecological approach.

It is, therefore, much more accurate to understand Gibson's theory as an alternative model of cognition, broadly construed as how animals come to know their environments,[56] and not an anticognitive or noncognitive theory. Indeed (and somewhat ironically for the antimentalist critics), the lovely thing about Gibson's theory is that it is a theory of perception that is automatically a theory of cognition, with no false separation between the two.

Antimentalist criticisms of ecological psychology also tend to miss the important point that—regardless of where one stands on the issue of representation—the first step in any study of visual perception in any creature should be to determine how much information is present in the environment (or, if we are especially skeptical, whether there is any at all) before we begin to even consider formulating hypotheses about what's going on inside an organism's brain.[57] As Mark Rowlands—a philosopher and something of a champion of Gibson's views—points out, it is merely the sensible application of what he calls the "barking dog principle" (based on the old adage "Why buy a dog and then bark yourself?") as applied to evolved creatures. If there is information freely available in the environment, why would natural selection go to the trouble of building in internal mechanisms that do exactly the same job? A failure to consider the information available in the environment again runs the risk of assuming that the organism is performing a task in its head, when, in fact, the task is one that can be left completely to the world (more on which later). As should be clear, this isn't quite the same as saying that no internal activity takes place. Instead, it's an argument for giving the external environment as much attention as the inside of an animal's head when we are investigating their cognitive capacities.

The more precise and technical details of how animals directly perceive environmental structure, and how this contrasts with conventional psychological views, need not concern us here.[58] I have mentioned the difference simply because ecological psychology is often presented in pejorative terms (it certainly was when I went to university!) and described solely as a view that denies the need for any internal cognitive mechanisms at all. As should be clear, this isn't actually the case: ecological psychology is more of a reinterpretation of cognitive processes, acknowledging that these reflect the mutual interaction of an organism with its environment, so that things that happen in the world can be included as part and parcel of an investigation into cognitive mechanisms.[59] The more nuanced and accurate position is to say that representational systems or "ideas" are not mental phenomena alone, but are also ways of behaving and regulating our actions in the world: even we humans do not internalize "ideas" in our heads in a way that is completely divorced from reality (although formal schooling often makes it seem that way . . .); rather, we use these ideas to help regulate and control our encounters with our environment.[60] The only thing that Gibson actually denied was the entirely false separation of organism and environment, perception and action, that the conventional view entails, and it is this—and the concept of affordances—that we should keep uppermost in our minds as we continue.