

Cognition, Fringe Consciousness, and the Legacy of William James

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In the West, from the time of the Greeks until the mid-seventeenth century, virtually all human cognitive activity was presumed to be conscious. This view shifted during the Enlightenment as various philosopher-scientists began to see that cognition rested on non-conscious processes. Kant gave the most influential, but highly abstract, expression of this insight, and it was soon reinterpreted in biological terms by Schopenhauer. By the 1870s, Helmholtz had achieved a fully modern view of human cognition: It is a product of the nervous system; only a small part of neural activity is involved with consciousness, and nonconscious neural processes alone are capable of executing what in today's terms we would call complex information processing.

This new understanding of cognition – as an interplay of conscious and nonconscious domains – spawned a massive research program. From the mid-nineteenth to the early twentieth centuries, some of the most acute scientific minds in history examined our phenomenology for clues about its neural substrate. We know in retrospect that this method worked quite well; its most sustained success was probably in the investigation of the physiology of vision. Mach discovered lateral inhibition by noting the purely subjective experience of intensity variations in the objectively homogeneous stripes now called Mach Bands in his honor. Helmholtz based his theory of tri-chromatic receptors on phenomenological evidence. Working back from even more subjective, introspective facts about color experience (e.g., most colors seem to be mixtures but a few, such as yellow and red, do not), Hering discovered opponent process cells.

William James's treatment of consciousness grew directly from this tradition. James, too, held that consciousness was infused by neural activity which careful introspection could detect. However, James's chief interest was in examining the character of conscious experience per se, and understanding the brain was for James a means to this end. And we know that the late nineteenth-century view of the brain he adopted is broadly correct. At the neural level it is wildly dynamic, with many localized processes of changing intensities interacting with one another in a flux of relationships.

This dynamic view of the brain helped guide James's phenomenology. James saw that on close inspection consciousness did not contain a series of discrete or recurring objects (as, say, Locke and Hume assumed), but rather a continuous process of shifting events, sometimes more concentrated, sometimes more diffuse. And just as brain activity is pervaded by a spray of changing relationships, so consciousness is pervaded by a spray of

changing relational experiences. This is the most radical aspect of James's phenomenology, and it is still often overlooked. Relational experiences, or what he also called the "fringe" of consciousness, are as basic and variegated as are sensory experiences. On James's account, most of the cognitive content in consciousness is constituted by feelings of relation – from our sense of a specific meaning to our general recognition of rationality and of temporal integration.

James's work, especially his *Principles of Psychology* (1890), attracted immediate attention. Thinkers otherwise as different as Edmund Husserl (whose notion of the "horizon" came directly from James) and Bertrand Russell were much in his debt. But within a few years of James's death, behaviorism seized power in the English-speaking world. For more than half a century, introspection was proscribed as "unscientific." James's star rose again with the cognitive revolution as the explicit study of consciousness gradually returned, and today James is probably the single most cited person in the cognitive literature on consciousness. But decades of unopposed behaviorist propaganda have had their effect. Even now most researchers take introspection to be a dubious research technique.

The strongest argument for introspection "in principle" is that it has worked in fact. Without question introspective evidence is *sometimes* solid and scientifically fruitful. We need look no further than to Helmholtz, Mach, and Hering to establish this point, or to the completely subjective Gestalt principles of perceptual organization, or to the James-inspired work on the feeling-of-knowing and metacognition to be considered later.

So the standard behaviorist objection to introspection rests on a non-sequitur. While agreement about a given introspective claim may not always be possible, it hardly follows that agreement is never possible. Certainly we cannot assume that introspection will decisively answer every question put to it. The trick in using introspection is to investigate experiences that *do* yield reliable and useful findings, even though in most cases this can only be decided after the fact. But limitations of this sort are hardly unique to introspection. They apply to most research techniques in science. Experiments often fail, pilot experiments especially. And even when an experiment is successful in the narrow sense, it can lead nowhere. But does anyone think this means that the experimental *method* is dubious?

James's legacy is rich, in part because his phenomenology is so solid and, as it turns out, so useful, for example in forming a foundation for later cognitive research on attention, and the relation of consciousness to memory. Unfortunately the lingering prejudice against introspection has kept most of James's heirs from taking full advantage of their inheritance. In this chapter we will look at just one topic raised by James's work, namely, feelings of relation or fringe consciousness, by considering (1) James's own account of fringe phenomenology and its cognitive functions, (2) various lines of subsequent research which support James's analysis and are unified by it, and (3) implications of the fringe not considered by James.

The third point touches on some of the most perplexing questions in consciousness research. In science the description of a phenomenon ideally leads to its explanation. But many doubt this paradigm can be applied to our phenomenology. How can we explain, say, why a given pattern of nerve firings is experienced as red and not green? As we will see, fringe experience has no distinct sensory content and actively eludes our attentive grasp, and yet these and other aspects of its phenomenology *do* seem accessible to scientific modes of explanation, chiefly functional analysis and a conservation principle. Another and longer-standing puzzle concerns the causal efficacy of consciousness. At

least from the time of Thomas Huxley, a school of thinking has held that consciousness in fact does nothing at all. Here, too, fringe experience may shed new light on a classic problem, since the functional analysis of the fringe strongly (but not conclusively) implies that consciousness does indeed play an active role in human cognition. In any case the fringe helps clarify mechanisms of conscious/nonconscious interpenetration if not their interaction.

The fringe, then, appears to be involved with a wide range of cognitive activity in consciousness. Its analysis may yield a unifying theory of considerable power.

James's Cognitive Phenomenology

James's usefulness stems not only from the general agreement his introspective findings command and the degree to which they mesh with later research, but also from the literary skill with which they are evoked, and their relative lack of theoretical preconceptions. The one commitment James brought to his phenomenology was a special interest in its dynamics, reflecting his view of brain activity.

The fringe: elusive, but at the heart of consciousness and cognition

The contents of consciousness fall into two broad categories on James's account: experiences that can be held and inspected in attention, and experiences that cannot. The former have distinct sensory content. But the latter do not; they are "feelings of relation" and they generally resist our attentive grasp. For if we try to attend to feelings of relation directly, this "is really annihilating them." They are immediately overlaid by a sensory experience of some sort, and the sensory component has such "vigor and stability" that it "eclipses and swallows up [feelings of relation] in its glare" (James 1890, p. 243).

James insists that feelings of relation perform absolutely fundamental cognitive functions. They make up the connective tissue which binds the relatively clear contents of consciousness together into larger wholes, and thereby constitute, among other things, our sense of temporality, continuity, meaning, and context:

The definite images of traditional psychology form but the very smallest part of our minds as they actually live. The traditional psychologist talks like one who should say a river . . . consists of molded forms of water. Even were . . . pails and pots all standing in the stream, still between them the free water would continue to flow. Every definite image in the mind is steeped and dyed in the free water that flows around it. With it goes the sense of its relations, near and remote, the dying echo of whence it came to us, the drawing sense of whither it is to lead. The significance, the value, of the image is all in this halo or penumbra that surrounds and escorts it, – or rather that is fused into one with it and has become bone of its bone and flesh of its flesh. (ibid., p. 255)

James's use of converging metaphors here is typical. They all aim to evoke the enveloping and penetrating character of feelings of relation in quasi-poetic terms. Feelings of relation are likened to water flowing around and into rigid containers, to dye impregnating cloth, to a peripheral diaphanous glow, and, more obliquely, to sexual union via the language of a wedding ceremony. James also used a number of less poetic terms to suggest the

phenomenological character of these feelings, including “vague,” “transitive,” “indefinite,” and “fringe” experiences. James gave the relatively stable aspect of consciousness many names too, among them “definite sensorial images,” “substantive experience,” and “the nucleus.” For better or worse, subsequent scholarship has tended to settle on the “fringe” as the covering term for feelings of relation, and since Mangan (1993a), “nucleus” has been used increasingly to refer to the definite, sensory-dominated aspect of experience on which we *can* focus attention.

The nucleus/fringe formulation helps us cut through some of the thicket of terms in James’s cognitive phenomenology, but it is crucial not to take the peripheral implication of the term “fringe” too strictly. Again, feelings of relation infuse nuclei as well as surround them. The nucleus is a relatively stable “sensorial” experience, able to “be held by the mind for an indefinite time, and contemplated without changing” (ibid., p. 243). On occasion, feelings of relation can become the dominant component of consciousness, but this is usually just for brief moments during the transition from one nucleus to the next.

Broadly speaking, the most inclusive function of the fringe is to represent a mass of germane relational information – i.e., context information – about a given nucleus. And this is the basis of cognition in consciousness, albeit obscurely: “Knowledge about a thing is knowledge of its relations . . . Of most of its relations we are only aware in the penumbral nascent way of a ‘fringe’ of inarticulate affinities” (ibid., p. 259).

How, then, is James able to establish the existence of these fringe feelings when they are so easily overpowered by the sensory component of the nucleus? James’s technique is often indirect, relying on memory. His genius is evident in his examples; they are rich with implications and at the same time are so commonplace that they command virtually universal assent. For example, James may ask us to recall the moment of transition between one nucleus and the next, when the power of nuclei to obscure the fringe is relatively weak. We discover “psychic transitions, always on the wing, so to speak, and not to be glimpsed except in flight. Their function is to lead from one set of images to another” (ibid., p. 253). Consider the first glimmer of forming an intention:

Has the reader never asked himself what kind of mental fact is his intention of saying a thing before he has said it? It is an . . . absolutely distinct state of consciousness . . . and yet how much of it consists of definite sensorial images, either of words or of things? Hardly anything! Linger, and the words and things come into the mind; the anticipatory intention, the divination is no more. But as the words that replace it arrive, it welcomes them successively and calls them right if they agree with it, and wrong if they do not. It has therefore a nature of its own of the most positive sort, and yet what can we say about it without using words that belong to the latter mental facts that replace it? (ibid., p. 253)

A great deal is packed into this passage. It illustrates James’s general contention that the fringe, per se, lacks sensory content, and also that consciousness involves a series of pulses during which the fringe is briefly dominant before the nucleus regains its full force. This can be likened to a series of Gestalt figure/ground shifts, with fringe and nucleus oscillating in relative salience. When the “definite sensorial images” of the nucleus do arrive, fringe experiences still envelop them – in this case James notes the feelings of “right” and “wrong,” the experiential polarity on which all conscious evaluation is based. James also notes a further reason the fringe is so easy to overlook. Almost of necessity we designate fringe experiences in terms of the nuclei to which they lead.

Imminence, continuity and the stream of consciousness

This brings us to what is arguably the most remarkable feature of the fringe – its power to imply or suggest, at a given moment, the presence of detailed information that is not, at that moment, in consciousness.

Suppose we try to recall a forgotten name. The state of our consciousness is peculiar. There is a gap therein; but no mere gap. It is a gap that is intensely active. A sort of a wraith of the name is in it, beckoning us in a given direction, making us at moments tingle with the sense of closeness, and then letting us sink back without the longed-for term. If the wrong names are proposed to us, this singularly definite gap acts immediately to negate them. They do not fit into its mold. (James 1890, p. 251)

In the tip-of-the-tongue (TOT) phenomenon, we probably come as close as we can get, in normal cognition, to experiencing a fringe state in relative isolation for any length of time. Here the fringe is the “anticipatory intention” we have all felt when a particular word seems about to enter consciousness, but in fact does not. This feeling of imminence is then something completely distinct from the word itself. The feeling contains contextual or relational information *about* the word, presented in a radically different phenomenological mode. This includes sketchy intimations about the word’s “function, tendency and particular meaning in the sentence” (ibid., p. 244). These anticipatory fringe contents are definite in the functional sense that they defiantly distinguish right from wrong contents. But James never tires of emphasizing that phenomenology, fringe experiences are peculiarly “indefinite,” “vague,” “nascent,” “dimly perceived,” “shadowy,” “inarticulate.”

The fringe, then, has the power to evoke the dim sense of *future* contents of consciousness in a *present* content of consciousness. To feel a word on the tip of one’s tongue is just one especially striking case of this capacity. In general “all of us have this 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” (ibid., p. 255). Sometimes this vista of the imminent future feels vast. “When very fresh, our minds carry an immense horizon with them. The present image shoots its perspective far before it, irradiating in advance the regions in which lie the thoughts unborn” (ibid., p. 256). In this way, too, we are able to experience in a summary, generalized way, the lingering spirit of huge masses of information that, strictly speaking, have long since passed: “the shadowy scheme of the ‘form’ of an opera, play, or book, which remains in our minds and on which we pass judgment when the actual thing is gone” (ibid., p. 255).

The fringe function of imminence gives consciousness its sense of flow and continuity. Our sense of time rests on the ability of the fringe to evoke, dimly, past and future in the present. The fringe, as the conscious locus of “memory and expectation, the retrospective and prospective sense of time . . . give[s] that continuity to consciousness without which it could not be called a stream” (ibid., p. 606). Discussions of James in particular and consciousness in general often make much of continuity. But from a cognitive standpoint, the continuity of consciousness is a derivative consequence of fringe operation. *Our sense of continuity has, in itself, no evident cognitive function.* The misplaced emphasis on continuity is probably one reason discussions of James so often miss the fringe and feelings of relation – in this case the relation of past and future to the present.

Related Cognitive Theory and Research

The fringe lets us integrate a wide range of empirically based findings, some of which are considered here. For a more comprehensive and web-accessible summary, see Mangan (2001).

Figure/ground and change blindness

The figure/ground relation as treated by Gestalt psychology resonates with the nucleus/fringe distinction in four ways. The ground and the fringe (1) are both phenomenologically vague, fuzzy, unobtrusive; (2) both surround a far more delineated core; (3) both extend into the core, for on the classic Gestalt account the ground seems to run under or behind the figure. Finally, (4) both the fringe and the ground mediate retrieval. James did not recognize this point, nor did the Gestalt tradition seem to either, until Irving Rock's research on "inattentive" experience, which also elaborated point (3): "In daily life . . . [when] we are not attending to a pattern at which we are looking, there is the distinct impression, nevertheless, that something is there and has certain phenomenal characteristics . . . By virtue of the iconic representation, we as observers recognize that the *potential* to transmute this impression is there" (Rock & Gutman 1981; their emphasis).

Change blindness is one offshoot of this research. Slow changes in stimuli can pass unnoticed, and then shock us when we discover the change. Why the sense of surprise? Because most of the context information we experience about a visual situation is *not, paradoxically, encoded visually, but as a non-sensory feeling* that certain visual stimuli are imminent. In change blindness, changes in the objective stimuli become increasingly dissociated from their conscious (but non-sensory) representation which is not felt to change. Finally our cognitive system rectifies this shortfall, and we are startled by how far the dissociation was able to go.

Implicit and meta-cognition, feeling-of-knowing, intuition

Running through these various technical terms is a common element. All refer to cases in which subjects are unable to identify an explicit reason for their judgments, even though they can make them with consistency, and often with conviction. To indicate this capacity people typically use terms that seem to refer to fringe experience: "gut feelings," "just knowing," "feelings-of-knowing," "hunches," "intuitions," and so on. These cases suggest a fringe/nucleus dissociation. The subject has a fringe experience that signals a relational evaluation (e.g., something is right or wrong relative to a given context), but the nucleus which in normal cognition would specify this information is absent.

The seminal study in this line of research is Hart's (1965) "Memory and the feeling-of-knowing experience," based explicitly on James's treatment of the tip-of-the-tongue phenomenon. Hart elicited TOTs by using such questions as "Who was the Union general at the battle of Gettysburg?" When a subject had a TOT, he or she was asked to rate their degree of "feeling-of-knowing." The greater the rating, the more likely the subject was able to correctly identify the missing word.

In artificial grammar experiments, subjects distinguish strings of letters generated by various arrangement rules, but are virtually never able to state the rule in question explicitly. They rely instead on "gut feelings." Arthur Reber links this phenomenological capacity to traditional notions of intuition and evaluation.

[T]he individual has a sense of what is right or wrong, a sense of what is the appropriate or inappropriate response to make in a given set of circumstances, but is largely ignorant of the reasons for that mental state . . . To have a vague feeling of the goal of an extended process of thought, to “get the point” without really being able to verbalize it . . . is to have gone through an implicit learning experience. (Reber 2003, p. 625)

Edelman’s “remembered present”

Gerald Edelman’s attempt to integrate phenomenology and neurophysiology was substantially influenced by James. Probably the chief point of linkage is in Edelman’s account of our sense of “now” – James’s “saddle-back” of duration or “specious present.” He sees clearly that while our subjective sense of the passing moment is unified, the neural mechanisms which carry out this feat are extremely diverse, complex, massively parallel, and occupy many interacting loci in the brain, especially the thalamus and cortex.

Dynamic reentrant interactions in the thalamocortical system must be thought of as successive in time – new perceptual categorizations are reentrantly connected to memory systems before they themselves become part of an altered memory system. This bootstrapping between memory and perception is . . . the so-called specious present of William James. I have called this . . . “the remembered present” to point up the dynamic interaction . . . that gives rise to consciousness. (Edelman 2004)

Cognitive linguistics

To ground semantics, Leonard Talmy (2000) proposed a set of experiential gradients running from “concrete perception to abstract conception” which independently capture many aspects of fringe experience. Toward the more abstract end of the palpability gradient, for example, “an entity is experienced as being abstract, unmanifest, intangible, and impalpable.” In the abstract region of the clarity gradient “an entity is experienced as being vague, indistinct, indefinite, or murky.” Talmy recognizes that many feelings fundamental to our use of language have virtually no sensory component. For example, the linguistic “category of ‘modality’ with such member notions as . . . *can*, *must* and *should*, has little concrete or sensed counterpart.”

But it does not take a professor of linguistics to recognize that our feeling of meaningfulness (or what James called “dynamic meaning”; see below) is something quite distinct from a sensory experience. Many, perhaps most, children discover this before the sixth grade when they repeat a word to the point that they (and we) naturally say it has lost its meaning. Only the naked sound remains. Technically called “semantic satiation,” this phenomenon has been studied experimentally since the early years of the last century (Severance & Washburn 1907).

Modern Extensions of James’s Fringe

Science tries to move from describing phenomena to explaining them. At the descriptive level James’s treatment of consciousness is remarkably rich, but beyond linking it to the dynamics of neural activity, James has very little to say about why consciousness would have the particular phenomenological character he observed. Why is the nucleus/fringe arrangement such a basic feature of the structure of consciousness? Why can’t we make

a fringe experience *itself* a stable nucleus? Why does the attempt to do this instead bring a new nucleus into consciousness? Why is the fringe the chief repository of relational information in consciousness? Why is this information non-sensory? Why is the fringe experience of “right direction” or “rightness” so ubiquitous?

Probably the most sustained attempt to explain fringe phenomenology from a cognitive standpoint is found in my own work (Mangan 1991, 1993a, 1993b, 2001, 2003). It aims to bring a standard mode of biological explanation – functional adaptation – to the study of consciousness. Just as we can explain, say, the shape of our teeth via their ingestive functions (e.g., biting, tearing, grinding) *so we can explain some characteristics of our phenomenology via their cognitive functions.*

Why is the fringe elusive?

James constantly notes the elusive character of fringe experiences: they cannot be turned into nuclei by an act of attention. If we do try to focus on the fringe, we almost instantly find ourselves inspecting a new, sensory-dominated nucleus instead – something very different from the fringe aspect of experience we tried to isolate and attend to a moment before. “As a snowflake crystal caught in the warm hand is no longer a crystal but a drop, so, instead of catching the feeling of relation moving to its term, we find we have caught some substantive thing . . . The attempt at introspective analysis in these cases is in fact like seizing a spinning top to catch its motion” (James 1890, p. 244). In functional terms, I would argue that this points to a mechanism for voluntary retrieval in consciousness. And if so, the elusive quality of the fringe is an adaptation to facilitate retrieval.

Fringe mediated retrieval is usually so trouble-free and rapid that it passes unnoticed. But during a TOT the system malfunctions; it is frozen in mid-cycle and we have introspective access to the most obscure part of the process. We find ourselves grasping at fringe experience in relatively pure form – at a beckoning, diffuse, structured vacancy, shorn of its normal overlay of sensory experience. Our aim is not to make the fringe *itself* a stable object of attention, and in general the design of fringe phenomenology disinclines us from doing so. Our frustration during a TOT shows how deeply we presume that grasping at the fringe *is* the way to bring a substantive nucleus quickly into consciousness.

Put more abstractly, we “call” information into consciousness by attending to the fringe feelings which imply that information. The fringe is designed to deflect direct acts of attention because this allows the transformation of imminent to explicit information in consciousness. So when someone points, we do not focus on the finger but on the object it indicates. If attention did stay fixed at the finger, the finger’s pointing function would cease.

Another way to see this is to consider a partial analogy with the icons that hug the periphery of a typical computer screen. To call new information to the screen, we first identify the relevant icon, move the cursor to it, and click the mouse. The center of the screen then immediately fills with the information that a moment before was implied by the icon, but was itself off-screen. What, then, would happen if clicking on an icon enlarged and clarified the icon itself and moved *it* to the center of the screen? Of course the icon’s call function would to that extent short-circuit. The purpose of clicking on, “attending to,” an icon is not to make the icon clearer or more central, but to bring the detailed information the icon implies to the center of the screen and make that information a “nucleus.” In both cases there is every reason to design the retrieval system so that the target itself does not become an object of detailed inspection or otherwise interfere with the information it helps us retrieve.

Of course analogies are not identities. And yet one apparent dis-analogy in the fringe/icon comparison (we can focus indefinitely on an icon) suggests a deeper parallel. Relatively few pixels are allocated for the display of any given icon. Most pixels go to the central workspace. Here allocation is limited by a trade-off relationship.

Conservation trade-offs

The key constraint on consciousness is its limited capacity. This long-standing point can be reformulated phenomenologically in a way that may look like a truism, but has great explanatory power. *There is a maximum resolution or articulation capacity that consciousness does not exceed.* In other words, the amount of detail we can experience about anything at a given moment is limited. This mandates various trade-offs: When more articulation capacity is concentrated in one region of the field of consciousness, less is available elsewhere.

The figure/ground structure of perception is a straightforward example of this principle. The figure enjoys detailed articulation, while its ground is blurry and ill-defined. In reversible figures like the classic face/vase image, we experience high articulation in only one figure at a time, and low in the other, even though both figures are objectively able to bear highly articulated experience. Here the exception proves the rule. With a bit of effort people can briefly attend to both the face and vase figures at the same time. But when they do, they report that *neither* figure is as highly articulated (e.g., is as detailed, vivid, dimensional) as *either* was when experienced sequentially. Similar trade-offs occur with auditory stimuli when, say, we try to listen to two simultaneous conversations. Sensory and non-sensory experience also appear to be bound by a trade-off relationship. Without realizing its implication, James occasionally suggests that as the sensory nucleus becomes less prominent, the fringe becomes more prominent, and *visa versa*.

From this perspective fringe experiences – vague, indefinite, fuzzy, without sensory content – appear to use little articulation capacity. And yet most context information in consciousness is represented by the fringe. Why is so little articulation capacity devoted to context information? Paradoxically, this is probably because the context information relevant to a given nucleus is so vast. Even a very slight increase in articulation devoted to presenting all the relevant context information would require a very large decrease in focal capacity.

We can then explain the nucleus/fringe structure of consciousness as the result of a basic tension between two conflicting functional demands: presenting specific information and presenting its context. The articulation limit mandates trade-offs. The diminished clarity of peripheral sensory experience is an adaptation which works to minimize the load on consciousness's limited articulation capacity. The non-sensory quality of fringe experience carries this load-reduction strategy one step further.

To return to the computer screen analogy. For similar design reasons – a limited number of pixels – a standard screen must trade-off between the level of detail allocated to the central workspace and pixels allocated to peripheral displays. More pixels devoted to the focal task mean fewer for the display of peripheral information.

Finessing articulation limits

In the early years of the cognitive revolution, Mandler, following Lashly and Miller, emphasized that consciousness receives the results of very complex nonconscious processing.

Detailed cognitive work is nonconscious, some of its fruits are conscious. And probably the most difficult cognitive task of all is to correctly assemble and apply context information.

The overall function of the fringe is to finesse the limited articulation capacity of consciousness and thereby serve as an interface mechanism. Though completely conscious, the fringe stands between nonconscious and focal conscious processing, using a few wisps of experience to radically *condense* or *summarize* nonconscious information of extreme complexity. The fringe both implies the existence of this information and gives us selective access to it, binding conscious and nonconscious processes into an integrated cognitive system.

Two fringe experiences are absolutely essential to accomplish this finesse. For want of better covering terms, I call them "rightness" and "wrongness." They do not themselves "compute" anything, but signal consciousness the degree to which nonconscious processing has determined that a given nucleus does or does not fit its appropriate context. James only discussed the phenomenology of these experiences in passing. He did see their crucial role in conscious cognition, but did not consider their summarizing or interface functions.

The rightness/wrongness polarity captures the ultimate evaluative relationship in conscious cognition. At the same time it inclines us to act.

Relation . . . to our topic of interest is constantly felt in the fringe, and particularly the relation of harmony and discord, of furtherance and hindrance of the topic. When the sense of furtherance is there, we are "all right"; with the sense of hindrance we are dissatisfied and cast about for other thoughts. (James 1890, p. 259)

The cognitive application of these experiences is very wide. They constitute, for example, what James calls "dynamic meaning," our sense that something is, or is not, meaningful. "Dynamic meaning is usually reduced to the base fringe we have described of felt suitability or unfitnes to the context and conclusion" (ibid., p. 265). It "pertains to the 'fringe' of the subjective state . . . [It] is an absolutely positive sort of feeling, transforming what would otherwise be a mere noise or vision into something *understood* . . . The image per se, the nucleus, is functionally the least important part of the thought" (ibid., p. 472). Here we encounter the phenomenological bottom line of cognition. Rightness signals that whatever it infuses is correct, understood, appropriate, meaningful, coherent, to be accepted; wrongness that whatever it infuses is incorrect, misunderstood, inappropriate, meaningless, incoherent, to be rejected.

In the most inclusive functional terms, the role of consciousness is to deal with novel or unexpected information. However, consciousness withdraws, and habituation and automatization set in, when something becomes well-known, expected, mastered. In this sense the aim of conscious cognition is to deal with the *unfamiliar* – problem-solving in its broadest sense. And in general what we mean by solving a problem is finding or assembling what, for us, is missing context information. The thrust of conscious activity is to find in a new situation the *right* response, the *right* interpretation. To do this, consciousness must somehow transcend its limitations, and access information it cannot itself contain in detailed form. It is the summary fringe experience indicating right (or wrong) context fit that finessees this bottleneck, and is the datum on which all conscious evaluation rests.

It is then crucial not to confuse rightness with familiarity. Determining familiarity is a far less demanding cognitive problem, and from the standpoint of consciousness it is a far less important cognitive datum. Probably the lingering prejudice against phenomeno-

logical analysis has led to this confusion. Many experimental paradigms which officially measure “familiarity” in reality measure “rightness.” In a target search experiment, we are not looking for the most familiar target but the right target, the target specified at the beginning of the experiment. In a feeling-of-knowing paradigm, we are not trying to retrieve the most familiar name but the right name, the name that fits the context specified by the antecedent question.

Missing the familiarity/rightness distinction seriously obscures our understanding of consciousness. Familiarity means finding a passive match, while rightness takes us to the active center of conscious processing – the evaluation and use of novel information.

Causal Efficacy of Consciousness?

So far my analysis has assumed that conscious processing and feelings of volition do just what they seem to do. But this view is not without its problems. The psychologist and philosopher Max Velmans has developed what is probably the most wide-ranging case against the presumption that consciousness is causally efficacious (in the sense that it directly causes brain activity viewed from a third person perspective) drawing on experimental findings, abstract arguments, and phenomenological analysis influenced by James.

Here we touch on what is arguably the most far reaching question we can ask about consciousness in a cognitive/biological context: Does it do anything? Depending on one’s point of view, it is either ironic or telling that Huxley, “Darwin’s Bulldog,” was so emphatic about consciousness’s supposed lack of function. For Darwin’s great gift to science was his mode of functional analysis. If consciousness has no function in the standard sense, then it is incommensurate with the most powerful method of biological explanation we currently possess. Yet if consciousness does have an adaptive function (or functions), then the high road to biological understanding is open before us, and the study of consciousness can pursue Darwin’s “top-down” method of biological analysis, complementing such “bottom-up” methods as neurophysiological research.

Velmans’s critique

In a recent series of papers, Velmans (2002, 2003) considers three of these difficulties. First, consciousness occupies no discernible place in third-person science. If the brain is examined from an external perspective, all neural processing, from input to output, can be accounted for by known biophysical principles without reference to consciousness. There are no “gaps” in processing for consciousness to fill. Second, our conscious experiences typically occur “too late to causally affect the processes to which they most obviously relate” (2003). This is based on experimental findings such as Libet’s work which shows that a feeling of volition and its associated act can both be caused by the same antecedent neural event. Rather than the conscious wish causing the act, Velmans takes a feeling of volition to be an accurate representation of a *preconscious* voluntary decision. As noted by Lashley, Miller, and Mandler, this conforms to the general finding that consciousness often contains the results of cognitive processing, but not the processing details.

Velmans’s third point centers on the phenomenology of conscious control or, rather, its supposed absence. “One is not conscious of one’s own brain/body processing. So how could there be conscious control of such processing?” (Velmans 2002, p. 8). He asks us to consider

“hesitation pauses” in speech. If the causal efficacy hypothesis were right, we would expect these pauses to contain experiences “associated with the formation of ideas . . . [and] conscious planning of what to say . . . But nothing is revealed of the processes that formulate ideas, translate these into a form suitable for expression in language, search for and retrieve words from memory, or assess which words are most appropriate” (ibid., p. 9).

But we can certainly be ignorant of the details of a complex process and still have the power to initiate, influence, or control it, especially in conjunction with a little feedback, for example, driving a car, using a computer, making a baby. Higher levels of neural organization control, but do not themselves contain, the information used to execute lower level functions. And the fringe component of a hesitation pause does represent *some* information about the underlying cognitive process – as Velmans himself, on reconsideration, would seem to grant:

I agree that, *viewed from a first-person perspective*, fringe conscious experiences seem to function in the ways that Mangan describes. We have a feeling of what we want to say before we say it and in this sense the feeling provides an implicit target. We also have a sense of whether our words fit our meaning, indicating whether they are “on target” and so on . . . In sum, I agree with Mangan that the fringe of consciousness contains feelings and judgments about material at the focus of attention thereby providing context in a highly compressed form. But this does not resolve the issue of how such feelings arise or how first-person experiences could have third-person causal effects on the brain. (Velmans 2003, p. 57 – Velmans’s emphasis)

On one far-reaching point I completely agree with Velmans. If there is not enough information *in* consciousness – that is, relevant phenomenological contents – to support making volitional decisions, then consciousness cannot be a locus of volition. But the converse also applies: *If the requisite information is present in some form, then we have suggestive evidence that consciousness does indeed do what commonsense assumes.* The fringe’s radical capacity to condense context information, its apparent call function, and the feedback capacity offered by the experiences of rightness and wrongness, all seem elegantly designed to support the exercise of volition in consciousness, and so provide a new argument for it (Mangan 1991, 2001, 2003).

See also 32 *The causal efficacy of consciousness*; 40 *Preconscious processing*; 53 *Phenomenological approaches to consciousness*; 55 *An epistemology for the study of consciousness*.

Further Readings

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