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Consciousness and Cognition

journal homepage: www.elsevier.com/locate/concog

Reconciling current approaches to blindsight

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ARTICLE INFO

Article history:

Received 6 January 2014

Revised 30 July 2014

Accepted 4 August 2014

Available online 27 August 2014

Keywords:

Blindsight

Consciousness

Brain injury

REF

REF-CON

ABSTRACT

After decades of research, blindsight is still a mysterious and controversial topic in consciousness research. Currently, many researchers tend to think of it as an ideal phenomenon to investigate neural correlates of consciousness, whereas others believe that blindsight is in fact a kind of degraded vision rather than “truly blind”. This article considers both perspectives and finds that both have difficulties understanding all existing evidence about blindsight. In order to reconcile the perspectives, we suggest two specific criteria for a good model of blindsight, able to encompass all evidence. We propose that the REF-CON model (Overgaard & Mogensen, 2014) may work as such a model.

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1. Introduction

Blindsight is one of the most intriguing yet mysterious phenomena in consciousness research, as well illustrated by the fundamentally self-contradictory term itself. The term refers to a “visual capacity in a field defect in the absence of acknowledged awareness”, as defined by Larry Weiskrantz (1986). The phenomenon as such has been described as everything from the most important contribution from experimental psychology to philosophy of mind (Holt, 2003; McGinn, 1991) to nothing but the result of poor measurement (Campion, Latto, & Smith, 1983).

The evidence behind the idea that blindsight exists is a relatively large number of experiments on a very limited number of patients. In particular, the preserved visual functions of patients GY and DB have been studied extensively resulting in several observations of their ability to correctly detect objects or discriminate shapes, brightness, or color presented to a part of their visual field (Cowey, 2010; Weiskrantz, 1986).

Regardless of several more recent experiments with more modern techniques, the “classic” blindsight experiment is arguably Weiskrantz, Warrington, Sanders, and Marshall’s (1974) study of DB. In the first of five experiments, DB was asked to shift his eyes from a fixation point to the position he would guess a light was flashed. The second experiment was very similar to the first, except DB now had to reach for the target with a finger instead of relying on eye movements alone. With this different method, results showed a very clear correspondence between target and finger position, especially for larger stimuli. Experiment 3–4 studied DB’s ability to discriminate between two possible stimuli (X vs O, horizontal vs vertical lines etc) and found that he was able to do so well above chance level with increased performance as a function of stimulus size. Experiment 5 looked at color discrimination, where DB was to decide whether red or green was presented, but was inconclusive because of technical issues with stimulus control.

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2. Blindsight type 2

Although the key feature of blindsight – the thing that makes blindsight “blind” – is the total absence of “acknowledged awareness”, most blindsight patients have reported particular kinds of “feelings” when presented with visual stimuli (Weiskrantz, 1986). The blindsight literature is strayed with notes and comments about conscious experiences had by the patients during the experimental procedures. Some of these reports refer to “feelings” (e.g. Weiskrantz et al., 1974), yet other seem to refer to some sort of perceptual content, e.g. “visual pin pricks” (Richards, 1973) “dark shadows” (Barbur, Ruddock, & Waterfield, 1980) or “white halos” (Perenin & Jeannerod, 1978). A particularly interesting aspect of these reports is their relation to the objective performance of blindsight patients. It is surprisingly unexplored in the literature, and therefore difficult to seriously discuss, yet there are a few findings of relevance. For instance, in the above-mentioned experiment by Weiskrantz et al. (1974), DB reported “a stronger feeling of something being there” for green compared to red stimuli. The reports correlated with performance, so that DB performed better for green rather than red stimuli.

The fact that blindsight patients seemingly sometimes report experiences could arguably have let researchers to re-evaluate blindsight as distorted or degraded vision, a kind of perceptual dysfunction, rather than the total lack of visual consciousness.

The difference between the two interpretations is big. Blindsight would in both cases be interesting in consciousness research, but in very different ways. In the “classical” interpretation – that blindsight is subjectively blind – one might consider blindsight a “pure contrast”, i.e. that the contrast between normal, conscious perceiving and blindsight may reveal neural correlates of visual consciousness. This approach is suggested by Lau and Passingham (2006). In the other interpretation – that blindsight is distorted perception – the phenomenon obviously cannot be considered a “pure contrast”, and thus, it will inform models of neural correlates of consciousness differently.

The argument that blindsight is perceptual dysfunction is rarely seen. Instead, for most blindsight researchers, the definition of “blindsight” has remained unchanged, and the instances of reported subjective experiences in the patients are argued to reflect a “blindsight type 2”. Blindsight type 2 is considered to be a case of experiencing a “feeling” or “knowing” of something that was visually presented, yet without any visual experience.

Below, the two positions are investigated further. The intention is not to provide a comprehensive review of the blindsight literature which has been done elsewhere (Covey, 2010) but rather to evaluate arguments for and against the two positions.

3. The classical interpretation: two kinds of blindsight

Blindsight type 1 is relatively well-defined by Weiskrantz as a “visual capacity in a field defect in the absence of acknowledged awareness”. The definition does not explicitly involve injury to the primary visual cortex, although this is often implicitly assumed. Nevertheless, the term is sometimes used to denote other kinds of unconscious perception, even in healthy subjects (e.g. Roseboom & Arnold, 2011). Common for these different variations, though, is the conviction that blindsight type 1 is a total absence of any conscious experience in a (part of the) visual field without a total lack of perceptual function.

Blindsight type 2 has a somewhat less clear definition. As stated above, it involves “feelings” associated with the visual capacity without these feelings are visual. Obviously, it is absolutely crucial for the definition to have any bearing that the experiences (“feelings”) are not visual, but this is not easily done. In order to do so, one must have a criterion (or set of criteria) to determine whether something is visual or something else.

It is important to note that the two types of blindsight cannot denote different syndromes in a normal sense, as they do not point out two different groups of patients. Studies of DB and GY, for instance, are the main sources of evidence for both type 1 and type 2, and, obviously, the same neural injuries seem to give rise to both phenomena. GY and DB seemingly sometimes report “feelings”, and sometimes to experience nothing at all under the same stimulus conditions (e.g. Weiskrantz et al. (1974)). Accordingly, the two types of blindsight must relate to two types of mental contents, and not different persons.

Persaud and Lau (2008) gave GY philosophical articles about qualia from *The Stanford Encyclopedia*, *The Oxford Companion to the Mind* and by Jackson (1982), and Daniel Dennett's book *Consciousness Explained* (1991). Persaud and Lau asked GY if he ever had qualia in his scotoma in an interview with several subquestions. GY, who is very well informed about blindsight, acknowledged that he had qualia in his intact field but stated that he did not have qualia in his scotoma, even under conditions where he was aware of something being present. Persaud and Lau conclude on this basis that GY does not have conscious visual experiences in his scotoma, but, instead, “non-visual” experiences.

This conclusion is only warranted if GY's verbal denial of having qualia (1) only applies to visual qualia, and (2) must lead us to conclude with necessity that he in fact does not have visual experiences (Foley, 2012). However, if assuming the existence of blindsight type 1, one is faced with a dilemma: Either the criterion for “visual capacity” is not introspective (and, in such case, the verbal categorization as “visual” or “not visual” by GY or other blindsighters is not sufficient), or the criterion is in fact introspective (and, in such case, there can be no such thing as unconscious vision, and therefore, no such thing as blindsight type 1).

Unconscious visual perception, including blindsight type 1, is established whenever a subject is able to react to a visual stimulus. Consequently, one would say, a visual process is one in which a subject at some level reacts to something visual. From this argument it should follow that if there is any kind of preserved conscious experience in blindsight subjects caused

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