

Affordances, Dynamic Experience, and the Challenge of Reification

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Why is it that affordances have received attention within psychology only in recent decades if they are supposedly what individuals perceive most fundamentally? This paradox can be explained, in part, by the fact that psychologists have usually considered the character of perceiving from a detached stance, and then reified the results of this analysis—an error that William James called *the psychologist's fallacy*—rather than attending to the immediate flow of perception–action. By the same token, if ecological psychologists were to take stimulus information as *what* is perceived, rather than as part of a conceptual framework offered to explain *how* we perceive, they would be committing a similar reification error. Ecological optics as a conceptual framework is always open to revision, even while the reality of affordances is assumed. Bearing in mind this distinction between *what* is perceived and *how* it is perceived, investigators need to return regularly to immediate experience, both as a means of verifying that our concepts connect back to our experience of the world and as a way of uncovering new qualities of perceptual experience for investigation. From this perspective, several exemplars of phenomenologically driven perceptual research are examined. Furthermore, the multidimensionality of affordances is considered, with an emphasis on their place in the flow of immediate experience, development, and sociocultural processes.

Theoretic knowledge, which is knowledge about things, as distinguished from living or sympathetic acquaintance with them, touches only the outer surface of reality.

—William James (1909/1996, pp. 249–250)

If James Gibson is correct, that we experience the environment in terms of its affordances, then why have affordances so easily eluded the attention of experimental psychologists over the years? As the supposed ground of all perceptual ex-

perience, these functionally significant properties of the environment should be readily apparent in the experimental literature. From its inception, however, experimental psychology exclusively focused on physical properties of the environment, neglecting affordances and their like.

Perhaps the reason that mention of affordances is scarce in the experimental literature is that they have been introduced into scientific discourse through J. J. Gibson's (1979) later efforts and only now are beginning to make an appearance. This explanation is not very convincing, however, because even though the term *affordances* is relatively new, Gibson was hardly the first person to point out that there is much to be gained by considering environmental features with respect to their functional significance. For some time, this suggestion has been in the literature of philosophy (e.g., Heidegger, 1926/1962; Merleau-Ponty, 1962; see also Dreyfus, 1991) and sociology (e.g., Schutz, 1967). Also, of course, there are references to these properties of the environment throughout the Gestalt psychology literature, most notably by Koffka and Lewin, as Gibson (1979, pp. 138–139) himself indicated.

Still, one might try to account for psychology's neglect of affordances by noting that all of these instances were too far outside of the mainstream of American experimental psychology to have much impact on its development and its broader influence. Less easily dismissed, however, is Tolman's (1932) allied concept of *manipulanda*, which he proposed in his major work, *Purposive Behavior in Animals and Men*. However, as influential as Tolman was in so many respects, his claim for the value of viewing environmental features in terms of their functional significance for behavior never took hold.

So why are affordances, and similar concepts, not even yet staples of the psychological literature? Could it simply be that this concept is inconsistent with prevailing paradigmatic ways of thinking in the discipline? A case could be readily made, for example, that the influence of operationism on psychological theory effectively ruled out a concept like affordances with its phenomenological and perceiver relative qualities. Without wanting to minimize this possibility, which I believe has much validity, I propose that there is a more fundamental reason. Importantly, for our purposes, it is a reason that has considerable significance for the ongoing development of ecological psychology. The relative obscurity of affordances and similar ideas in experimental psychology despite their declared pervasiveness in everyday experience is worth considering for a moment, because doing so will remind us what affordances are and, just as important, what they are not.

WHY ARE AFFORDANCES SO COMMONPLACE, AND YET SO ELUSIVE?

Let me first be clear about the phenomena to which *affordances* refer. Affordances—and affordances by any other name—point to a recurring claim in

the literature of philosophy and the human sciences: At a basic, prereflective level of awareness, prior to the abstractions (e.g., categorization, analysis) all humans so readily perform on immediate experience, we perceive our everyday environment as a place of functionally meaningful objects and events. In their immediacy, the “things” of our everyday environment have perceivable psychological value for us in terms of the possibilities they offer for our actions and, more broadly, for our intentions (Heft, 1989). This aboriginal mode of awareness runs through the flow of our ongoing perceiving and acting, constituting its experiential bedrock.

To experience objects and events of the world most fundamentally as bearing possibilities for our actions, that is, as affordances, is by definition to experience them relationally. Affordances are attributable to the intrinsic properties that features, objects, and events possess by virtue of their makeup, and are delimited or specified in relation to a particular perceiver–actor (J. J. Gibson, 1979; Heft, 2001; Reed, 1996).

Perceiving the affordances of our environment is, if you will, a first-order experience that is manifested in the flow of our ongoing perceiving and acting. By *first-order experience* I mean experience that is direct and unmediated; it is the experiencing of x , in contrast to experiencing x through the intercession of y or z . *Awareness* sinks to a minimum at these times to such an extent that encounters with the world seem nearly automatic and habitual, and the experience of a boundary between the self and the world is negligible. We are “simply” immersed in situated doing and being.

Alternatively, and more saliently, we can step outside of the ongoing flow of immediate perception–action awareness by reflecting on the things of the environment; that is, we can shift the necessarily selective character of our attentional focus from experiencing the immediate flow of events to experiencing the experience and, in doing so, isolate particular portions of immediate experience, holding them in awareness for analysis, categorization, or other second-order or indirect acts of cognition. Accompanying these acts of reflexivity is a comparative heightening of awareness, as entities in experience are momentarily lifted out of the perceptual flow for closer scrutiny.

When we are engaged in this second-order mode of knowing, we experience objects and events of the world largely in relation to each other—for example, we may classify them as belonging to the same or different categories—rather than experiencing them primarily in relation to us as perceivers–actors, that is, as affordances. Experienced in the former manner they stand apart from us; they are “in” the world, and there they reside in their own domain of physical objects, indifferent to our interests. Experiencing them as physical objects, rather than as affordances, we are not drawn toward them or repelled by them for any intrinsic qualities they possess. If they are valued at all it is because they can serve as a means to some other end; the source of their value is extrinsic. In such a detached, physicalistic view of the environment, as opposed to a functional view, the environment consists of intrinsically neutral things to which value is subsequently attached.

To return, then, to my initial question, if affordances are so pervasive and immediate in our experience, and so intrinsically rich in psychological content, why have they been given so little consideration by psychologists, especially in comparison to the things of the world considered from a physical standpoint? In view of even the brief remarks made so far, this state of affairs should not be too difficult to understand. The scarcity of affordances in psychological discourse is largely explainable in terms of the nature of intellectual inquiry itself. Science is fundamentally an analytical enterprise; thus, when we think about the environment for the purposes of psychological study we are prone to adopt this more detached attitude—and affordances are difficult to notice from a stance of detachment.

The distinction between immediate, first-order, nonanalytical awareness and reflective, second-order, analytical awareness is important, because it identifies two alternative avenues for knowing. Critically, experimental psychology's failure to maintain this distinction in a consistent manner has produced no end of problems. In fact, it has resulted historically in so much theoretical mischief that James (1890/1981) dubbed this misstep "the psychologist's fallacy." The relevance of these matters to the idea of affordances will be clear shortly.

THE PSYCHOLOGIST'S FALLACY

This distinction between immediate and reflective modes of awareness has been made many times in 20th-century philosophy, particularly by individuals identifying themselves with a phenomenological orientation. An early expression of this distinction was offered by James in *The Principles of Psychology* (1890/1981), in the context of his influential discussion of *knowledge of acquaintance* and *knowledge-about*. Concerning knowledge of acquaintance, he wrote:

I am acquainted with many people and things which I know very little about, except their presence in places where I have met them. I know the color blue when I see it, and the flavor of a pear when I taste it; I know an inch when I move my finger through it; a second of time, when I feel it pass; an effort of attention when I make it; a difference between two things when I notice it; but *about* the inner nature of these facts or what makes them what they are, I can say nothing at all. I cannot impart acquaintance with them to anyone who has not already made it himself. ... At most, I can say to my friends, Go to certain places and act in certain ways, and these objects will probably come. (p. 217)

As for knowledge about:

We can ascend to knowledge *about* it by rallying our wits and proceeding to notice and analyze and think. What we are only acquainted with is only *present* to our minds; we *have* it, or the idea of it. But when we know about it, we do more than merely have

it; we seem, as we think over its relations, to subject it to a sort of *treatment* and to *operate* upon it with our thought. (pp. 217–218)

James (1890/1981) further contrasted the differing character of these two kinds of knowledge as follows:

The words *feeling* and *thought* give voice to the antithesis. Through feelings we become acquainted with things, but only by our thoughts do we know about them. *Feelings are the germ and starting point of cognition, thoughts the developed tree* [italics added]. (p. 218)

One cannot help noticing that James's use of the term *feeling* in this passage as being implicated at a basic level in cognition is unusual in comparison to how *feeling* has been treated in most cognitive psychology. This term clearly has a broader connotation for him than is usually ascribed to it. I return to this point later.

All forms of knowing for James involve selection by a knowing agent from a field or manifold of potentially knowable qualities and structures. This distinctive characteristic of his psychology cannot be overemphasized. The selective processes that are associated with knowledge of acquaintance are *sensation* and *perception* (James, 1890/1981). By means of both, one has a direct or immediate (i.e., unmediated) awareness of qualities of things of the world, including one's own body. Whereas sensation is an immediate awareness of particular object qualities (e.g., color), perception has a more elaborated character, where immediate awareness can encompass a comparatively wide range of relations, such as experiencing an object of a definite shape and size (e.g., a face). James's assertion that there is direct awareness of sensations and percepts is, for him, an *empirical* claim. He was reporting that we experience these qualities of sensation and perception as being characteristics of the world rather than as reflecting some inner mental state—that is, as being mediated. I referred to this earlier as *first-order experience*. James (1890/1981) wrote in this regard:

So far is it from being true that our first way of feeling things is the feeling of them as subjective or mental, that the exact opposite seems to be the truth. Our earliest, most instinctive, least developed kind of consciousness is the objective kind, and only as reflection becomes developed do we become aware of an inner world at all. (p. 679)

In his late writings, James (1912/1976) called the phenomena of immediate (unmediated) experience *percepts* and the phenomena of reflection or analysis *concepts*. I retain this useful terminological distinction throughout this article.

The philosophers and psychologists who have most directly shaped contemporary theories of perception, by contrast, have considered the objects of sensation and perception to be mental states rather than properties of the world. Why is this? James pointed out that, when the forebears of contemporary theory engaged in an

analysis of perceiving, they typically lost sight of the fact that they were indeed engaging in an *analysis*; that is, they failed to notice that they were stepping outside of the immediacy of the process of perceiving and offering an account at least once removed from it. By failing to recognize that they were examining the phenomena from “without,” they mistakenly took the outcome of the analysis as a constituent of the process. That is, what they and, by extension, we commonly do is erroneously take a product of analysis for a constituent of that which is being examined. In other words, we mistake concepts for percepts. In such cases, which are all too common, the psychologist is confusing “*his own standpoint with that of the mental fact about which he is making his report*” (James, 1890/1981, p. 195). To do so is to commit the *psychologist’s fallacy*.

An example, no doubt, will be helpful here. James (1890/1981) commented, as follows, on the tendency of theorists historically to take a simple sensation as an element or a building block of conscious awareness:

No one ever had a simple sensation by itself. Consciousness, from our natal day, is of a teeming multiplicity of objects and relations, and what we call simple sensations are the results of discriminative attention, pushed often to a very high degree. (p. 219)

In other words, as paradoxical as it may seem at first glance, a simple sensation is an abstraction rather than the primary datum it has often been taken to be. To use James’s terminology, a simple sensation is a *concept*—a concept being a product of reflection on immediate experience.

Likewise, as is typically the case in modern cognitive science, when mental representations are taken as an object of experience—and hence as an essential step in the causal chain of mental/brain events that eventuates in the experience of perceiving—again the psychologist’s fallacy has been committed. It is more accurate to say that, when we experience a mental representation, we are experiencing the product of our analysis of perceiving processes, rather than experiencing a constituent of perceiving. Instead, the evidence from immediate experience indicates that the objects of perceiving, that is, percepts, are in the world.¹

James’s distinction between percepts and concepts, and his claim that we sometimes fail to keep them straight in our theories, are very significant insights. The psychologist’s fallacy is not only applicable to the way sensation and perception have been characterized but also is symptomatic of a more general vulnerability in the nature of human reasoning processes that can appear in any number of contexts. Analysis and reflection are processes of abstraction, and we seem to have a proclivity for taking qualities derived from immediate experience for their sources

¹Some readers may object that I am using *evidence* and *empirical* in a rather loose way. James asked us, however, to take up a phenomenalist–empirical attitude, that is, to adopt a positivist stance: What does immediate experience, unaltered (or at least minimally so) by any prejudgments about the way things “must be,” tell us about perceiving? It is this sense of empirical that I am embracing.

and, in doing so, fail to realize (or remember) that they are abstractions. Whitehead (1925) called the broader application of this insight *the fallacy of misplaced concreteness*. Dewey (1896) also wrote often about our propensity for this logical error in thinking, and in his more philosophical writings James (1909/1996) used the felicitous phrase *vicious intellectualism* to refer to this tendency.

Why am I raising these issues about percepts versus concepts, and the psychologist's fallacy, in the context of a discussion of affordances? I am doing so to voice a cautionary note. Ecological psychologists, too, need to be careful not to fall victim to this error in thinking in the investigation of affordances, because if they were to do so, further growth in the research program would be impeded, and future directions for the investigation of affordances could be curtailed.

THE PSYCHOLOGIST'S FALLACY AND ECOLOGICAL OPTICS

How do affordances fit into the Jamesian distinction between percepts and concepts and the parallel distinction between knowledge of acquaintance and knowledge-about? It is clear that affordances are percepts. Affordances are claimed to be directly perceived and unmediated, as is the case with Jamesian percepts. J. J. Gibson (1979) wrote: "To see these things [e.g., places, attached objects, objects, substances, and events] is to perceive what they afford" (p. 240). Affordances have the unreflective, immediate qualities that make them sources of knowledge of acquaintance.

Furthermore, recall James's (1890/1981) claim that "through *feelings* [italics added] we become acquainted with things" (p. 218). Likewise, affordances are not neutral things; they are not value free. J. J. Gibson (1979) quoted Koffka approvingly: "Each thing says what it is ... a fruit says 'eat me'; water says 'Drink me'; thunder says 'fear me'; and woman says 'Love me'" (p. 138). That is, affective and motivational qualities are intrinsic to affordances. Awareness of affordances typically is an intertwining of knowing, feeling, and acting.

The action-related quality of affordances points to a specific characteristic of percepts, noted earlier, that distinguishes them from concepts. Affordances are perceived in the course of action; they are a part of a flow of activity and awareness. This quality marks a distinguishing feature between percepts and concepts. In contrast, concepts (conceptual experience) are apparent "pauses" in the flow of action. The significance of this difference will become apparent shortly.

So far, I have considered some of the qualities of affordances. Now I turn to a different matter: *How* are affordances of the environment perceived? To address this question, we must step outside of the flow of experience, beyond the immediacy of a first-order description, and consider how direct experience of functionally significant properties of the environment is possible. An account of how affordances are directly perceived starts with the *conceptual apparatus of ecological*

optics. Whereas affordances are percepts; surfaces, medium, stimulus information, and invariants are *concepts* (using Jamesian terminology). With ecological optics, Gibson offered a set of concepts to aid in understanding what makes direct perception possible. However, the medium for perceiving and the structure in the medium specifying an object are not themselves *perceived*; rather, they are abstractions from immediate experience and are the hypothesized grounds for perceiving.

Gibson was careful in his writings to maintain this sort of distinction. Thus, whereas affordances are directly perceived, information is “picked up.” He referred to information *for* perception but not to the perception *of* information. For the same reason, although one can rightly refer to direct perception, the phrase *direct pickup* is at best redundant. Through the pickup of stimulus information, the individual perceives—that is, is aware of—the affordances of the environment (Reed, 1996). “Perceiving is ... a keeping-in-touch with the world, an experiencing of things” (J. J. Gibson, 1979, p. 239).

By offering a set of concepts as a means of accounting for observable phenomena in immediate experience, Gibson operated as all scientists ultimately do. The various features of the conceptual apparatus are offered up to be tested and refined, and perhaps even ultimately rejected if some better explanatory tools come along. This continuous process of proposing and testing concepts based on ecological optics (and related ideas) is the domain of the experimental research programs in ecological psychology.

Although there is always the possibility that existing concepts can be rejected in place of better ones, what cannot be rejected is the *reality of affordances*. They are the essential stuff of experience of the world; they are “*what is there*” most immediately, and it is with affordances that an ecological analysis of perception must begin, because most fundamentally an ecological analysis is an account of perceiving the world. In this regard, Gibson’s efforts seemed to heed the advice of his former colleague MacLeod (1947), taking phenomenology to be a propaedeutic to experimental investigation.

I now apply the previous discussion of the psychologist’s fallacy and misplaced concreteness to the ontological distinction between percepts and concepts and, in turn, to ecological optics. It is easy to see how one might slip into talking as if what we *perceive* are invariants, flow vectors, tau, pi values, and so on. That would be unfortunate, however, because doing so would amount to more than a loose use of language; it would create the possibility of *reifying* these concepts. That is, it could lead us to treat stimulus information as something concrete and materially real, and there are at least two problems with doing so.

First, Gibson was clearly concerned that his ideas could become ossified. If that were to happen, there could set in a resistance to putting them to continual test, a tendency to hold onto them even in the face of better fitting ideas. As a result, further conceptual progress would be impeded. That this was a deep concern for Gibson is evidenced by the fact that he concluded his last book precisely on that note:

“These terms and concepts are subject to revision as the ecological approach to perception becomes clear” (J. J. Gibson, 1979, p. 311).

Second, the perennial threat of reification (if you will, the Old Testament threat) has always been that this intellectual tendency blinds one to the *full* reality of things—that at best it offers a limited glimpse of a much richer reality. In *Science and the Modern World* (1925), Whitehead wrote:

The advantage of confining attention to a definite group of abstractions, is that you confine your thoughts to clear-cut definite things, with clear-cut relations. ... The disadvantage of exclusive attention to that group of abstractions, however well-founded, is that, by the nature of the case, you have abstracted from the remainder of things. In so far as the excluded things are important in your experience, your modes of thought are not fitted to deal with them. (p. 59)

If the concepts of ecological optics are reified in our thinking, we would treat them as “what” is perceived rather than as a critical facet of the explanation for “how” we perceive. The harm in that is we then could lose sight of the richness of our perceptual experience because our prime focus becomes *just those* properties these concepts single out, as significant as those properties may be. In short, by mistaking concepts for percepts, we may overlook many essential qualities of human perceptual experience, thereby leading us to miss some of the critical questions that a science of perception that is adequate to the human condition needs to address.

I would like to think that what I have said so far is relatively uncontroversial. But when I turn to specific cases with these issues in mind, we begin to see just how complex the problems facing an ecological account of perceiving truly are.

THE MULTIDIMENSIONALITY OF AFFORDANCES

If one considers the experience of affordances in the flow of everyday actions, it is clear that affordances are multidimensional. To explain what I mean by this, consider the following example, which I adapted from S. Runeson (personal communication, July 2002). Although it may be true that the invariant ratio of leg length to step riser height in stimulus information specifies for an individual perceiver whether a surface *can* be stepped up on, in the complexity of everyday situations this perceived relationship alone is not sufficient information for specifying whether that surface *ought* to be stepped up on. And with affordances we do enter indeed the world of “oughts”—that is, the world of *values*.

Whether the surface affords stepping up on, considered in a broader context of making intentional choices in particular circumstances, always depends on more factors than body-scaling considerations alone. To name but one of these other factors: What is the apparent character of the surface? Does the surface appear to be slippery (as it would if it appeared to be coated with ice), or tacky (as it would if it

appeared to be freshly painted), or unstable (as it would if it were a plank resting on two piles of books), or brittle (as it would if its wooden surface appeared partially rotted)? This example is intended to illustrate that, in everyday contexts, body-scaling considerations may be necessary but are not sufficient information for specifying the affordance properties of an environmental feature. For this reason, the information specifying affordances will be even more complex than yet imagined. Indeed, in his discussion of the information for affordances, J. J. Gibson (1979) suggested that something he called “a *compound invariant*” might be needed for describing an affordance, but he was by necessity quite vague about what this might entail.

In fact, the situation is even more complicated than described so far. To return to the example of the step affordance, the question whether I “ought” to step up on the surface, rather than “can” I do so, is tied up in sociocultural meanings, as is most human intentional action. Stated differently, in most cases the character of the surface has a sociocultural dimension as well as a structural one. Take the case of a step that is memorialized for some sacred or historical reason by a culture. The body-scaled properties of the step might indicate that it *could* be stepped up on, but all the while it *ought* not be for reasons quite apart from those factors. Or, to take a different example, that pen on the desk may be graspable for me, given its diameter in relation to my grip, but because it is resting on the desk of the president of the college, it is not a pen I ought to pick up. From the standpoint of motor action, the pen does afford writing with, but from the standpoint of action in social context it does not.

How is ecological psychology to handle such cases? Should they be dealt with as matters of perceiving, or should such sociocultural and intentional considerations be relegated to extraperceptual processes? My view is that we should continue to push for the perceptual explanation even for such more elaborated considerations of meanings as those grounded in sociocultural processes. We should try to make good on the ecological claim that we experience our world in terms of perceived meaning, without having to resort to a hybrid theory to do so. Only then would we know if such an account is feasible or if it should be abandoned.

One avenue to explore here might be hypothesizing that the relevant information is embedded within a temporally extended flow of events that includes the perceiver’s history of engagements with the environment. Said in other words, we might begin to look at this question in the context of perceptual learning and development. Of course, such a temporally extended analysis goes much beyond what we have typically considered to date, but conceptual advances may require us to push the boundaries of what can be reasonably considered as context. I return to these matters in the last part of this article.

However, it is critical to note that the preceding comments concerning viewing affordances as percepts rather than concepts are in no way intended to diminish the experimental discoveries produced by research on affordances thus far. The work on body-scaled information has been insightful and innovative. But it is im-

portant to remember that it is affordances that are perceived, and not information—to recall James’s percept–concept distinction. When a body-scaled invariant is identified, we are still operating at a fairly abstract, analytical level of analysis and somewhat removed from the domains of meaning, motivation, and value wherein affordances reside. Recognition that affordances are typically multidimensional and embedded in an intentional structure of action will keep our analysis anchored in the domains of motivation and value and hence closer to lived reality.

What do these considerations suggest for ongoing research? This question is the overriding concern of the remainder of the article. For now, I state the broader conclusion, which will need considerable fleshing out. It is essential that we continually move back and forth from, on the one hand, experience as such—that is, to the things as they appear in everyday experience—and on the other hand, conceptual analyses that will account for such experiences. Only by continually checking our present conceptualizations against everyday circumstances as experienced will we ensure that the work of ecological psychology can ultimately connect back to a world of human experience.

To summarize the discussion so far, identifying the stimulus information that specifies perceived affordance properties is the essential task of the ecological research program. The claim that perceiving is direct and unmediated rests on uncovering such structures in the available stimulus array. This endeavor is built on Gibson’s ground-breaking *conceptual* contribution of ecological optics. However, it is essential to bear in mind that ecological optics is a conceptual framework; it is offered to explain *how* direct perception is possible. It is not a description of *what* is perceived. If the concepts of ecological optics become reified in the course of our investigations, then Gibson’s efforts since his first book, to bring back into psychology’s orbit the everyday world of meaningful objects and events, will be undercut.

As we proceed analytically, we need to return continually to the question of articulating “What is there to be perceived?” We should follow Gibson’s lead here and attend to immediate experience, or the phenomenology of perception, *not as an end in itself* but rather as a starting place. After all, it was in immediate experience that Gibson found such notable phenomena as texture gradients, optical flow and egomotion, occluding edges, and affordances, and in so doing set the stage for the productive research programs based on these phenomena (Heft, 2001).

THE PHENOMENOLOGY OF PERCEIVING

How does one go about maintaining an appreciation for the everyday “things” of human experience and the questions that they raise for an account of perceiving, while at the same time avoiding the psychologist’s fallacy? Are there any guidelines one can follow to make the less articulable dimensions of experience more salient? Maybe the best course of action is to examine some notable exemplars of phenomenological description of perceiving in the hope of heightening our sensi-

tivity to what may lay right before us. If nothing else, this work is certainly eye opening, offering glimpses of the possibilities there that may be uncovered. As one phenomenological pioneer concluded, reflecting on his life's work: "It now seems certain that our sensory experiences (and by this I mean all the impressions corresponding directly to rather complex systems of stimulation) are infinitely richer in content than could have ever been anticipated" (Michotte, 1954/1991, p. 44).

Turning then to exemplars, there is Gibson, of course, and the qualities of perceptual experience already noted. Moreover, phenomenological description played a critical role in the work of many of the psychologists Gibson most admired, such as Albert Michotte and David Katz (J. J. Gibson, 1967). A good place to start is a brief consideration of some of Katz's work, which will serve as a reminder of the richness of the perceptual world and the intriguing questions it poses to researchers.

Modes of Appearance

In his book *The World of Color* (1911/1935), Katz provided an approach to the analysis of color experience that differed from the standard physicalistic framework. Instead of limiting his attention, as has been done ever since Newton's classic prism studies, to the correspondence between wavelength of light, on the one hand, and color sensation, on the other, Katz explored the *modes of appearance* of color. In doing so Katz identified a number of modes of color appearance, including *film color*, which has a degree of transparency; *surface color*, which has opacity; *volume colors*, such as the illumination of a contained or bounded space; and *luminous colors*, such as from a body that emits some light energy.

What is striking about these distinct modes of color appearance is that instances of each case can be equated for wavelength spectroscopically; and yet, even when they are, they still appear to a perceiver as being qualitatively different (Beck, 1972). The clear lesson from such an analysis is that to equate the experience of color in everyday circumstances solely with wavelength of light energy is a mistake. Of course, wavelength is one abstract correlate of color experience in any circumstance, as are the relations among wavelengths from adjacent surfaces. However, to limit the account of color appearance to those physical correlates is to offer, at best, a limited explanation of why the colors of things in everyday settings appear as they do.

To return to James's psychologist's fallacy, what is wrong in saying that we *perceive* colors of our world in terms of wavelength of light is that we do not perceive colors *per se*. Using Katz's (1911/1935) terminology, what we perceive are film colors, object colors, volume colors, luminous colors, and so on. (Even this is a bit of an abstraction, for surely we perceive colored objects, colored filmy appearances, colored volumes, etc.) Although we may attend to such subtleties with minimal awareness, and may be inclined on reflection to detach color from its context, the

concept of wavelength further encourages that step. As invaluable and precise as the concept of wavelength is as a concept, it is not what we perceive. When we bear in mind that wavelength of light is abstracted from immediate experience, and that despite its unquestionable scientific value we perceive not wavelengths of light but some compound that likely includes wavelength as one component, then we can begin to consider how much more there is yet to be explained about the perception of color.

Katz's (1911/1935) examination of color experience takes a psychological domain that we often think we know much about and shows how much more there is to know. Sensitivity to the phenomena, with a minimum of analysis, serves to uncover readily overlooked qualities of everyday reality. It opens up many new qualities that need to be addressed if we are to have a better understanding of perceptual experience. And yet, with Katz's analysis we have not quite attained a domain of perceived meanings and values—film color, volume color, and so on, are not themselves functionally meaningful. However, we are somewhat closer to this domain.

I now offer a second example, this time from Katz's (1925/1989) work on touch, because it will allow me to take the discussion a little further both phenomenologically and methodologically. Katz observed that, in touch, as with color experience, one can distinguish among modes of appearance. *Surface touch* is the most obvious mode of appearance for tactile experience and includes the experience of rigidity, extension, and texture. Katz also identified *immersed touch*, in which the resistance that is experienced is elastic and tends to surround the sensory surface (e.g., immersing one's hand in water) rather than being rigid and having an edge as is typically the case with a surface. There is also *volume touch*, which is experienced when "a solid object is felt through soft material, and the latter seems to fill the intervening space" (Krueger, 1989, p. 17). A ready example of this last mode of felt appearance is palpation of the sort practiced with great skill in clinical medicine, when the density and shape of organs are examined by pressing on the skin.

Within any one of these modes of appearance, how might one proceed methodologically to identify qualities that warrant further investigation, to validate the adequacy of these descriptions and to begin to consider matters of reliability? One would do well to follow Katz's lead and turn to experts in a given domain. In the case of touch, Katz (1937) examined the descriptive terms used by bakers to describe the differing qualities of dough for their suitability in bread making. Consider the following descriptors of dough reported to Katz:

- *Lively*: "kind and on moist side; comes to the moulding table full of life";
- *Wiry*: "full of stretch and pull, usually on greasy side";
- *Bounce*: "full of life and resilience, seems to grow under your hand and comes back to you when moulding";

- *Firmness*: “a compound quality relating to water absorption [and] gluten quantity and quality”;
- *Resistance*: “the amount of pressure required to expel gasses generated during fermentation by moulding”;
- *Body*: “multidimensional, including degree of stickiness to the touch, degree of elasticity (lively or clay-like), degree of toughness (how often it can be pulled before breaking), [and] degree of extensibility (how long it can be stretched before breaking).” (pp. 384–386)

Additional insight into the character of the information specifying these qualities can be gained by considering how bakers make use of such discriminations. Katz (1937) pointed out that these qualities are typically noted when the dough is being manipulated, and at the time the baker relies mostly on touch and vision to make these assessments. In this regard, he wrote:

The psychological properties [of the dough], e.g., body and spring, do not correspond to the physical properties of viscosity, elasticity, etc., but are rather the result of a complicated cooperation of the different senses of the skin, the muscles, the sinews, and the joints. (p. 389)

That is, the informative properties are revealed not by sensory input passively applied to a neural channel, but it is revealed by an individual’s perceptual systems engaging a complex feature of the world. Moreover, here we see that the critical information refers not to physical properties per se but to properties that arise from the perceiver–environment engagements. For this reason, Katz rightly called them *psychological properties*.

Finally, by working with a group of experts Katz (1937) was able to evaluate the degree of commonality among descriptor categories to see whether there is some convergence to a particular set of qualities and, furthermore, whether these descriptors have both interobserver and predictive reliability. Taking these steps in a systematic and rigorous way (which would require one to go beyond Katz’s analysis) would reduce some of the force of the usual (and frequently justified) criticism of phenomenological description, which is that it is both idiosyncratic and unreliable.

Katz’s (1937) investigations with bakers demonstrate that there is potentially much to be gained from entering the study of some perceptual domain with guidance from individuals who have already engaged in considerable perceptual learning in that domain. These experts can point the perceptual researcher to meaningful properties of the entity in question, presumably somewhat like the way these experts’ own mentors directed their attention during apprenticeship. If, following Gibson, one function of language is to “consolidate the gains of perceiving” and in turn to direct subsequent selection of stimulus properties, then those individuals with a comparatively elaborated vocabulary when making these discriminations

can be valuable resources for the investigation of affordances.² Katz's studies of color and more especially of touch, can point one in the direction of a useful approach to an empirically grounded phenomenological investigation.

Value Properties

Koch (1969/1999) similarly proposed that the language individuals use to describe perceptual experiences can serve as a guide to identify distinctive stimulus qualities and that experts in a given perceptual domain will be especially valuable resources for perceptual researchers. For example, with reference to perceptual experience in the domain of taste, Koch wrote:

It is already possible for most of us to comment on a meal in a more particulate way than some such exclamation as "Delicious!" Great chefs ... members of gourmet communities, professional wine and tea tasters, have in fact achieved a gastro-nomic-experience language of expressive differentiation and specificity. (p. 206)

Koch (1969/1999) took his phenomenological considerations in a slightly different direction than Katz did by placing greater emphasis on the motivational dimension of perceptual experience. Perceptual qualities, such as specific complex taste combinations, are experienced in more than a detached, analytical manner; intimately tied up with experience of them, and perhaps inextricably so, are affective and motivational qualities. Koch referred to these qualities of things in the world as *value properties*. These qualities are intrinsic to the perceiver-object relationship:

I like them by virtue of something far more *definite*, "real," if you will, than anything that could be phrased in the extrinsic mode. Each one I like because of *specific* properties or relations immanent, intrinsic, within the given action. Or better, the properties and relations *are* the "liking." (p. 202)

²Let me offer another example, this time concerning volume touch, although here the inquiry was quite informal and limited compared to Katz's (1937) study of bakers. I asked a physician who has more than a decade of experience teaching physical examination techniques to medical students to reflect on touch as a diagnostic tool. This physician began by distinguishing between the techniques of *percussion* (a tapping technique) and *palpation* (a pressing on the body envelope). Percussion generates multimodal information (hearing and touch) that may indicate underlying pathology. For example, it can produce a "tympanetic" percept, like a resonant drumbeat, as contrasted with a flat or a dull percept, and each of these qualities indicate different diagnostic possibilities. Furthermore, the presence or absence of abnormal tissue mass can be detected by a percussive wave, which is initiated by setting fluid in motion at one point on the body and noting if the expected wave through the fluid is felt at another point. Palpation on the body surface provides information as to whether the underlying cavity is filled with a solid, fluid, or air. What quality is to be expected, and hence what deviates from the expected, varies at different points on the body surface.

But more than merely liking, perceivers are attracted to engage particular things because of the experiences these activities possess:

I have been drawn to these activities, and not others, because (among other reasons) they “contain,” “afford,” “generate” specific properties or relations in my experience toward which I am adient. *I like these particular activities because they are the particular activities they are.* (Koch, 1969/1999, p. 202)

Returning to an earlier comment, a detached stance toward the things of the world, which necessarily accompanies the analytical attitude science requires, may predispose one toward seeing value as something that is added to or extrinsic to the thing experienced. In contrast, Koch argued that perceiving as a relation between perceiver and perceived has an intrinsic, motivational quality; and this claim is consistent with James’s treatment of perceiving as a process by which one acquires *knowledge of acquaintance* through “feeling.” James (1890/1981) wrote: “Feelings are the germ and starting point of cognition” (p. 218). This view—that feelings have a cognitive character—is gaining currency in the philosophy-of-mind literature (e.g., Nussbaum, 2001).

These considerations help to enrich our understanding of the dual nature of affordances as things that are known and are acted on, and they help clarify why Gibson claimed that an ecological analysis of perceiving is necessarily value laden.³ A vital step in the development of a psychological analysis of aesthetic experience will surely be considerations such as Koch’s (1969/1999) concerning the intrinsic qualities of value properties.⁴

Phenomenological analyses of perceiving have uncovered a variety of meaningful qualities that escape notice when one adopts the analytical mode of thinking appropriately characteristic of science. The examples offered earlier are intended to be merely suggestive of the rich possibilities that await explication in the ongoing experience of perception and action.

The previous discussion, however, has neglected the most pervasive and subtle quality of perceptual experience: its *dynamic quality*, which is the focus of the next and final section of this article. It is treated separately not only because it is more

³For further discussion of the dual nature of perceiving, see James’s discussion of affectional qualities in his *Essays in Radical Empiricism* (1912/1976), as well as the treatment of them in Heft (2001).

⁴In one of his final projects, Koch established The Aesthetics Research Center at Boston University, the primary goal of which was an investigation of the “fine and particulate knowledge about art and its generative conditions ... from those on most intimate terms with the phenomena in question: artists themselves” (Koch, 1973). The centerpiece of this project was to be a series of detailed interviews with prominent artists of the day. It is noteworthy that, when Koch turned to find a collaborator on the project, he invited Anthony Barrand, a Gibson PhD and a professional musician and dancer. The program faltered for reasons extraneous to the research problem, however, with only a handful of the projected interviews conducted.

pervasive than the other qualities considered, but also because it is especially well suited in a discussion of affordances to counteract the reifying tendencies in our thinking.

THE DYNAMIC QUALITY OF EXPERIENCE: AN ANTIDOTE TO REIFICATION?

That inner dimension of reality is occupied by the activities that keep it going ...

—William James (1909/1996, p. 250)

Owing to its analytical nature, science as an enterprise is fundamentally engaged in generating concepts; but, as James (1909/1996) noted, concepts typically are discrete and static. Even when their referent is a dynamic process, concepts tend to freeze moments of that process into discrete entities. The voices of developmentalists in biology and psychology have long represented an important countercurrent to this tendency, but their perspective continues to be overshadowed by psychology's essentialist inclinations.

Ecological psychologists have been among the few, other than developmentalists, who have tried to bring the dynamic quality of experience more to the center of experimental inquiry. One could argue, however, that even here the dynamic character of experience has not been embraced as fully as it might. Keeping the dynamic nature of experience continually in focus, both as an intrinsic quality of perceiving and as a background for analytical work, will prove to be valuable to the ecological program in at least two respects: First, as mentioned earlier, it will be a useful antidote to incipient inclinations to reify phenomena. Second, it will help ecological psychologists make headway on some of the conceptual challenges presented by affordances.

The natural world at all levels of organization and time scales—including the terrestrial midrange, where psychological phenomena reside—is marked by change. How should we begin to think about the dynamic nature of the *psychological domain* and its primary features? Let us return once more to the writings of William James.

Continuity of Perceptual Experience

James (1890/1981) was justly celebrated for calling attention to the dynamic quality of immediate, first-person experience. He argued, for example, that by isolating the “concept” of sensation (in the case of perception) and other elementaristic notions such as ideas (in the case of thought), and viewing them as constituents of experience, theorists had overlooked the essential flow of immediate experience. James colorfully discussed this omission as follows:

The traditional psychology talks like one who should say a river consists of nothing but pailsful, spoonsful, quartpotsful, barrelsful, and other moulded forms of water. Even were the pails and the pots all actually standing in the stream, still between them the free water would continue to flow. It is just this free water of consciousness that psychologists resolutely overlook. (p. 255)

The dynamic character of experience, which was crucial for James, as it is for Gibson, needs to be borne in mind as we engage in our conceptual analysis of the grounds for perceiving.

Perceptual experience has a dynamic quality for several reasons. Two of those reasons include the following: First, the features of natural world are themselves changing, although only the midrange changes occur at a time scale that is immediately perceivable to humans (J. J. Gibson, 1979, chap. 1). Second, perceptual systems are fundamentally action systems, with actions of the perceiver adding apparent change into already event-filled stimulus array (J. J. Gibson, 1966).

As Gibson long argued, when the dynamic nature of perceptual experience is fully embraced and, accordingly, when event perception is recognized as fundamental (Warren & Shaw, 1985), the traditional take on perceiving as an epistemologically dumb process, necessarily in need of supplementation by extraperceptual factors, must be reevaluated. Potentially informative stimulus structures that specify environmental features become available over time to a perceiver in the context of an event. This perspective has several significant epistemological implications, including the following: If lawful structures of perceptual information can be shown experimentally to be available over time, then the scope of perceiving as an effective epistemological process likewise can be viewed as temporally extended, opening the possibility for locating meaningful experiences squarely in the domain of the immediate perceptual flow.

To illustrate this point, take the case of causal relations. In the 18th century, Hume (1748/1955) famously argued that analysis of a cause–effect sequence in sensory experience reveals only a succession of discrete events. In the standard example, Object A collides with Object B, producing a change in the position of B. *Analytically*—that is, on reflection—there is the movement of A, followed by the movement of B. However, the causal relation as such is not present in sensory experience. The consequences of this analysis were momentous historically for epistemology because it meant that an essential structural relation of the natural world—causality—did not turn out to be perceivable at all! From that conclusion “cause” either becomes a belief that we have about the world or an a priori quality of our perceiving the world, either way effectively removing causality from the world and instead locating it in the perceiver.

In the 20th century, Michotte (1954/1991) challenged Hume’s analysis, because he felt that it was inconsistent with phenomenological experience, and he set out to examine the matter experimentally (see Thinès, Costall, & Butterworth, 1991). Michotte wrote:

On the basis of incidental observations, I had long been convinced that we can perceive the “actions” performed by objects or animate beings on one another in the same way as we can see simple movements. However, since I wanted to provide confirmation of this claim and subject it to critical examination, I attempted to find a means of experimental proof. (p. 40)

In his groundbreaking experimental work, which is quite familiar to ecological psychologists, Michotte (1963) found that the appearance of causal relations among a sequence of events holds within fairly well-defined spatio-temporal limits in perceptual experience. Again consider the standard example of one object making contact with a second, followed by the second object moving along a particular trajectory. Among the variables that Michotte systematically varied was the duration of contact; he found that, *within a certain range of contact duration*, the first object was perceived by observers as causing the second to move. However, when the first object remained in contact with the second object beyond some specifiable duration—that is, before the movement of the second object began—“the causal impression disappears, and is replaced by an impression of successive movements of two objects ... which is very loosely integrated” (Michotte, 1963, p. 92).

Furthermore, Michotte (1963) found that particular spatio-temporal relations produced perceptibly distinguishable *types* of causal effects. For example, under one set of specifiable relations, when an object “makes contact” with another, and then ceases moving just as the second object begins to move along the same prior trajectory, observers report that the first object “launched” the second. However, when the first object even after contact continues to move along the trajectory with the now-moving second object, observers report a pushing or a chasing (“entraining”) rather than a launching effect.

What is the upshot of these kinds of findings? The fact that observations of participants correspond lawfully to specifiable stimulus parameters that can be systematically manipulated bears out Michotte’s impression, and presumably that of “naïve experience,” that we indeed perceive objects and animals as acting on other things. Hume took every instance of successive events as disjointed experience, because he was operating at a level of abstraction that did not give sufficient attention to the phenomenology of causality. In short, careful observation followed by experimental analysis demonstrated that causal relations are immediately perceivable, thereby precluding the problematic theoretical step into the Humean skepticism or its epistemologically unfortunate, mentalistic alternatives.

Feelings of Tendency

As significant as Michotte’s (1963) work is, it only scratched the surface of the phenomenology of event perception. In part, this is because the event Michotte

studied is limited as an exemplar of an event. This point will be clearer after I consider the phenomenology of event perception more fully.

Certain aspects of James's (1890/1981) analysis of the stream of thought in *The Principles* are a foreshadowing of what would later become a central thesis of his radical empiricist philosophy.⁵ What is radical about radical empiricism is the claim that immediate perceptual experience consists not only of objects or entities but also their relations. "Radical empiricism takes conjunctive relations at their face value, holding them to be as real as the terms united by them" (James, 1912/1976, p. 107). This claim opposes the traditional empiricist views that have experience chopped up into discrete, bounded bits. The latter view would necessitate that relations among objects be imposed on immediate experience by, for example, mental acts. James's claim that relations among objects are features of perceptual experience, then, stands in contrast to Hume's (1748/1955) analysis, and it receives some experimental support from Michotte's (1963) research considered earlier.

In addition to objects and their relations, James (1890/1981) identified other qualities of immediate experience that "are just as important and *just as cognitive* [italics added]" (pp. 240–241) as relations. These additional qualities he called *feelings of tendency*, a term that refers to the "permanent consciousness of whither our thought is going. It is a feeling like any other, a feeling of what thoughts are next to arise, before they have arisen" (James, 1890/1981, p. 247). These qualities are indistinct, being "nothing but *signs of direction* in thought, of which direction we nevertheless have an acutely discriminative sense, though no definite sensorial image plays any part in it whatsoever" (James, 1890/1981, p. 244). Whereas relations provide continuity and coherence within the stream of thought, feelings of tendency are indicative of the continuity and future orientation of immediate experience.

By identifying feelings of tendency as a ubiquitous quality of conscious experience, James (1890/1981) sought "the re-instatement of the vague to its proper place in our mental life" (p. 246). The term *vague* is an interesting choice of words to describe this quality. It suggests that what is to be experienced next in the stream of experience can be but dimly made out, that it is not quite yet in focus. However, feelings of tendency are not a sign of uncertainty and are even less a prelude to the unknown. Feelings of tendency suggest the anticipation of particular possibilities, albeit still indistinct ones, to come. By identifying these qualities in perceptual experience, James called attention to the fact that perceptual experience has a measure of prospective open-endedness, which is characterized by a penumbra or "fringe" connecting the "up to now" and the "yet to come." In short, immediate experience consists of objects and their relations, as well as a suggestion of what possibilities may follow, although the latter remain as yet unrealized.

I will now try to sharpen this analysis a bit more. First, the open-endedness of prospective awareness is not unlimited, because it operates within constraints. In part,

⁵I have shown in previous work the ways this philosophical position deeply influenced the development of Gibson's thinking (Heft, 2001).

the possibilities of what comes next in the flow of experience is systematically constrained by what preceded it, including the individual's history and potential for action. Second, anticipated possibilities are only to be realized in further activities of the individual. There is a suggestion of possibilities, rather than inevitabilities, at the leading edge of awareness; what is realized comes about, in part, through further action. Carr (1986) put the point quite well: "In the midst of an action the future is not something expected or prefigured in the present, not something which is simply to come; it is something to be brought about by the action in which I am engaged" (p. 36).

James intended this dynamic view of the experienced world to serve as an alternative to the prevailing views of his day of either a world that is a static, timeless place (as held by the Idealists), or a place of permanent, fixed laws that run off in clockwork fashion and govern change immutably (as held by the determinists). For James, these last two positions simply do not square with a naturalistic view of the world. Rather, orderly change and open-endedness are essential qualities of the natural world, as is the possibility of *novelty*—all of which are evidenced in such diverse natural processes as species evolution and the passage of thought. The natural world is a domain of possibilities, and with regard to psychological phenomena, in particular, individuals participate in the realization of some of these possibilities.

The experience of a horizon of possibilities as an intrinsic quality of perceptual experience reflects the *prospectivity of perceiving*. Perceiving is forward looking, extending ahead in time (E. J. Gibson, 1994). To use a term no longer in fashion, perceiving has *protensity* (Boring, 1933/1963). As mentioned earlier, the prospectivity of perceiving is not merely a matter of reflexively following a particular determinate event over time, such as visually tracking an object along some trajectory. Because of its intentional character, perceiving is *not* adequately conceptualized in this manner as awareness being passively pulled along by a sequence of information. Instead, a more adequate view is that of an agent engaging in actions for the purpose of revealing information that is available and, *reciprocally*, those actions being guided by the temporal structure that has been as yet revealed. That is, prospectivity is tied up in the reciprocity of psychological processes and environmental events considered as two facets of a perceiver–environment dynamic system.

M. R. Jones has made important contributions to the investigation of prospective perceiving, looking specifically at what she calls *dynamic attending*. At times, she describes dynamic attending as an *entrainment* of perceiving to environmental events over time (e.g., Jones & Boltz, 1989). This term is helpful as far as it goes but somewhat limited owing to its passive connotation. For, as Jones has shown, dynamic attending has an anticipatory character of staying in touch with the world rather than a reactive process of being drawn along by events (Jones & Boltz, 1989; Jones, Moynihan, MacKenzie, & Puente, 2002; Large & Jones, 1999). However, saying that attending is anticipatory does not make it out to be a process of a mind detached from a world of dynamic events. Jones (2001) added that "anticipatory attending can also be stimulus-driven ... because it is responsive to patterns of

stimulus onsets and stimulus sequence” (p. 209). In short, dynamic attending reflects the continuing reciprocity of a perceiver–environment system.

One might raise the objection, however, that the attribution of prospective possibilities in perceiving leads away from precisely the kind of account the ecological approach posits. For does not the claim that there is an awareness of possibilities rather than certainties at the prospective edge of perceiving clash with the lawfulness of event perception that much ecological research has demonstrated?

This is not the case because to oppose possibility and lawfulness is to set up a false opposition. James (1909/1996), for one, cautioned his readers not to take his comments that “the universe is loosely connected” to mean that experience is shot through with uncertainty:

If chance is spoken of as an ingredient of the universe, [critics] interpret it to mean that double sevens are as likely to be thrown out of a dice box as double sixes are ... [which is a supposition] that no indeterminist ever sees real reason to make. (p. 77)

The claim that there is some open-endedness at the prospective edge of perceptual experience does not negate the presence of varying degrees of constraints converging from several sources at this prospective edge and collectively accounting for the lawfulness of events. In addition, the presence of possibilities, instead of certainties, admits the individual’s contribution to the realization of some natural events.

Before bringing the discussion back to affordances, let me anticipate a similar objection to the prior discussion. If the prospective edge of perceiving is marked by varying degrees of possibility, is one not then committed to the claim that individuals necessarily rely on probabilistically based inferences to guide their perceiving–acting? Stated in another way, does not prospective possibility necessarily lead one away from a direct realist account of perceiving and toward the very kind of account, like probabilistic functionalism (see Hammond & Stewart, 2001), which J. J. Gibson (1957) rejected?

It is one thing to say that probability statements can serve as useful and even accurate *conceptual* devices for describing *outcomes* of perceiving and acting. However, it is quite another to characterize perceiving and acting as *intrinsically* probabilistic in nature, as if individuals perceive, act, and think on the basis of a calculation of probabilities. To return to my earlier discussion of the psychologist’s fallacy, characterizing psychological processes themselves as probabilistic may be substituting a secondhand account of these processes (i.e., “the psychologist’s standpoint”) for the processes themselves taken prior to abstraction. In other words, to view perceiving as a process that in a reasonlike fashion estimates probabilistic relations is to *intellectualize the processes* under consideration. As long as there is detectable regularity in the flow of stimulus information to guide action reliably—and there is considerable evidence in the ecological literature that this is so—then direct perception remains a theoretically viable account even with some

measure of indetermination. As Turvey and Carello (1995) pointed out: “Of importance, there is no requirement in Gibson’s perspective that a structured array be fully specific to its source: Structured arrays can only be as specific to their sources as the laws of physics allow” (p. 483).

Recognizing the presence of feelings of tendency or of possibilities at the leading edge of awareness does not contradict direct realism; rather, it admits that the perceiver can “look ahead” to varying extents anticipating possibilities. The degree to which the forward edge of awareness extends prospectively into the future is likely to vary more or less with the constraints that the “up to now” impose on the “what comes next,” and the “up to now” is a product of ongoing, reciprocal, perceiver–environment couplings, as Jones and her colleagues have shown. In their investigations of music event perception, Jones and Boltz (1989) found that, when perceivers are presented with time structures that are highly coherent, they are able to anticipate prospective structure in a more extended fashion than if the time structures are irregular. However, the experience of a recurring structure of an event is in no way a guarantee of what is to come. But to say that is not to say that any outcome is equally likely; that is, it doesn’t mean “double sevens are as likely as double sixes.” There can be varying degrees of constraint at the prospective edge of perceiving.

Of course, noting the prospectivity of perceiving is just a piece of the more general claim that experience is continuous and ongoing. If we take continuity in some measure to be a fundamental attribute of psychological experience, then we can more readily recognize when we have before us something that has been analytically abstracted from immediate experience. That is, instances of excising discrete, discontinuous moments from the flow of perceptual experience will stand out for what they are—namely, convenient devices for thinking about aspects of the psychological domain. Bearing that in mind, we will be less likely to characterize in static terms the essential perceptual phenomena to be explained. Put more simply, embracing the continuity of experience is the best antidote to the problem of reification in the study of perceiving.

Affordances and Prospective Change

Recognizing the prospectivity of perceiving not only enriches our phenomenological description of perceptual experience, but importantly, helps us with some of the more challenging features of affordances. To explain, the notion of affordances is exceptional for several reasons. First, and most obvious, is its claim that meaning can be found in perceptual experience. Second, the perceptual meanings that affordances point to are unusual because they are far more fluid than concept meanings typically are. For example, features of the environment can possess alternative affordances at different times in the context of different encounters. However, if affordances are potentially so changeable as this latter observation indicates, then (returning to the first point) what does it mean to say that there is

something like perceptual meaning at all? Should we not expect the meaning of “things” to be more stable than that? If we bear in mind the dynamic character of immediate experience, some clarity can be achieved about these peculiarities of affordance meaning.

By now, it is widely recognized in psychology and philosophy that there is much to be gained by viewing the nature of meaning, broadly considered, more fluidly than it sometimes has been in the past. Here again, James anticipated a great deal of later work on cognition. Reflecting on the nature of word meaning in his chapter “The Stream of Thought,” James (1890/1981) reminded readers that the linguistic–temporal context within which a word is embedded contributes to its meaning. He referred to this source of meaning as *dynamic meaning*:

Each word, in such a sentence, is felt not only as a word, but as having a *meaning*. The “meaning” of a word taken thus dynamically in a sentence may be quite different from its meaning when taken statically or without context. (p. 265)

These observations concerning the role of context in the experience of word meaning apply even more obviously to affordance meanings, which are context dependent by *definition*.

At a minimum, affordances are specified relative to an individual. More than that, however, affordance meaning is also typically established by a feature’s relation to a broader environmental context. This claim is most easily supported with reference to cases where the same object can have different functional meanings in different environmental contexts. Consider, for example, a chair in one’s home living room that is perceived as affording sitting on owing to its perceiver-relative properties. The same chair situated in a museum and symbolically cordoned off in an alcove typically would not have this same perceived meaning for that individual. This is because in both cases it is not simply a chair that is perceived but a chair-in-context. The setting in which the object is located is a constituent aspect of its perceived meaning; context is part of what is meaningfully perceived (Heft, 1990).

Indeed, what might be called the canonical meaning of an affordance⁶—for example, “chairs afford sitting on”—is probably also established initially in context. Specifically, what we take to be an object’s canonical affordance must certainly be based on a history of experiencing the culturally normative use(s) of an object in particular contexts. For instance, many features in a home could function as a places to sit (i.e., they are properly scaled to the body for sitting) but normatively are not used in that way, and hence they are not normally perceived as serving that function. To offer a second example, although toddlers might early on perceive forks as digging or gouging tools, over time, through varieties of socialization experiences of both an intended and an incidental nature, the canonical meaning of forks as eating implements becomes stabilized. This is not to say in each case that

⁶The term *canonical affordance* was suggested by Alan Costall.

the object could not be perceived as affording an alternative, nonnormative property. It is just that, in the typical flow of action, the object in question is not perceived as possessing that atypical functional meaning (i.e., that potential affordance property is not selected).

Once an object's canonical affordance is established, that meaning may seem to exist independently of any context. As a result, like some word meanings, affordances may be "taken statically or without context." However, affordance meaning is always specified in relation to context, although the prior context that has played a role in establishing this meaning may be only implied, being tacitly brought to present experience as part of *the individual's history* of perceptual learning and knowing. These considerations of the role of context in the experience of affordances enrich, I hope, in some measure what is meant by perceived meaning.

Furthermore, consideration of the role of context in dynamic meaning clarifies how it is possible that a feature can assume multiple affordance meanings. The multiple-affordance character of a feature can be understood in relation to the multiple functions the feature can be perceived to play in action (Heft, 1989). Thus, there is a task context for actions, and a specific functional property of a feature may be realized (i.e., selected) only under circumstances that give rise to the task. For example, when working outdoors on a windy day an object can be pressed into service as a paperweight, although that may not be its canonical function and it is rarely perceived as such.

If one keeps in mind these dynamic contextual considerations, one is unlikely to slip into thinking that an affordance is a fixed functional property of a feature. Even though the intrinsic properties of a feature (e.g., the height of a chair seat) establish what are the affordance possibilities of that feature relative to a perceiver—that is, they establish its necessary conditions—which possibility is realized in experience is bound up with contextual factors, most of which are fluid. Treating an affordance as a fixed substance, rather than as a dynamic functional relation embedded in ongoing person and environment processes, is a variation on the error of reification examined earlier. Doing so, however, is an essentialist misstep in our efforts to understand the processes of the natural world.

The Dynamic Context for Perceiving Affordances

What, then, are some of the dynamic contextual factors that participate in the act of perceiving affordances? That is, what are the dynamic influences that converge at the forward edge of awareness to constrain prospective possibilities?

Acknowledging in advance the artificiality of doing so (as well as the preliminary nature of the ensuing comments), these reciprocal influences can be divided for analytical purposes roughly into two categories.

First, there are *person-related factors*—that is, those factors an individual brings, so to speak, to an encounter—that participate in bracketing or delimiting affordance possibilities. A list of such factors would need to include the following:

- The *physical–bodily attributes* of an individual, and the continuing changes over time in these attributes that alter the individual's relation to environmental features. These attributes include body size, muscle strength, postural stability, locomotor skill, and fine motor control. Ongoing changes in attributes such as these alter over time the affordance properties of environmental features that are perceived relative to the individual (e.g., Adolph, 1997; Adolph & Avolio, 2000).

- Ongoing processes of *perceptual learning* that establish what is perceived (i.e., what information is detected), with those perceptual possibilities changing over time (E. J. Gibson, 1969; E. J. Gibson & Pick, 2000; J. J. Gibson & Gibson, 1955). For example, perceived structure can become increasingly differentiated, and more inclusive units of structure can be extracted in the course of ongoing perceptual experience.⁷ Typically concurrent with perceptual learning is improvement in *motor skills* that allow for exploitation of a wider range of affordances possibilities over time (e.g., Steenbergen, van der Kamp, Smitsman, & Carson, 1997; van Leeuwen, Smitsman, & van Leeuwen, 1994).

- Shifts in the *intentionality* of ongoing perceiving–acting. The perceived affordance of an object can change in immediate experience as the goal of intentional action changes (Heft, 1989). Perceiving a spoon or fork as a digging tool when the need for such an implement arises illustrates this point. The classic studies of *functional fixedness* (e.g., Luchins, 1942) are also pertinent here, although inversely so. In this work, the canonical functional properties of objects, presumably based on prior normative uses, were shown to interfere with flexible problem solving, which in these cases required perceiving new functional (relational) properties of familiar objects. That is, well-established intentional relations to an object constrained the way individuals perceived affordance possibilities.

I hope that it goes without saying that to speak of phenomenal change of a feature's affordance in the context of intentional action is *not* to suggest that different meanings can be imposed on objects apart from their intrinsic, structural characteristics. Particular functional possibilities of the object are detected, and hence realized, in relation to intentional acts of perceiving. With a change in the goal of action, there can be shift in which functional property of a feature is realized (i.e., selected) in perceiving–acting. However, this is not a matter of imposing a function on a feature; rather, it is one of revealing that potential function in the context of action.

⁷Recently, Runeson, Juslin, and Olsson (2000) reported change of a different sort with training; namely, the processes used by individuals in making judgments about perceptual events can change over time. They reported that individuals tended to shift from an inferential mode of knowing to a direct-perceptual mode with experience, and this shift presumably reflects discovery of stimulus information (i.e., perceptual learning) relevant to the task at hand. Although this research does not examine affordances per se, it parallels Heft (1993), where it was reported that performance on an affordance task can shift when a task is engaged in a reflective manner or with a minimum of reflection, with performance relatively less precise in the former case. Needless to say, this process distinction aligns with James's concept–percept distinction, respectively.

Second, there are several environment-related processes that establish the affordances potentially available to be perceived at a particular time. Consequently, environmental processes, considered at different time scales, can constrain the range of potential affordances that are available for an individual. A list of such sources of constraint would include the following:

- The *immediate environmental context* in which a feature is perceived, as we have seen, is a factor constitutive of its meaning, and a feature's environmental context is not necessarily fixed. A specific feature can be found in different contexts, and in each case it may have perceptibly different functional meanings. Sometimes the alternative contexts in question can be somewhat local, as in the case of a gavel sitting on a table and the gavel in the same room but on display; or an eating utensil in a tray of others, or the same utensil at someone else's place setting. Sometimes, the differing contexts can vary more globally, as in the cases of a chair in a living room versus the chair on display in a museum; or a pen displayed on a store counter and that same pen laying on someone else's desk.

Global context changes can also occur without a change in geographical locale. To explain, Barker (1968) argued that the meaning of a setting ("what kind of setting it is") is a property of the collective pattern of action by individuals in conjunction with nonsocial features of that place (*milieu*). As such, the same locale can take on quite different functional meanings at different times—*place* meaning changes as the pattern of collective action changes. For example, a school gymnasium can be used for an athletic event on some occasions and for a school fair on others. Each of these collective patterns of action and milieu are distinct behavior settings (Barker, 1968; Schoggen, 1989). And in each of these different behavior settings the same objects can be perceived as having different functional meanings. To return to the previous example, the basketball hoops and backboards in the gymnasium are perceived as a target for jump shots in the one case and as supports on which to hang decorations in the other. Thus, accompanying the change of the overall functional meaning of a place can be a shift in the meaning of some of its constituent affordances.

As already mentioned, early experiences of encountering some object repeatedly in the same context may result in viewing it as having a fixed affordance, existing independently of *any* context. It is common, though, for one to discover with time that, under different circumstances, the familiar use of the object may not be socially sanctioned. No doubt a particular challenge for anyone somewhat new to a culture, such as a child, is to discover that context indeed matters and, hence, to identify when and how it matters with regard to particular affordance possibilities. Such achievements require sensitivity to object–context relations.

- Changes in affordance possibilities that accompany *sociocultural processes*, with such changes sometimes occurring over a very broad time frame and with widespread effects. From the perspective of sociocultural change, new entities with novel affordances are introduced into the culture, new affordances of famil-

iar objects are realized, familiar affordances are sustained over time through continued use, and affordances fade from the scene through disuse. In other words, if we take the long view offered by a sociocultural perspective, and recognize that the environments in which we live are mostly constructed and sustained through human activities (Vogel, 1996), affordances can be seen as embedded in ongoing collective social activities. The products of collective processes over time constitute the context for subsequent human actions, and so on in a continuous manner. In this way, some of the affordance possibilities that exist at any particular time reflect earlier sociohistorical actions and choices, and they serve as a platform for future endeavors.

In addition to whatever changes were *intended* with the introduction of new affordances and intended disuse of others, there are inevitably *unintended* consequences owing to the complex interdependencies that are present in the environment. Sometimes these unintended effects result in the irretrievable loss of valued knowledge and skills, and sometimes they present us and other animals with challenges that threaten our well-being. Occasionally, new positive prospects are presented to us in an unintended manner as well, and opportunistic use of them can take us in unexpected and delightful directions. Each of these scenarios again points out that there is a margin of open-endedness in prospective change.

The purpose of the preceding discussion was to abstract some of the background factors that converge at the forward edge of perceptual awareness, contributing to the range of affordance possibilities for an individual at a particular time. It is at the reciprocal convergence of several streams of dynamic processes, some related to the individual's history and some related to the history of the environment, wherein the possibilities for a particular person–environment encounter occurs. Bearing in mind that affordances are embedded in a confluence of ongoing dynamic processes such as these should function as a countervailing influence against a tendency to view affordances as fixed properties of the environment.

CONCLUSION

The radical revision of psychology envisioned by Gibson included the view that primary in our perceptual experience is a world of meaningful objects and events, a world of perceived values. The conceptual apparatus, such as ecological optics, that he developed to explain how such experience is possible, is a major contribution of ecological psychology—perhaps *the* major contribution. However, it is critical that the explanatory framework of ecological psychology not be confused with the phenomena to be explained; that is, it is vital to hold fast to James's seminal distinction between percepts and concepts. If we do not do so—that is, if the concepts of ecological optics become reified in our thinking—then a sufficiently rich ac-

count of perceptual experience may be undercut by the inherent limitations of our concepts.

If we follow the same path taken by many other specialty areas in psychology's recent past, then as the intellectual products of our research become more and more formalized with the growing sophistication of the program, we may be less inclined to free ourselves from them if and when we should. But we must bear in mind that these critical features of our deepening understanding will always remain abstractions from the phenomena of human experience. To the extent that we take concepts for percepts, to that same extent the vision of the psychological environment we have to offer, in its own fashion, may be only slightly less sterile and remote from everyday human experience than the physicalistic view we hope to replace.

One way to minimize this possibility is to be ever mindful that the domain of perceptual experience—that is, the domain of percepts—is a dynamic one, with its possibilities continually being realized over time. In this regard, the considerable intellectual contribution of the affordance concept to the study of perceiving can be amplified with due recognition that these meaningful qualities of immediate experience are embedded in the dynamic flow of perceiver–environment processes. For the purpose of analytical investigations, affordances must be lifted out of this ongoing flow for closer scrutiny, but this analytical step should not mislead us to think that perceiving an affordance is a fixed terminus or end point of perception–action processes (Dewey, 1896).

The affordances that are available to be perceived by an individual over time reflect an interweaving of reciprocal, continuing, historical processes. Perception–action systems are facets of ongoing intentional actions embedded in learning and developmental processes; and, as a result, affordance possibilities are delimited relative to the perceiver's history. Concurrently, the affordances that are available to be perceived are features of a world that is in the process of continuous change, with most of these changes being the products of human actions. In the midst of these ever-weaving strands, some affordances come into existence in time, others are preserved or transformed, and still others fade at the prospective edge of immediate experience.

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