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Consciousness and Perceptual Attention: A Methodological Argument*

Abstract

Our perception of external features comprises, among others, functional and phenomenological levels. At the functional level, the perceiver's mind processes external features according to its own causal-functional organization. At the phenomenological level, the perceiver has consciousness of external features. The question of this paper is: How do the functional and the phenomenological levels of perception relate to each other? The answer I propose is that functional states of specifically *perceptual attention* constitute the necessary basis for the arising of consciousness in a perceiver.

Widely studied within cognitive psychology, perceptual attention is still awaiting a thoroughgoing philosophical treatment. The paper presents and draws upon Anne Treisman's feature-integration theory of attention (cf. A. Treisman & G. Gelade, "A Feature-Integration Theory of Attention," *Cognitive Psychology*, 12, 1980. Pp. 97-136). According to this theory, attentional mechanisms are responsible for the binding of perceptual features into coherent and stable objects of perception. By itself, I will claim, the theory of feature integration does not allow a straightforward reduction of consciousness to the functional processing underlying it. However, on the basis of Treisman's theory we can produce a methodological argument for endorsing the non-reductivist thesis that attentional states constitute the necessary basis for the arising of consciousness in a perceiver. The paper closes by presenting this argument, according to which the thesis is implied by a unified account of the common representational natures of attentional and conscious states.

Introduction.

Our perception of external features comprises, among others, functional and phenomenological levels. At the functional level, the perceiver's mind *processes* external features according to its own causal-functional organization and perceptual inputs. At the phenomenological level, the perceiver has *consciousness* of external features. The general question of this paper is: How do the functional and the phenomenological levels of perception relate to each other? The specific and partial answer I propose is that *functional states of perceptual attention constitute the necessary basis for the arising of consciousness in a perceiver*. (I shall refer to this as *thesis T*). I proceed in five steps. First, I formulate and clarify the above general question (Sec. 1); second, I present the outline of a psychological theory of perceptual attention, namely Anne Treisman's feature-integration theory (Sec. 2); I then reject a recent empirical argument in favor of thesis *T* (Sec. 3), and I go on to formulate the suggestion that the relation between perceptual attention and consciousness cannot be researched empirically (Sec. 4); and finally, on the basis of insights gained in sections 2 to 4, I provide a methodological argument in favor of thesis *T* (Sec. 5).

1. How Do Functional Processing and Consciousness Relate to Each Other?

In well-lit surroundings, with her eyes open and well-functioning, Silvia is looking at a red, shiny, bulgy tomato. Under a general description, we can say that Silvia is having a *perceptual state*—the state of perceiving the tomato; more specifically, however, we can describe her perceptual state at (at least) three different levels: a material, a functional, and a phenomenological level. At the material level, Silvia's brain is *affected by* a wealth of perceptual stimuli. As these stimuli impinge on Silvia's sense organs, they effect changes in her brain, thereby constituting the neurophysiological basis of her representation of the tomato. At the functional level, Silvia's mind is *processing* features of the tomato such as, for example, its redness, its shininess, and its bulgy shape. This processing reflects the mind's functional organization, and it constitutes the abstract object of a functionalist theory of perception. Finally, at the phenomenological level, Silvia is having *consciousness* of the features of the tomato. As she looks at the tomato, Silvia experiences its features through states that possess specific felt phenomenal qualities such as, for example, looking red, shiny, or bulgy.¹

Perception is thus a multi-layered phenomenon, comprising the levels of perceptual stimuli, processing, and consciousness. Phenomena at each of these three levels are studied respectively, though not exclusively, by neurophysiology, cognitive psychology, and the philosophy of mind. It is neither easy nor common to draw links between these disciplines, and for this reason the scientific study of perception is still a complex and fragmented enterprise. In recent years, however, researchers have laid more and more emphasis on interdisciplinary approaches to perception. A key question in these approaches is to individuate systematic relations holding between the material, functional, and phenomenological levels of perception. How do the three relate to each other? Which phenomena at one level constitute necessary and/or sufficient conditions for phenomena at the other levels?

The above questions outline a very broad challenge that, for the purpose of the present paper, I shall now endeavor to narrow down. First of all, I will here ignore the material level, focusing exclusively on the relation holding between functional processing and phenomenological consciousness of features and objects. Secondly, among the different kinds of perceptual processing I shall concentrate on *attentional* processing. I will thus investigate the relation between functional states of attention and states of consciousness. I call this the project of correlating perceptual attention and consciousness.

In my investigation, I will rely on some assumptions without providing much argument. In particular, I will assume that the existence of *some* form of functional processing of a feature is necessary, though not always sufficient, for the arising in the perceiver a consciousness of that feature. The necessity claim is, in effect, a plausible but not-so-innocent assumption, reflecting the belief that the levels of perception described above somehow build upon each other. As all functional processing presumably has its necessary basis in brain activity, so consciousness presumably has its basis in functional processing. The claim of non-sufficiency, on the other hand, is empirically grounded in the observation of actual cases of *implicit perception*.² In implicit perception, a perceiver typically processes a (set of) feature(s) to a considerable degree of complexity, but without being able to report having any consciousness of them. Phenomena such as blindsight and subliminal perception provide concrete examples here. Blindsight patients show through their behavior to be functionally responsive to external features of which they reportedly

have no consciousness—although they do process certain relevant features, they report having no consciousness of them. Similarly, subliminal perceivers are influenced in their behavior by features that they have no memory of having consciously perceived, as is the case when pictures of a drink are interspersed in a movie, and as a consequence the viewers become thirsty for that drink.³

The question of this paper can then be expressed as follows: given that some form of functional processing is necessary for the arising of consciousness in a perceiver, which *specific* form of processing is necessary and/or sufficient for it? The (partial) answer that I shall try to articulate is that *attentional* processing within perception provides the necessary basis for the arising of consciousness. More precisely, including all necessary qualifications, the proposal is the following:

(*T*) At any time *t*, the occurrence of attentional processing of a stimulus *x* in a perceiver *S* is a necessary condition for the arising of consciousness of *x* in *S* at *t*.

In a more concise slogan, the claim is that perceptual attention constitutes the functional basis of consciousness. We have consciousness of a feature exclusively when we are at the same time attending to it.⁴

Before looking more closely at the concepts of ‘consciousness’ and ‘perceptual attention’, we should pause to notice three senses in which *T* is a relatively weak thesis. First of all, *T* claims that attentional processing is necessary, and not also sufficient, for the arising of consciousness. The thesis, therefore, allows that some attentional processes might occur unaccompanied by any subjective consciousness. Indeed, an implementation of attentional processing in artificial intelligence might one day make that possibility real. Unless one believes that attentional processing ontogenetically *constitutes* consciousness, one should expect a machine instantiating attentional processing to experience no consciousness. Secondly, *T* claims that, in general, *some* attentional process occurs whenever *some* consciousness does. The thesis thus allows that two indistinguishable token attentional processes might occur accompanied by qualitatively different token states of consciousness (or vice versa, of course). And again, this possibility is probably real. Given the multiple physical realizability of functional states,⁵ two different brain states may underlie two indistinguishable attentional processes *and* two different states of consciousness. And finally, *T*’s claim is *empirical*, not conceptual. The failure of functionalist analyses of consciousness, I submit, attests to the fact that no internal, conceptual relation holds between descriptions couched in functional and phenomenological vocabulary. And since the concept of an attentional state is a fully functional one, a conceptual defense of a thesis such as *T* can be ruled out from the beginning.

Indeed, one might criticize thesis *T* for its relative weakness. The thesis, the criticism goes, does not advance our understanding of whether consciousness can be *reduced* to attentional (and in general functional) processing. In this way, the thesis ignores the main ontological question concerning consciousness—the ‘hard problem’ of the nature of consciousness.⁶ As a reply, I will admit that *T* does not support a reductionist project concerning consciousness—it does not help someone who attempts to exhaustively explain the nature of conscious phenomena in terms of functional processing. However, to insist on the reductionist project is to fix upon only one of the many philosophically interesting questions concerning consciousness. When they think about consciousness, philosophers in effect tend to be either reductionist or antireductionist, as they engage in the titanic debate called the mind-body problem. This tendency betrays a primarily

naturalistic interest in the mind, an interest that is born out of the threat posed to a scientific conception of reality by the existence of consciousness. But my interest in the present context is *not* naturalistic; rather, my interest lies with how different aspects of the mind relate to each other, with no immediate concern for whether they are also naturalistically explainable. Thesis *T*, to use a slogan, may contribute to our understanding of the *workings* of the mind, not its metaphysics.

2. Consciousness, Attention, and Feature-Integration Theory.

Competing definitions of the elusive concept of *consciousness* abound in the literature. My concern here is exclusively with phenomenal consciousness. A perceptual state is conscious, as I will understand the term, when there is *something it is phenomenally like* for a perceiver to be in that state.⁷

Two features of consciousness will be central to the argument of the paper: subjectivity and representationality. As I characterized it already, consciousness belongs to the phenomenological level of perception. As a consequence of this fact, states of consciousness are accessible exclusively from a first-personal point of view. To know whether someone is in a given conscious state, it appears, one would have to *be* that person.⁸ Moreover, I will argue below (section 5) that conscious states are *representational*, that is, they are contentful states that are about external features and objects. The redness of a tomato, the perfume of a flower, or the coldness of steel are all examples of possible contents of our conscious states.⁹

The concept of *attention* has both ordinary and scientific connotations. Ordinarily, we often talk about a perceiver's capacity to attend to mid-sized objects or locations in the environment. A hunting cat, for example, may attend to its prey by intently smelling, listening, and scrutinizing a corner of the room; and as I look at a window in a brightly-lit shop, I am able to visually attend to the objects displayed therein.¹⁰ As for the *scientific* concept of attention, cognitive psychology has been offering a variety of proposals at least since Donald Broadbent's pioneering filter theory of attention.¹¹ I will introduce, in what follows, a direct descendant of Broadbent's approach. Called the feature-integration theory, this more recent approach was propounded by Anne Treisman and some of her collaborators back in 1977, and it has since achieved a quasi-hegemonic status within the psychological literature.¹²

According to feature-integration theory, perceptual processing falls into an early and a late stage. At the early stage, perceptual features are processed in parallel, while processing at the late stage is typically serial.¹³ At the early stage, that is, the mind registers a wealth of perceptual stimuli simultaneously, or in parallel, along a number of separable *feature maps*. A feature map is, roughly, a framework for the representation of the subject's spatial surroundings, with markers on the locations at which the relevant features are detected (Cf. Figure 1 below). The feature map for color, for example, represents different colors at different locations in the subject's environment.¹⁴ Examples of feature maps would be the ones for color, orientation, spatial frequency, brightness, direction of movement, loudness, pitch, and so on to cover all kinds of features for which the mind has evolved or acquired separate detectors.¹⁵ Now, since the maps are functionally independent of each other, at the early stage of processing there will be no promiscuity between features of different kinds. Silvia's exposure to the tomato, for example, will produce different, independent

registrings of, say, redness and shininess, but no unified representation of redness *and* shininess. It is only at the late stage of perception that the mind conjoins redness and shininess (and possibly other features) to constitute a *perceptual object*. The objects of perception are, in effect, coherent bundles of perceptual features, the product of the mind's active integration of the raw materials of perception.¹⁶

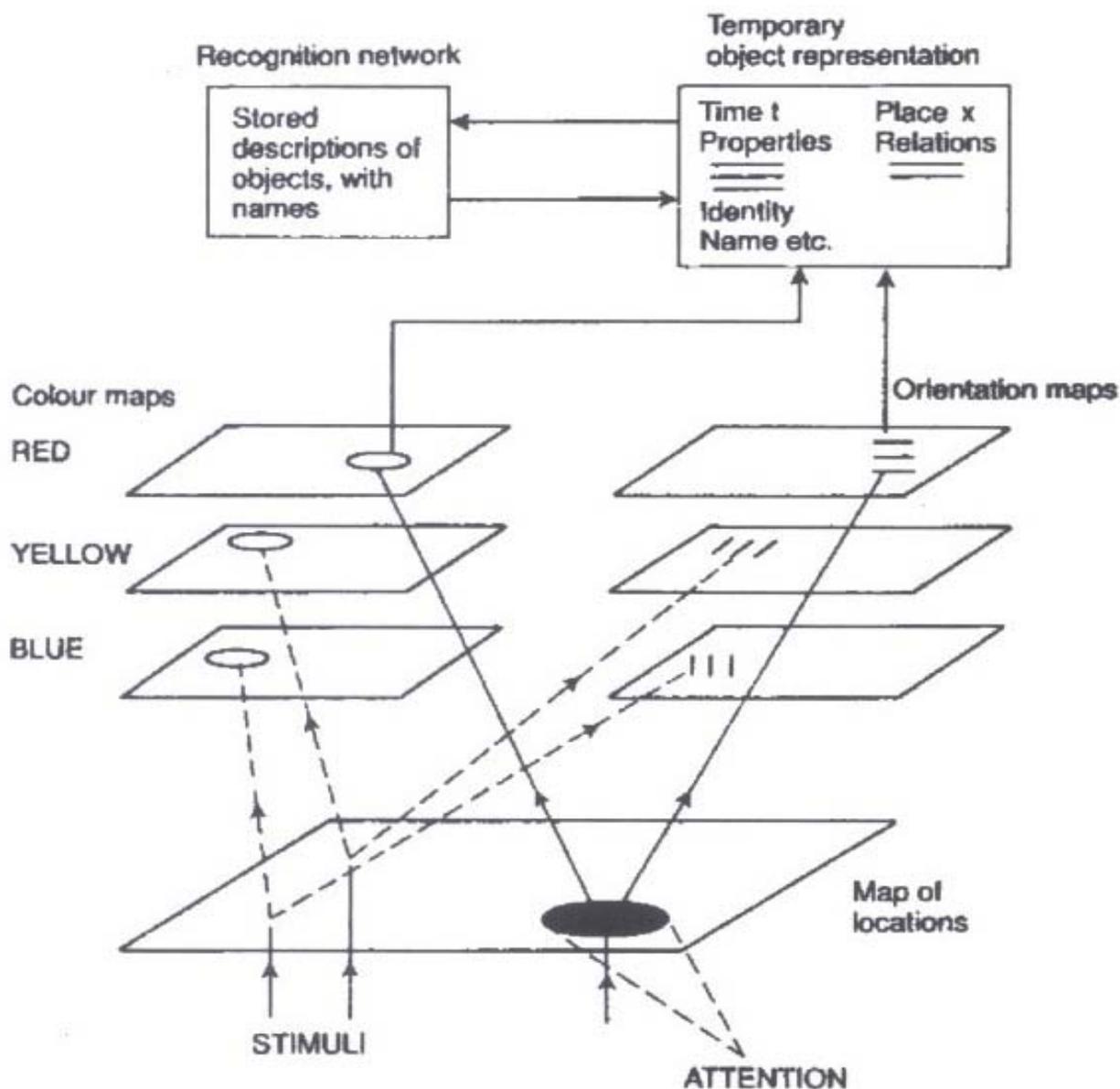


FIG. 1: The framework of feature-integration theory (from Treisman 1993)

The core of the late stage of perception, Treisman argues, is taken up by attentional processing. “Focal attention,” she writes, “provides the ‘glue’ which integrates the initially separable features into unitary objects” (Treisman & Gelade 1980, 98). She thus characterizes the faculty of attention as the mind’s capacity of binding perceptual features, in a process that leads to the constitution of the objects of perception. Attention, in the simile of Rensink [2000], is like the hand that grabs a set of perceptual features and joins them in an object of perception.

As internal representations of external objects, most objects of perception are the product of the constitutive operations of attentional processing. But it should be noticed that, according to feature-integration theory, not *all* objects of perception are constituted by attentional processing. As Treisman argues, it is possible for conjunctions of features to occur *automatically* in the perceptual system—features from separate maps can become conjoined without the contribution of attention.¹⁷ The outcome of these automatic conjunctions will be perceptual objects that are in all ways similar to the ones constituted through attentional processing. However, these perceptual objects will in many cases be illusory, as they were not constituted by a system that is functionally devoted to the conjunction of features. As a result, attentional processing will produce mostly (though not always) correct representations, whereas automatic processing may often yield incorrect ones. Since attentional processing evolved to perform the specific function of binding features, it is more likely than automatic processing to yield correct representations of objects.¹⁸ But there may be important evolutionary reasons why some form of object perception, however degraded, does happen without the involvement of attentional mechanisms.

The theory of feature integration provides us with a tripartite taxonomy of the functional level of perception. On the basis of the theory, that is, we can classify perceptual functional states according to three broad categories.¹⁹ To the category of *pre-attentional* states belong the registrations of external features within the mind's feature maps. (At this early perceptual stage, we have arguably no representation of external features yet, but only the unconnected registration of features). To the category of *in-attentional* states belong the representations of external features that arise out of automatic processing (as opposed to attentional processing). And finally, to the category of *attentional* states belong the representations of external features that arise out of active, attentional processing. In the light of this taxonomy, we can better understand the substance of the claim of thesis *T*. According to *T*, only attentional states support phenomenally conscious objects of perception, as opposed to objects that would be perceived unconsciously. If *T*'s hypothesis is correct, therefore, there should be no phenomenology accompanying the occurrence of either pre-attentional or inattentional states. This is a prediction that, on the basis of feature integration theory, seems worthy of empirical consideration. I will thus now analyze a recent empirical argument in support of thesis *T*.

3. An Empirical Argument for *T* Rejected.

In *Inattentional Blindness*, Arien Mack and Irving Rock report the results of a new experimental method designed, as they write, “to explore perception without attention” (1998, ix). Part of the book can be read as a detailed empirical argument in support of thesis *T*. They write in the introduction,

the single most important lesson is that there seems to be no conscious perception without attention. Given the explosion of work in the last decade on preattentive perception, this is a provocative claim. Nevertheless, it is one to which we were ineluctably drawn by these findings. (ibid., ix)

According to Mack and Rock, the argument for thesis *T* relies on the discovery that subjects often fail to perceive highly perceptible stimuli when their attention is not engaged by them. This widespread *inattentional blindness*, as the phenomenon is now known, suggests that attending to a

stimulus might be necessary for a subject to be able to consciously perceive it.

To study perception without attention, Mack and Rock ingeniously devised a set of so-called *distraction task* visual experiments (henceforth DT experiments).²⁰ At the beginning of these experiments, test subjects are asked to keep their eyes focused on a fixation mark displayed at the center of a computer screen (Figure 2). They are then assigned a distraction task: a cross, they are told, will soon be flashed very briefly somewhere on the screen, and they will have to report, afterwards, which of the cross' two arms was the longer one. With these instructions, Mack and Rock reasoned, the subjects would be actively attending to the cross when it is flashed, and they would *not*, in the meantime, be attending to other stimuli that may appear on the screen. The extent to which subjects do nevertheless see these other stimuli, the scientists plausibly assumed, provides insights into the nature of perception in conditions of inattention.

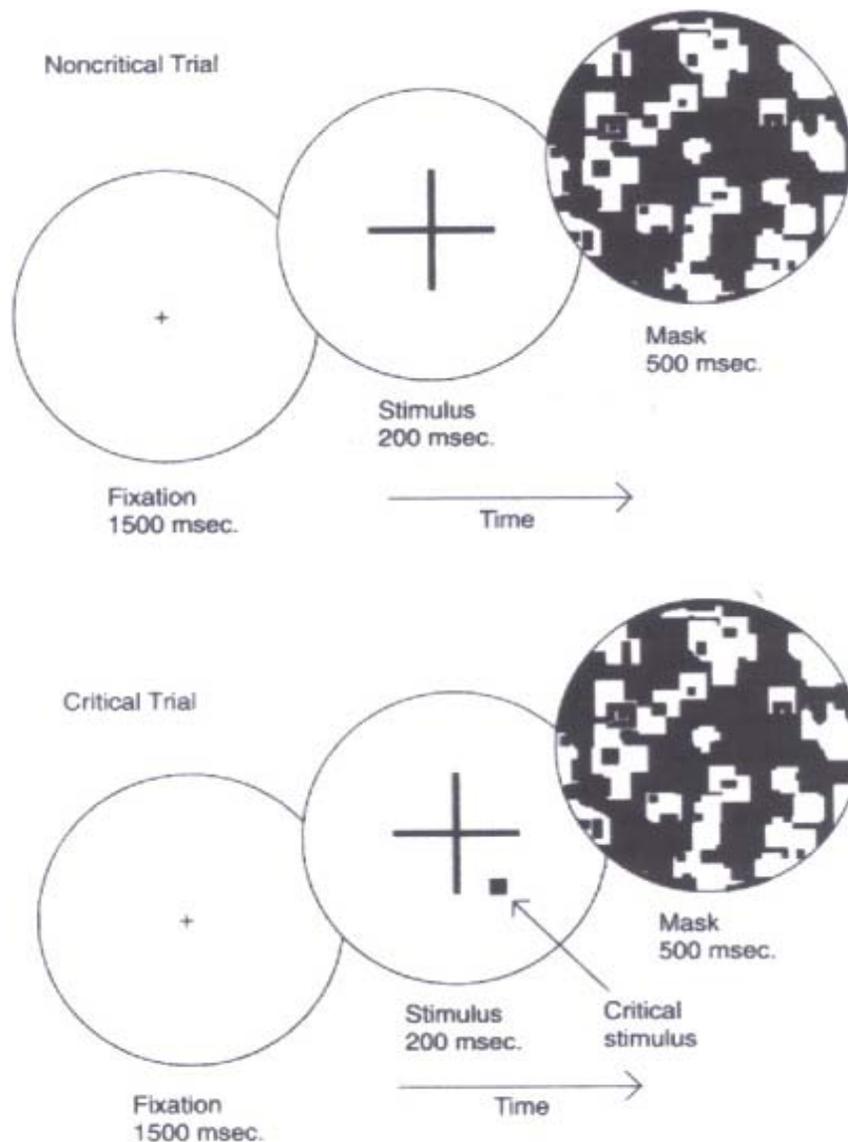


FIG 2a and 2b: Distraction task experiments (from Mack & Rock 1998, p.7).

Mack and Rock ran a number of DT experiments. In a first series of them, the test cross was always presented at fixation, right where the subject was looking (Figure 2a). At critical trials, however, an

additional stimulus was presented along with the cross. This was, typically, a highly visible item, with a distinctive color, shape, etc., which appeared in a quadrant of the cross within a few degrees of fixation (Figure 2a). And after all trials, the subjects were asked whether, during the trial, they had seen anything else on the screen besides the cross. The results of these experiments presented Mack and Rock with a mild case of inattention blindness: 18 out of 79 subjects (or 23%) failed to report the presence of the additional stimulus at critical trials. Moreover, when asked to ‘guess,’ from a number of options, which one had been presented to them, these subjects generally performed at chance, suggesting that they had not even subliminally perceived the additional stimulus. About one fourth of the test subjects, the scientists concluded, had been inattentionally blind to the presence of the additional stimulus.

Mack and Rock hypothesized that the above amount of inattention blindness would be reduced if the critical stimulus were presented at a location closer to foveal fixation. They thus proceeded, in a second set of DT experiments, to swap the locations of the cross and of the additional stimulus, presenting the first in the parafovea and the second at fixation (Figure 2b). This move would possibly eliminate inattention blindness altogether, they assumed, since the perceivers might be able to detect unattended stimuli that are presented right at fixation. The experiments’ outcome, however, surprisingly contradicted and even reversed this assumption. In the new conditions, that is, a whopping 80% of subjects failed to report the presence of the additional stimulus. The amount of inattention blindness, Mack and Rock discovered, tends to increase when the unattended stimulus is presented at fixation.

A plausible interpretation of the above results, Mack and Rock argue, is encapsulated in a version of thesis *T*: a perceiver needs to attend to a stimulus in order to be able to see it consciously. Indeed, their (implicit) reasoning is quite simple. Since most subjects do not see a stimulus when they are *not* attending to it, but they do see it when they are, we should conclude that attending to a stimulus is necessary for a subject to be able to perceive it. But while this argument is fundamentally correct, I believe, its conclusion is not, and cannot be, thesis *T*. Thesis *T*, as will be recalled, makes a claim about conscious perception. DT experiments, however, test only a subject’s ability, in certain conditions, to *report* conscious perception. And to report conscious perception is not the same as to actually have it: a subject’s perceptual reports may tell us very little about her actual conscious perception. To overlook this distinction, I believe, is to conflate two fundamentally different kinds of perception: accessible and conscious.²¹ To *accessibly* perceive a given stimulus, on the one hand, is for a subject to have a particular kind of rational access to that stimulus—to be able, for example, to acquire and express certain perceptual beliefs about it.²² Indeed, DT experiments test this ability, as a test subject may express, for example, the belief that a red square was just flashed at the left of the cross. To *consciously* perceive a stimulus, on the other hand, is for a subject to undergo a certain qualitative experience as a result of being exposed to that stimulus. And of course, DT experiments are unable to test this kind of perception. Nothing, in the experimental setup described above, discloses the subject’s qualitative experiences to the experimenter. While DT experiments reveal a lot about a subject’s accessible perception, therefore, they are unable to support any conclusion concerning conscious perception. And by taking DT experiments to support thesis *T*, Mack and Rock systematically misread a result about accessible perception as one about conscious perception.²³

DT experiments, therefore, fail to provide cogent empirical evidence for thesis *T*. Their failure,

moreover, may be understood as a consequence of the constitutive limitations of the methodology of cognitive psychological research on consciousness. As a matter of fact, DT experiments instantiate a behavioral experimental methodology that is pervasive within cognitive science. If indeed the failure of DT experiments is determined by such constitutive limitations, it appears, then *all* experiments in empirical cognitive science will fail just as well. Thesis *T*, accordingly, would not be empirically verifiable. I turn to this matter in the next section.

4. Can Any Empirical Argument for *T* Work?

The notion that empirical experimentation can tell us little about the nature and the laws that govern consciousness, if any such laws exist, is quite well established within the philosophical literature. It lies at the core of the so-called *explanatory gap* argument. The argument centers on a metaphorical gap that separates explanations and descriptions couched at the the functional and phenomenological levels of perception.²⁴ Intuitively, our knowledge of the functional level is in principle irreducible to our knowledge of the phenomenological level (and vice versa), and consequently phenomena described at the two levels are epistemically incommensurable. More precisely, a version of the argument departs from the following three premises:

- 1) Knowledge of attentional processing is third-personal;
- 2) Knowledge of a state of consciousness is first-personal;
- 3) Third- and first-personal knowledge are irreducible to each other.

The labels ‘third-‘ and ‘first-personal’ characterize the ways in which a certain kind of knowledge can be acquired. As a matter of definition, third-personal knowledge can be acquired in principle from every rational point of view, whereas first-personal knowledge is acquired from exclusively one person’s rational point of view.²⁵ Premises 1 and 2 thus reflect the different ways in which we can gain knowledge about, respectively, attentional processing and conscious states. We can learn about attentional processing by appealing to an empirical psychological theory of it. As scientific, the observations and generalizations of such a theory are accessible to every rational person, and consequently our knowledge of attentional processing is third personal (premise 1). On the other hand, our knowledge of a state of consciousness is strictly first personal (premise 2). In principle, only *I* could have knowledge of the distinctive feel of a pin puncturing my hand; only Silvia could know how the tomato looks to her; and even if I were to look at the tomato in the exact way Silvia does, I would thereby know exclusively how the tomato looks *to me*.²⁶

Attentional processing and consciousness, therefore, are the possible objects of two different modes of knowledge, one universal and the other singular, as it were.²⁷ Now, premise 3 crucially claims that these modes of knowledge are irreducible to each other. According to 3, the content of third-personal knowledge could not exhaust the content of first-personal knowledge, and vice versa. For however carefully Silvia and I try to describe to each other our own visual experiences of the tomato, we will not be able to know what the tomato subjectively looks like to each of us. And conversely, no subjective experience of the tomato will provide either of us with knowledge that we can share in words. A perhaps analogous irreducibility, it should be noticed, may also hold among other heterogeneous kinds of knowledge. Consider, as an example, chemical and mathematical knowledge. The first may enable us to establish that a given substance is methanol; the second may tell us that a given variable's value is 2; however, the question whether methanol and the number 2

are one and the same entities appears to be unanswerable. In fact, we cannot meaningfully ask that question, for we have no way of *verifying* any answer to it. (Contrast with the question whether methanol is the same as ethanol, or whether 4 is the same as 2^2 .) Now, if premise 3 is true, a similar unverifiability affects questions involving third- and first-personal knowledge. And since thesis *T* clearly does involve third- and first-personal knowledge, we should conclude that the thesis is empirically unverifiable: there is no meaningful way of correlating our observations of the occurrence of states of attention and consciousness in order to test whether *T* is true or false.

If the above is correct, then thesis *T* has no empirical content. This fact would vindicate the suggestion of section 3, according to which the flaws that we highlighted for Mack and Rock's defense of *T* are symptoms of the in-principle empirical unverifiability of *T*. And since *T* is not defensible on conceptual grounds either, as we briefly saw in section 1, we would have to conclude that thesis *T* is, quite literally, meaningless. Researching whether *T* is either true or false would be, accordingly, methodologically irrational. This conclusion, it seems, is where the project of correlating attentional and conscious phenomena should founder.²⁸

I believe that the above version of the explanatory gap argument is fundamentally correct, and hence that thesis *T* is empirically unverifiable. A more thorough defense of this claim, however, would take too long to include here. For the present purposes, therefore, I will treat the empirical demise of *T* for granted. Whoever does not feel the force of the explanatory gap argument will have reason to complain, here. But it is reasonable to expect that they will not blame the choice of keeping such a ponderous topic out of the present paper. I am quite happy to concede that my conclusions are conditional on the acceptance of some version of the explanatory gap argument.

In the light of the empirical and conceptual demise of thesis *T*, hence of its supposed meaninglessness, I will attempt in the next section to defend *T* on the basis of some general methodological considerations. These will be, of necessity, speculative considerations. To be sure, as we have just seen, thesis *T* may be both empirically and conceptually unverifiable. And yet, as I wish to argue, we do have some reasons for endorsing it nonetheless.

Before engaging in speculative argument, however, we should briefly question our motivations for doing so. What is, in other words, the *significance* of the argument I am about to propose? Why should we try to defend, or at least test, thesis *T* even in the face of its arguable meaninglessness? The answer here is that, as is so often the case with consciousness, the alternative to speculation is a rueful acceptance of mystery. The mystery would be especially acute in the present case, as we sense that there must be some specifiable relation between phenomena as closely related, intuitively, as consciousness and perceptual attention. The significance of the argument I propose, therefore, is that it allows us to start somewhere, however tentatively, in the investigation of a central phenomenon in our mental lives.

5. A Methodological Argument for *T*.

To recapitulate, I aim to establish a relation between the phenomena of perceptual attention and consciousness. In particular, I aim to defend thesis *T*, according to which attentional processing is necessary for the arising of consciousness in a perceiver. As we saw, the defense of *T* is one specific project within the broader enterprise of correlating the functional and phenomenological

levels of perception. To understand perception, I argued in section 1, we must understand the relations holding between its various levels.

As announced, my argument appeals to *methodological* considerations, as considerations about the justifiability of the theoretical assumptions that are presupposed by any truth-aimed investigation of phenomena. While theoretical assumptions generally ought to be defensible conceptually, I submit, arguably they need not always be. Occasionally, for example, an inquirer may assume a specific presupposition for the sake of its estimated conduciveness to fruitful discovery, say, or out of consideration for the coherence of her theory. I will not appeal to either fruitfulness or coherence in my argument. But I will rely at one step on an inference to the best explanation which, as such, makes the argument non-conceptual and, to a certain extent, speculative.

Intuitively, the gist of the argument is that *representationality* provides the thread for methodologically linking the phenomena of perceptual attention and consciousness. Starting from the premises that attention and consciousness are both representational, I suggest, we can take a few more steps to argue for the truth of thesis *T*. The argument has three premises and two conclusions, which I will now introduce and discuss in turn.

The first premise is that *perceptual attention is functionally representational*. A mental state is representational, as I understand the term here, when it has a content, thus representing external objects and features. In the light of feature-integration theory, this premise is uncontroversial. As we saw in section 2, attentional processing effects the constitution of perceptual objects, which are in effect mental representations of external objects.

The second premise is that *consciousness is, essentially, phenomenally representational*. As phenomenal, that is, consciousness essentially purports to represent external features and objects. Accordingly, we can say that Silvia, while undergoing pure phenomenal experiences, is also having consciousness *of* external features such as, for example, the tomato's bright redness, or its sweet-sour scent. Phenomenality, as such, is representational. I differ from many philosophers, here, as it is generally allowed that consciousness may be only contingently, not essentially, representational (cf., e.g., Block 1995, p. 381).

Two kinds of conceptual considerations support premise 2. There is, first of all, the phenomenological intuition of the characteristic *locality* of consciousness. A perceiver typically experiences conscious properties as located at certain positions in her immediate environment. The redness of the tomato, for example, appears to Silvia as located *two feet in front of her*; and I may feel a pain *in my right foot*, or at other locations in my body. The phenomenon of locality strongly suggests that conscious properties represent properties that are found at the locations at which they appear to be to the perceiver. Silvia's consciousness, as it were, appears to her to be anchored in her immediate environment. There are, secondly, facts about the grammar of our ordinary talk about occurrences of consciousness. In particular, the concept of consciousness appears to be *transitive*, as a consequence of the transitivity of the verbs that express it in language (e.g., *to see*, *to touch*, *to hear*, and so on). Hence, in common speech we have to mention both a perceiver and external features in order to intelligibly refer to a perceiver's conscious states. We say that Silvia sees *the tomato*, that she touches *its smooth peel*, and that she hears *a squishy sound* as the tomato falls to the floor. The transitivity of the concept of consciousness, thus, suggests that some representational relation to external features is essential to the metaphysical constitution of a state of consciousness.

Premise 2 ought to be distinguished from a stronger claim, according to which the experiential properties of conscious states *supervene* on the subject's functional-representational properties.²⁹ I am not committed to this claim. For all I know, a swampman replica of me at time *t* could possess all of my functional-representational type-properties at *t*, yet experience type-phenomenal properties different from the ones I am having at *t*. I am committed, however, to the claim that the experiential properties of conscious states *supervene* on their own phenomenal-representational properties. This amounts to saying that changes in phenomenal representation necessarily are phenomenally experienced, which is not controversial.

As a third and last premise, I propose the following phenomenological intuition: *It appears to us as though the functional-representational content of attentional states partly determines the phenomenal-representational content of consciousness.* Intuitively, that is, what we experience in consciousness appears to us to vary according to which external features we attend to. When Silvia looks at the tomato, for example, her conscious experience appears to her to be partly determined by which of its features she attends to, be it its color, its smell, its texture, or some other feature. Moreover, our conscious experience of a feature varies according to the way in which we attend to it. If Silvia focuses her attention on the smell of the tomato, instead of dividing it over her whole perceptual intake, she will probably render her consciousness of such smell more vivid, or she will inhibit her consciousness of other attended features.³⁰

In two important respects, premise 3 makes a rather weak claim. It is, first of all, epistemic rather than metaphysical, as it concerns how mental reality appears to us to be, not yet how it is. It claims, secondly, that consciousness is only *partly* determined by attention. There is some influence of attention over consciousness, but the second does not *supervene* on the first. (The stronger thesis of supervenience would be difficult to support phenomenologically). With these qualifications in place, I submit, premise 3 rests on solid ground.

If the above three premises are accepted, some methodological reasoning on them can lead us to thesis *T*. I recap the premises here:

- 1) Attentional states are functionally representational;
- 2) Conscious states are phenomenally representational;
- 3) It appears to us as though the functional-representational content of attentional states partly determines the phenomenal-representational content of conscious states.

Methodology comes in, at this point, if we consider how we can explain premises 1 and 2 in the light of our current knowledge about the mind. We should notice that, as far as a theoretical explanation goes, we understand premise 1 better than we understand premise 2. On the one hand, that is, we have a rather clear sense of how attentional states come to represent external objects. As we saw in section 2, feature-integration theory provides an intuitive account of how some basic intentionality can arise within perception. But on the other hand, we lack a comparable understanding of the representational aspects of consciousness. In virtue of which phenomena, the question is, does a perceiver's consciousness of an object acquire the property of representing that object? If we accept, plausibly in my view, that representation requires some causal connection to hold between representer and represented, the difficulty of providing an account of the representationality of consciousness becomes apparent. Hence, I submit, while we know that

conscious states have content, we still do not know *how* they acquire such content.³¹

We are now ready to take the decisive steps in the argument. Premises 1 to 3 establish a close connection between perceptual attention and consciousness: both phenomena essentially have some form of representational content (premise 1 and 2), and those contents appear to us to be correlated. But we have just seen that, while we have a (possibly underdeveloped) account of the representational properties of attention, we lack a similar account for the representational properties of consciousness. In this situation, I suggest, we can perform an inference to the best explanation and conclude that, in effect, the representational aspects of consciousness are identical, ontologically, to the representational aspects of attention:

- 4) The representationality of consciousness is constituted by the representationality of attentional states.

The representational properties of consciousness, the conclusion says, are nothing over and above the representational properties of attention. Indeed, the phenomenological intuition of premise 3 by itself suggests that the content of conscious states may ontologically depend upon that of attentional states. Given the appeal to phenomenology, of course, such a proposal would probably be *too* speculative. But now we have seen that conclusion 4 has the further support of the above methodological considerations. The inference to the best explanation that leads to 4 is acceptable, I suggest, in the light of the mysteriousness of the representationality of consciousness.

Conclusion 4, if accepted, logically leads to thesis *T*. If phenomenal representationality, as an essential property of consciousness, actually is a property of attentional states, it follows that the occurrence of any conscious state will be accompanied by the occurrence of an attentional state bearing the same content. The occurrence of attentional processing, that is, will be necessary for the arising of consciousness in a perceiver.

Before closing, let me address some possible objections. My argument is clearly invalid, but this is no objection. Whoever grants the conceptual independence of the functional and phenomenological levels of perception should accept that even our best possible reasons for assuming some form of dependence between them will fall short of being purely conceptual. In the argument above, then, we legitimately claim methodological dependence with the aid of an (admittedly empirical) inference to the best explanation from premises 1, 2, and 3 to conclusion 4.

Someone might argue that premise 2 misunderstands the very concept of consciousness. The claim that consciousness is phenomenally representational contradicts one of the distinguishing features of consciousness: that such a phenomenon is constituted exclusively by *intrinsic*, as opposed to *relational*, properties.³² Indeed, in my understanding of consciousness, a conscious state is essentially constituted, partly, by a representational relation to external features and objects. But I see no harm in this. The intrinsicality of consciousness is predicated by Block on the fact that conscious properties can be conceived of as separate from any functional-relational properties. Indeed, we can arguably conceive of zombies, that is creatures who possess functional properties but lack consciousness, or vice versa. However, in my account, consciousness is relational *as such*, and not derivatively upon the relational nature of any functional property. If I am right, we cannot conceive of a creature who, while experiencing conscious properties, has no phenomenal

representation of her environment. And phenomenal representation, as such, is relational. Indeed, if I try, I fail to imagine a what-it-is-like property that is not also somehow related to my present or past environment. Where, I wonder, could all those colors, scents, feelings, and itches be coming from?³³

Finally, doubts may be raised concerning the very coherence of the notion of phenomenal representationality deployed above. For private-language reasons, one might say, representation constitutively requires some form of public sphere in which it can happen. But consciousness is an essentially private phenomenon. Thus consciousness, as such, cannot be representational. Here, I share these concerns, which partly motivated my claim that we do not quite understand how consciousness can be phenomenally representational. And yet, the locality of consciousness, as well as the transitivity of its concept, are powerful considerations supporting the claim that consciousness does, indeed, represent. Premise 2, therefore, is paradoxical but not yet false. More work needs to be done, here, to alleviate and possibly solve the paradox.

This concludes my defense of thesis *T*. As I hope to have shown, there is a meaningful question as to how the functional and the phenomenological levels of perception relate to each other. The partial answer that I have proposed in this paper is that states of perceptual attention, at the functional level, constitute the necessary basis for the arising of consciousness at the phenomenological level. In particular, I have argued that the thesis can be defended by appealing to some speculative methodological considerations, an analysis of the concept of consciousness, and an appeal to some core features of Anne Treisman's feature-integration theory. Overall, I believe, following this methodological strategy might contribute one day to develop a coherent and informative overarching theory of attention and consciousness. As the argument of this section shows, for example, such a theory could provide us with a unified account of the representational natures of both attentional and conscious states. And even more interestingly, perhaps, the theory would characterize consciousness, partly, as a product of the mind's spontaneous processing, as such processing is theorized within the feature-integration theory of attention. The arising of consciousness would thus be revealed to require the mind's attentional constitution of an object of perception. Intriguingly, consciousness might even be the causal *product* of attentional constitution. This is a suggestion that, however speculative and surprising, certainly deserves careful consideration.

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Endnotes

1. The functional/phenomenological distinction is inspired by Ned Block's related distinction between access consciousness and phenomenal consciousness ((Block 1995), 380-5). Cf. also David Chalmers' distinction between psychological and conscious states ((Chalmers 1996), 11-6).
2. I take the term from (Rensink 2000a), 1485.
3. A classical work on blindsight is (Weiskrantz 1986); for an exposition of some of the philosophically relevant aspects of blindsight cf. (Block 1995) and (Tye 1995), 209-18. For recent discussions of subliminal perception, where such phenomenon is explained as a case of processing unaccompanied by consciousness, cf. (Rock et al. 1992) and (Moore and Egeth 1997).

4. To my knowledge, thesis *T* has yet to be discussed in the philosophical literature, and it has been discussed unsatisfactorily in the psychological literature. The psychologist Anne Treisman, for example, advances the thesis without giving any apparent argument for it: “ Before any conscious experience is possible, some form of attention is required, since information from the different feature maps must be combined” ((Treisman 1993), 13). (Rock et al. 1992), on the other hand, argue that attention is *not* necessary for consciousness; however, their word for ‘consciousness’ is ‘perception,’ and the results of their experiments exhibit a systematic ambiguity between the phenomenological and functional levels of perception. What their experiments show, I believe, is that some processing of features happens even without attentional processing—a result that is both compatible with and predicted by thesis *T*.

5. In the sense introduced by (Putnam 1975).

6. Cf., for a concise formulation of the so-called hard problem, (Chalmers 2000).

7. I here follow (Nagel 1986).

8. Things are different at the material and functional levels of perception. Neurophysiological data are third-personally available, and they provide us with insights into the mechanics of the brain; similarly, observable behavioral data reveal the mind’s functional organization, making it amenable to scientific theorizing.

9. I believe, moreover, that conscious states plausibly inherit part of their phenomenal character from their content. I am thus committed to a weak representationalist thesis, according to which conscious states feel, partly, according to what they represent. I do not endorse, however, a strong representationalist thesis, according to which a state’s phenomenal character *supervenes* on its representational content. While weak representationalism is not often considered in the literature, the strong thesis is at the focus of debate. In favor of it is, for example, (Shoemaker 2000); against it is (Peacocke 1983).

10. Arguably, some degree of faithfulness to the intuitive concept of attention constitutes a constraint on the acceptability of a technical or scientific explanation of attentional phenomena. One challenge in thinking about attention is, in the language of (Sellars 1963), to reconcile our scientific and manifest images of it. Cf., for some thought about this challenge, (Martin 1998).

11. Cf. (Broadbent 1958). This author firmly rooted the study of attention within the cognitivist paradigm nascent in the fifties, after its more phenomenological beginnings in (James 1890).

12. Cf. (Treisman, Sykes, and Gelade 1977), (Treisman and Gelade 1980), and (Treisman 1993). For more recent statements of the theory, along with refinements, cf. (Rensink 2000a) and (Rensink 2000b). As space does not allow even a fair outline of the theory, I will here focus on the aspects most relevant for my argument later in the paper.

13. Coming from the field of computer programming, the parallel-serial distinction was brought into cognitive psychology by (Neisser 1967). In parallel processing, various perceptual stimuli are processed simultaneously, in a single sweep as it were. In the considerably slower serial processing, on the other hand, stimuli and objects of perception are processed one at a time.

14. The concept of a feature map was added to the theory relatively late—cf. (Treisman 1988), 205ff. The maps are usefully conceived as tri-dimensional, that is as constituted by three variable parameters together with a way of registering the content of each combination of the parameters.
15. Perceptual features do not correspond uniquely to commonsense physical features. As (Treisman 1993), 7, argues, what counts as a single feature is “an empirical question, to be answered by converging operations designed to diagnose the functional features in the visual dictionary.” Her thesis is philosophically controversial, however, as it involves a privilege of the scientific over the ordinary conception of external features, a preference for the scientific over the manifest image.
16. Cf. also (Rensink 2000a), 1472-4, who develops the notion of perceptual objects as *coherence fields* of features.
17. Cf. (Treisman and Gelade 1980), 98; (Treisman and Schmidt 1982).
18. There would thus be a statistical link between active processing and correct representation. Since Treisman is silent on the topic, however, this claim remains my own speculation.
19. Cf. (Treisman 1993), 13-6.
20. Cf. (Mack and Rock 1998); the following summarizes experiments and results originally reported in chapters 1 and 3 of this book.
21. My argument is here indebted to (Block 1995)’s distinction between access consciousness and phenomenal consciousness.
22. I model this notion of rational access after the concept of *access-consciousness* in (Block 1995). A state is access-conscious, as Block writes, when it is “poised for direct control of thought and action” (382). My label as *accessible* may be preferable, however, because it stresses the dispositional nature this kind of consciousness or perception. For alternative ways of defining accessible perception, cf. both (Kihlstrom, Barnhardt, and Tatarin 1992) and (Marcel 1983).
23. One objection to be forestalled here is that, in DT experiments, subjects actually express *infallible beliefs about their own conscious states*, such as one’s belief that one is consciously seeing the red square. If we grant this, of course, then DT experiments do yield evidence about conscious, as well as accessible, perception. But the problem is that the claim that these beliefs are infallible is highly controversial. As (Nisbett and Wilson 1977) have convincingly shown, subjects’ reports about their own mental states tend to be extremely unreliable.
24. (Levine 1983) first formulated the explanatory gap problem, a version of which plays a central role in the argument for dualism of (Chalmers 1996), 106-11. I present here my version of the problem, and I do not aim at any accurate exegesis of earlier formulations.
25. For a definition along these lines, cf. (Nagel 1986). (Nagel 1974) employs the first- vs. third-person asymmetry in an argument that resembles the one I give here.

26. Some philosophers doubt that we may have *knowledge* of our own conscious states, and this doubt may be granted. As long as we acknowledge that there is an exclusively first-personal relation between a person and her own states of consciousness, however, the argument above still stands.

27. A plausible explanation of the asymmetry is that the two modes of knowledge involve two kinds of content: imagistic (for first-personal knowledge) and propositional (third-personal). The explanatory gap between the two kinds of knowledge would thus be explained by a general theory of content. On the propositional vs. imagistic distinction, cf., among others, (Peacocke 1992), ch. 3.

28. The above line of argument, it should be noticed, differs from that of a more traditional explanatory gap strategy. Within the mind-body debate, for example, the explanatory gap is usually discussed for its ontological consequences. On either side of the debate, physicalists and dualists argue on whether the epistemic gap between physical and phenomenal knowledge entails an ontological gap between physical and phenomenal properties. The argument above, however, considers the *methodological* consequences of the explanatory gap—the argument is that, given the gap, attempting to correlate phenomenal and physico-functional properties is a methodologically flawed enterprise. Thus while a dualist, say, rejects the identity between consciousness and brain states, a proponent of the above methodological argument denies the meaningfulness of even discussing such identity.

29. For a defense of this claim cf., among others, (Dretske 1995), (Shoemaker 2000), and (Byrne 2000).

30. By the way: does the focusing of attention *vivify* one's consciousness of the attended perceptual features, or does it rather *inhibit* one's consciousness of all other attended features? The question might not be empirically answerable. (James 1890), 401-7, took the first option, while (Broadbent 1958) took the second. For some discussion of the question, cf. (Treisman 1993), 22, and (Moray 1987).

31. Of course, serious objections can be and have been mounted against functionalist accounts of representation. But at least, with these accounts, we have a starting point from which to move to refine our understanding. Nothing similar is available for us to understand the representationality of consciousness.

32. Cf. (Block 1995), p. 383; also (Goldman 1993), p. 113.

33. Cf., for a possibly related intuition, (Akins 1993), p. 267.

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