

## Why the Blind Can't Lead the Blind: Dennett on the Blind Spot, Blindsight, and Sensory Qualia

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In *Consciousness Explained* Dan Dennett proposes a deflationary treatment of sensory qualia. He seeks to establish a continuity among both the neural and the conscious phenomena connected with the blind spot and with the perception of repetitive patterns on the one hand and the neural and conscious phenomena connected with blindsight on the other. He aims to analyze the conscious phenomena associated with each in terms of what the brain *ignores*. Dennett offers a thought experiment about a blindsight patient who has the sensory information that normals do, but who seems *not* to have their sensory qualia. What is it that normals know that this blindsight patient does not? Dennett's answer is "nothing." Dennett's denial of "filling-in" accounts of repetitive patterns and the blind spot constitute a Rylean intuition pump for this thought experiment. Research by Ramachandran raises important problems for Dennett's account. Moreover, Dennett's attempt to discount the significance of "artificial scotomas" inadvertently employs a principle that undermines his case for establishing the continuity between the phenomena in question. © 1993 Academic Press, Inc.

### I. INTRODUCTION

In *Consciousness Explained* Dan Dennett offers a welcome corrective to much loose talk about consciousness by dualists and materialists alike. He maintains that our conscious mental life is neither a report on a single stream of representations from a homunculus in the mind's central clearinghouse nor the registration of such representations at a comparable clearinghouse somewhere in the brain. He is as unsympathetic with materialists' versions of what he calls "the Cartesian Theater" as with those of dualists. He also thinks materialists are mistaken when they concur with dualists in the presumption that consciousness is a report on some unified stream of representations. By contrast, Dennett offers his "Multiple Drafts" account of consciousness where the phenomena in question are the result of "parallel pandemoniums" of specialized neural circuitry producing what are usually short-lived, "fragmentary drafts of 'narrative'" some of which "get promoted to further functional roles" (1991, pp. 253–254).

Surely, one of the most controversial positions Dennett adopts in the course of developing his Multiple Drafts view is what might (generously) be called his deflationary account of sensory qualia. In short, Dennett denies that sensory qualia exist, at least as some special phenomena of consciousness. (See, however, Dennett, 1991, p. 45). Although I am no friend of qualia, I will argue in this paper that Dennett's principal case for his deflationary conclusions runs afoul of some important empirical findings in perceptual psychology. The findings in question concern Ramachandran's research on the blind spot (1992; Ramachandran and

Aiken, 1992) and his and Richard Gregory's research (1991) on so-called "artificially induced scotomas."

## II. FROM THE BLIND SPOT TO BLINDSIGHT TO THE DENIAL OF SENSORY QUALIA

The blind spot in each of our eyes arises at those points on the retinas where the optic nerve connects with the axons of the retinal receptors. Under normal binocular conditions we are unaware of these blind spots, since the eyes' displacement relative to one another ensures that receptors in one eye will "cover" for the blind spot in the other. When viewing some displays monocularly, however, the blind spot's consequences are evident. Close one eye while focusing on the cross in Fig. 1 with the other. One of the spots will disappear in your open eye's blind spot when the figure is about 6 in. away from your face.

What is of interest to Dennett is the fact that we do not experience a blank in our visual field in such circumstances, but rather a pattern that is related to the surround. When we close one of our eyes while looking at the world around us, we have no sense of our blind spot, i.e., we have no sense of gaps or discontinuities in the world we see. The interesting explanatory questions concern why this is the case and by what means this continuous visual experience is achieved.

Dennett is quite specific concerning the character of neural activity connected with the blind spot. In short, he thinks there is none; more specifically, he thinks it *incorrect* to speak of the brain "*filling the blind spot in.*" Consistent with his general attraction to pandemonium models of cognitive activity, Dennett states that:

The brain doesn't have to "fill in" for the blind spot, since the region in which the blind spot falls is already labeled (e.g., "plaid" or "Marilyns" or just "*more of the same*"). . . . not getting any evidence from the blind spot region is not the same as getting contradictory evidence. The absence of confirming evidence from the blind spot region is no problem for the brain; since the brain has no precedent of getting information from that gap of the retina, it has not developed any epistemically hungry agencies demanding to be fed from that region. . . . In other words, all normally sighted people "suffer" from a tiny bit of "anosognosia." (1991, p. 355, emphasis added)

This is of a piece with Dennett's general line on conscious phenomena. He holds that ". . . the brain doesn't actually have to go to the trouble of "filling in" anything with "construction"—for no one is looking. As the Multiple Drafts model makes explicit . . . the brain just adjusts to the conclusion that is drawn . . ." (1991, p. 127). Concerning the blind spot in particular he maintains that "the fundamental flaw in the idea of "filling in" is that it suggests that the brain is providing something when in fact the brain is ignoring something" (1991, p. 356). Our consciousness of a continuous visual field in these cases is not a function of the brain's constructive activity but rather of its failure (indeed, in the

binocular case with the blind spot, of its *inability*) even to recognize that something is amiss. The brain proceeds on its default assumptions that areas of the visual field from which it has no direct information are simply more of the same—hence, Dennett’s claim that “the brain is ignoring something.” For Dennett nothing about this passive reliance on default assumptions is usefully described as “filling in.” Dennett holds that the absence of representation is not the same thing as the representation of absence, and the representation of presence is not the same thing as the presence of representation. (See, for example, Dennett, 1991, p. 359.)

On the face of it, research on the blind spot and such esoteric phenomena as artificially induced scotomas would not seem to have much bearing on accounts of sensory qualia. The reason these findings do bear is that Dennett’s central preparatory argument in defense of that position turns on establishing a continuity between the phenomena of both consciousness and brain activity connected with the blind spot and those associated with (1) the normal perception of repetitive patterns and (2) scotomas of the visual cortex (and with other pathologies of neglect).<sup>1</sup>

I turn, first, to the normal perception of repetitive patterns, which inspires Dennett’s treatment of the blind spot. When looking at a panel from Andy Warhol’s Marilyn Monroe Diptych we see rows and rows of paintings of that famous actress’s face. On Dennett’s view, we do not expend the resources necessary to identify each of the Marylins, our sense of familiarity with the details of each picture notwithstanding. Instead, our brains ignore the parafoveal regions of the visual field in such circumstances, simply labeling those regions “more Marylins.” The principle is one of presuming that the contents of the more remote regions of the visual field are, again, just “more of the same.”

According to Dennett, we are neither looking at each of the Marylins nor engaging in some active process of filling them in, so much as *ignoring* them. Ignoring them because the brain assumes, whenever there is no compelling evidence to the contrary, that the parafoveal regions of our visual fields are simply continuous with the patterns we have in focus. Dennett thinks that this is the appropriate model for explaining experiences with the blind spot. Both situations involve the brain ignoring something.

Unlike the blind spot and the perception of repetitive patterns, scotomas constitute nonnormal situations. Scotomas arising in nature (in contrast to Ramachandran and Gregory’s “artificial scotomas” discussed in section III) are of two varieties, viz., those where the scotoma arises as a function of retinal damage and those where the scotoma arises as a function of a lesion in the visual cortex. (The latter variety is the problem endured by those who possess blindsight. See Weiskrantz, 1986.)

Damage to the visual cortex can be partial (where information from some part of the visual field is absent) or complete (where, “the person is rendered com-

<sup>1</sup> Dennett also thinks that they are similar to the neural and conscious phenomena associated with the experience of temporal discontinuities during petit mal epileptic seizures, but that will not concern us here.

pletely blind'') (1991, p. 323). Victims of cortical scotomas experience *gaps* in their visual fields from which they receive no information accessible to consciousness, the normal functioning of their retinas notwithstanding. What they seem to notice, is the *absence* of information: "the subject is normally aware of the scotoma, but as a lack, not as a positive area of black . . ." (1991, p. 325). What they experience, according to Dennett, is not a black spot in their visual field, but rather a sense of loss.<sup>2</sup>

Dennett's account of these scotomas coheres with the general characterization of these and related phenomena as examples of "*neglect*." Dennett's point is that with pathologies of neglect the conscious experiences in question are, again, a function of the brain *ignoring* information, which, in the case of cortical scotomas, the retinas are still supplying.

Consequently according to Dennett, the experience of a scotoma is like some of our monocular experiences with the blind spot. "What is it like to have a scotoma? It might seem that this is already familiar to all of us, for we all have blind spots in our visual fields . . ." (1991, p. 323). Dennett's claim that "all normally sighted people 'suffer' from a tiny bit of 'anosognosia'" results from his suggestion that a principled continuity underlies these various phenomena.

Dennett's attack on sensory qualia turns largely on a thought experiment he proposes, which itself turns on some especially surprising abilities that many victims of cortical scotomas possess. At least some of these victims can "guess" with astonishing accuracy a wide range of features of stimuli that fall within that part of their visual fields about which they claim to be blind. Hence, they have been said to possess "blindsight." Even though the areas of their occipital cortex appropriate for normal visual experience have been damaged, "there are still plenty of communication channels over which the information from the perfectly normal retinas could reach other brain areas" (Dennett, 1991, p. 325). Moreover, blindsight patients seem to improve at this guessing with practice.

It is in this light that Dennett invites us to consider the possibility of an especially well-prepared blindsight patient:

Suppose we begin with a standard blindsight subject, who "guesses" whenever we cue him. . . . Feedback would soon tune this to the maximum, and if the guessing leveled off at some agreeably high rate of accuracy, this should impress the subject that he had a useful and reliable talent that might be worth exploiting. This is in fact the state that some blindsight subjects are in today.

Now suppose we start asking the subject to do without the cuing—to "guess" when to "guess" . . . . Whether or not he was conscious of these stimuli, if his "guessing" reliability was high, he could treat those stimuli on a par with any conscious experiences. (Dennett, 1991, pp. 331–332)

<sup>2</sup> Dennett's account of blindsight patients' experiences of their scotomas is not without controversy. Ramachandran comments: "having seen several patients with scotomas of cortical origin, I am not convinced that they are 'aware' of it in the sense described by Dennett. In fact they seem as unaware of the scotoma as we are of the blind spot. Apparently, there is no greater 'epistemic hunger' for signals from visual cortex than for the region corresponding to the blind spot!" (Personal communication; also see 1992, p. 91.)

Dennett then points out that at least one of Weiskrantz's subjects, DB, approximates this situation for some sorts of stimuli. So, a suitably trained victim of blindsight might gain access to all of the information about his visual field that a normally sighted person enjoys (including, for example, the ability to discriminate colors).

One point of this thought experiment is to emphasize just how much "conscious" experience can change as a result of training. After all, once a suitably trained subject has gained the facility Dennett envisions, would that subject be *conscious* of the contents of that part of the visual field for which he or she was previously blind and, specifically, could the subject be said to experience sensory qualia? Dennett does not think that the answer to the first question really matters, but he suspects that the qualiaphile's answer to the second question would be a resounding "no." But *that* is Dennett's answer as well! He then inquires, though, about what this blindsighted subject lacks that normally sighted individuals do not. By now, Dennett hopes that the line of argument he has developed will elicit the response that *nothing* differs about the two cases. Such a response, though, is tantamount to denying the existence of sensory qualia, at least to the extent that they are alleged to constitute special phenomena of consciousness.

From the standpoint of Dennett's analyses, then, various phenomena, but especially *blindsight*, should be understood as continuous with many normal monocular experiences with the *blind* spot. I shall refer to this, henceforth, as Dennett's strategy of the blind leading the blind.

### III. FILLING IN FILLING-IN

Ramachandran and Gregory (1991) have carried out a number of experiments with what they call "artificial scotomas." In addition, Ramachandran (1992; Ramachandran and Aiken, 1992) has done studies on the blind spot under monocular conditions. The critical question is what are the fates of Dennett's "no-filling-in"-line on the blind spot (and on conscious phenomena generally) and his "more of the same" or, as he sometimes says, his "more Marylins" principle that it inspires, in the face of Ramachandran and Gregory's findings?

I will argue that Ramachandran's findings on the blind spot substantially subvert Dennett's case for a continuity between experiences associated with the blind spot and those with repetitive patterns. In addition, Dennett's argument for discounting the research concerning artificially induced scotomas turns on a principle that thwarts his own claims for the continuity of the blind spot and blindsight. This defeats the intuitive appeal of Dennett's thought experiment and the argument against sensory qualia it motivates. In this section I will discuss *how* Ramachandran and Gregory's experimental results present problems for Dennett's position.

Ramachandran and Gregory (1991) have devised means for inducing in normal subjects blind-spot-like phenomena that they describe as "artificial scotomas." Ramachandran and Gregory's stimulus is a standard monitor displaying television "snow" with a fixation point at its center. Off to one side is a small, anomalous stimulus. After fixating for some seconds, subjects experience the filling in of the

anomalous square with snow continuous with the surround. Ramachandran and Gregory's hypothesis concerning their artificial scotomas (which Dennett seems to endorse) is that the neurons responsible for sustaining the information about the anomalous square become fatigued (or in some sense overwhelmed) and the activity of neurons downstream comes under the influence of their neighboring "snow reporting" neurons.

Two findings with artificial scotomas seem relevant to Dennett's views. First, in a variation on the design described above, Ramachandran and Gregory transformed the stimulus into a uniformly gray screen just *after* subjects had experienced the filling in of the anomalous square. For as long as 10 s thereafter the filled-in square of snow persisted in the subjects' visual fields as they continued to fixate on the uniformly gray screen. According to Ramachandran this finding suggests that "a set of neurons actually generates a representation of the region that was filled in with twinkling dots. Furthermore, the evidence implies that the representation can persist even after the surrounding dots have disappeared" (1992, p. 90).

Second, in some of Ramachandran and Gregory's experiments subjects experienced *gradual filling-in with dynamic features* in their artificial scotomas. In the experiments in question Ramachandran and Gregory altered the original stimulus in two ways. First, the background of the snow was a different color (pink) from that of the anomalous square (grey). Second, the anomalous square had its own pattern of black spots moving in a continuous, horizontal motion across the square like a conveyor belt. After sufficient fixation on the focal point at the center of the screen, subjects experienced the black spots in the anomalous square continuing to move horizontally across what had now become a filled-in pink background before being replaced after an *additional* 5 s or so by the snow from the surround.

Such gradual filling in of some of Ramachandran and Gregory's artificial scotomas and the persistence of filling in long after the stimulus has changed indicate that, at least, under *some* conditions, the brain *does* fill in—in just the way that Dennett denies—and that the representations in question can be quite long-lived.

I now turn to Ramachandran's findings with the blind spot itself. Ramachandran's experiments indicate that a number of factors constrain what is perceived in the blind spot during monocular viewing circumstances, including such variables as contours, perceptual salience, patterns of interruption, and more. At least three of Ramachandran's stimuli, though, generate results that seem completely contrary to Dennett's "more of the same" principle.

(1) Subjects failed to complete (some) repetitive patterns across the blind spot. With Fig. 2 (see Ramachandran, 1992, p. 88) subjects do *not* fill in the critical fingerprint (circled by me) when it falls in the blind spot.

(2) In Fig. 3 (see Ramachandran, 1992, p. 90) subjects do fill in the ring whose center falls within their blind spots—producing a solid disk *unlike* any of the other rings in the stimulus.

(3) Thick rings around a central annulus *larger* than the blind spot, in what I shall call the concentric doughnuts stimulus (see Fig. 4 [Ramachandran, personal communication]), also induced a homogeneous disk at the center.

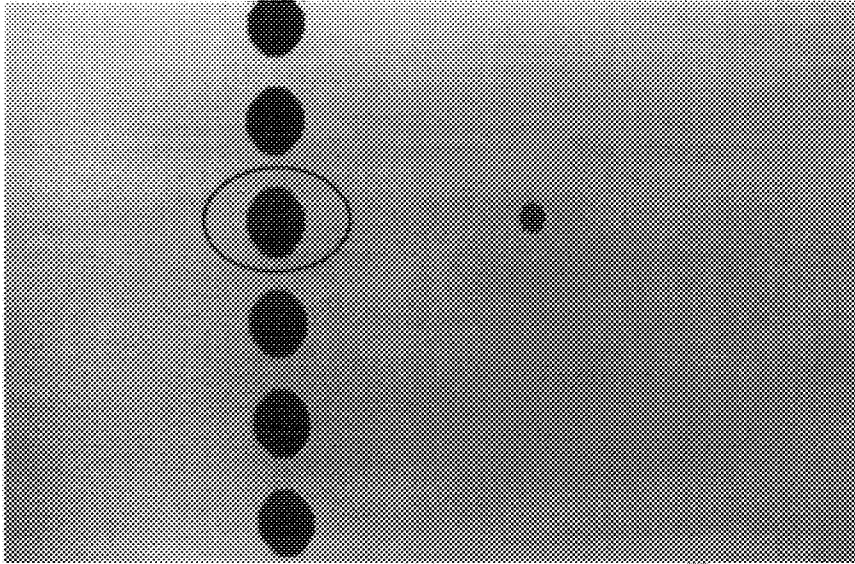


FIGURE 2.

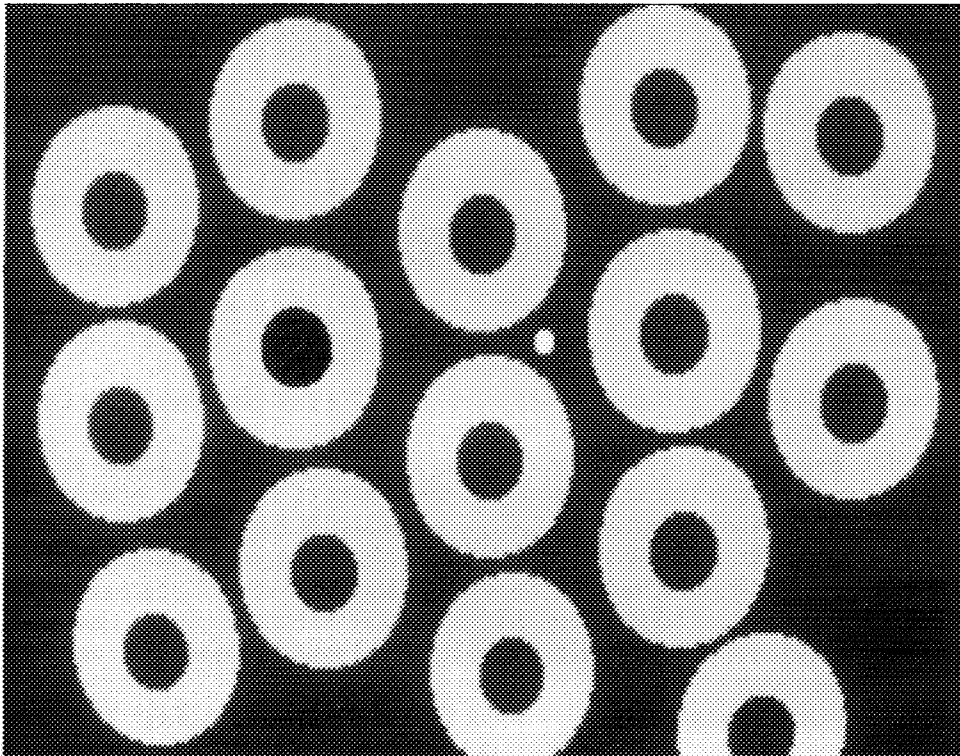


FIGURE 3.

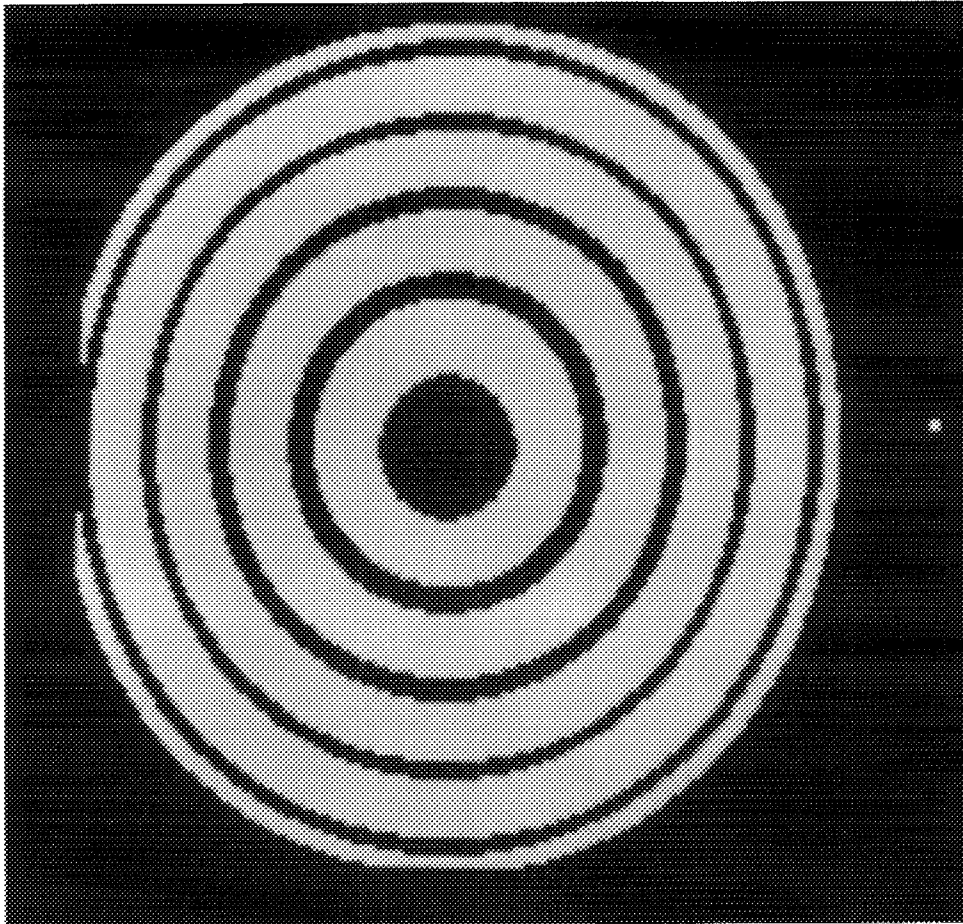


FIGURE 4.

These findings pose important problems for Dennett's position, since in all three cases the filling in is not "more of the same."

Even if Dennett can successfully disqualify the results with the artificial scotomas, these blind spot results suggest that the "more of the same" principle is *seriously underspecified*, at least so far as it applies to the blind spot. The concentric doughnuts stimulus (Fig. 4) is probably the most important here, because even though the central annulus is *larger* than the blind spot, Ramachandran's subjects report seeing a solid central disc in the experimental situation. This does not conform, *even for regions larger than the blind spot*, to Dennett's "more of the same" principle.

Arguably, grounds remain for defending Dennett's application of the "more of the same" principle to the blind spot—at the risk, though, of the appearance-at-least of considerable ad-hocery. For, after all, Dennett has not specified in any *systematic* fashion what should count as "the same" in applying his "more of



the same" principle. Nevertheless, even if this fall back strategy holds some promise, minimally Ramachandran's results reveal an important respect in which Dennett's account of "more of the same" is perilously underspecified.

Still, things are not quite *that simple*, since calling the principle, as Dennett often does in his discussions of repetitive patterns, his "more Marylins" principle is rather suggestive. Apparently, this principle is quite sensitive to detail in repetitive patterns in a way that some of Ramachandran's results seem to belie. Dennett has an alternative route available here, though, and that is just to maintain that the blind spot should receive a different analysis than does the perception of repetitive patterns.

*That concession need not be debilitating for Dennett's larger project concerning sensory qualia.* Even if the perception of repetitive patterns is disqualified as the model for Dennett's account of the blind spot, this need not vitiate the strategy of the blind leading the blind. To jeopardize that strategy and pull the plug on Dennett's Rylean intuition pump altogether, I must undermine the connection that Dennett has proposed between the experiences of normal subjects with the blind spot and those of persons suffering from blindsight.

#### IV. THE PROBLEM OF MIXED MESSAGES

In one of the two locations where Dennett discusses Ramachandran and Gregory's artificially induced scotomas in *Consciousness Explained*, his comments *unintentionally* suggest that he is willing to forego his commitment to the *continuity* of the neural status of the blind spot with the neural status of blindsight. He remarks that:

V. S. Ramachandran and R. L. Gregory . . . have just performed some experiments with what they call . . . artificially induced scotomas, in which there is good evidence of gradual filling in of textures and details. There is one fundamental difference between their experimental circumstances and the conditions I have been describing; in their experiments *there is competition between two sources of information*, and one gets overruled (gradually). (1991, p. 353, footnote 13, emphasis added)

Ramachandran and Gregory's artificial scotomas involve *competition* between the group of neurons reporting on stimuli within the anomalous region of the visual field (which, apparently, become gradually fatigued or, in Dennett's language, out-shouted) and the remaining neurons in the visual cortex (in particular those with receptive fields that overlap or even straddle the receptive fields of the overworked first group and which outshout them). This second group of neurons is connected with those parts of the retina reporting an otherwise homogeneous pattern of snow on the monitor.

Here the brain sorts through a pair of incompatible *representations of presence*. In the language of the Cartesian Theater, it must deal with *mixed messages*. With the blind spot, however, no such competition between alternative representations arises. Thus, Dennett maintains Ramachandran and Gregory's findings concerning artificial scotomas do not bear on his account of such phenomena as the blind spot.

By highlighting this distinction between *competitive* situations (or mixed messages) and *noncompetitive* situations (or nonmixed messages), Dennett inadver-

tently supplies the grounds that render the blind incapable of leading the blind. Dennett thinks that there are two types of noncompetitive situations, viz., those absences of representation where there are simply no messages (such as the blind spot) and those unproblematic representations of presence where the messages are univocal (in normal perception). Dennett maintains that Ramachandran and Gregory's results with artificial scotomas do not bear on noncompetitive situations such as normal perception (even of repetitive patterns) where the message is univocal nor do they bear on the blind spot (where Dennett thinks that there is no message at all).

The crucial point, though, is that this introduces a worrisome precedent for Dennett's strategy of the blind leading the blind, since even on Dennett's account, *blindsight*, just like Ramachandran and Gregory's artificial scotomas, is a competitive situation. The neurons in the scotoma's field supply a representation of absence; however, simultaneously, neighboring neurons provide more central processors with representations of presence. In the case of cortical scotomas Dennett explicitly notes that "there are still plenty of communication channels over which the information from the perfectly normal retinas could reach other brain areas" (Dennett, 1991, p. 325). On Dennett's view blindsight is possible for victims of scotomas *only because* their brains receive mixed messages.

The rub is that *it is precisely because artificial scotomas constitute a competitive situation that Dennett dismissed their relevance to his no-filling-in account of the blind spot* (in the passage cited at the outset of this section). So, if blindsight is *also* a phenomenon different in kind from the blind spot, which it seems it must now be, then we have pulled the plug on Dennett's Rylean intuition pump for his deflationary treatment of qualia, as his move from our perfectly homely intuitions about the blind spot to the elimination of sensory qualia is mediated by his presumption of a continuity between the blind spot and blindsight. The point is that Dennett's disqualification of artificial scotomas on the basis of their competitive character has undermined his case for establishing that continuity.

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