

## ORIGINAL ARTICLE

# Identity-Crowding and Object-Seeing: A Reply to Block

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Contrary to Block's assertion, "identity-crowding" does not provide an interesting instance of object-seeing without object-attention. The successful judgments and unusual phenomenology of identity-crowding are better explained by unconscious perception and non-perceptual phenomenology associated with cognitive states. In identity-crowding, as in other cases of crowding, subjects see jumbled textures and cannot individuate the items contributing to those textures in the absence of attention. Block presents an attenuated sense in which identity-crowded items are seen, but this is irrelevant to the debate about phenomenal experience of an object in the absence of object-attention. Finally, even unconscious object perception in identity-crowding likely involves an attention-like selective process.

**Keywords** consciousness; attention; cognitive phenomenology; seeing; phenomenology; perception

DOI:10.1002/tht.57

## Introduction

Ned Block (2013) argues that there is object perception in the absence of attention, that attention is not necessary for seeing objects.

In the course of his argument Block makes two claims:

- (1) There is conscious object-seeing without object-attention.<sup>1</sup>
- (2) There is unconscious object-seeing without object-attention.

Block's attempt to establish (1) with the example of "identity-crowding" fails. First, I offer a better explanation of identity-crowding reports and experiences: unconscious perception indirectly contributes to the overall phenomenal state of the subject through non-perceptual phenomenology associated with judgments. Then I argue that there is not phenomenal perceptual individuation or identification of an object, nor are objects seen in any relevant sense in the case of "identity-crowding".

Since Block thinks conscious and unconscious perception can both be instances of object-seeing, it seems he would be satisfied to establish (2) alone; that is, (2) would establish that objects are seen in the absence of attention. Nevertheless, most of his paper is devoted to establishing (1), probably because (1) is a more significant claim than (2). (1) entails that attention is inessential to conscious object-experience, a consequential

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fact about the nature of conscious experience. (2) is unsurprising given that there is unconscious perception and that the attention under consideration is conscious attention. In contrast, if (2) concerns unconscious selective mechanisms (rather than conscious attention) it is likely false.

### **There is conscious object-seeing without attention**

Blocks appeals to a specific kind of crowding in which “one sees something without even the possibility of attending to it” (2013, p. 1). It is impossible to attend to the object seen since, according to Block, the object is large enough to be seen, but too small to be attended (given the perceptual context understood in terms of eccentricity and spacing of objects). This is possible since, in this sense, the grain of attention is larger than the grain of vision.

Crowding is a phenomenon of peripheral vision in which the spacing, eccentricity, and arrangement of objects affects the ability of subjects to discriminate and identify them. For example, crowding occurs when an object that is in the center of a crowded row of three objects cannot be discerned (Pelli 2008). Block focuses on what he calls “identity-crowding” (2013, p. 4–11). Identity-crowding is supposed to provide an instance in which an object is seen but is not, and could not be, attended. If the row of three crowded items consists of three instances of the same item, in Block’s Figure 3 he uses an array of all ‘A’s (i.e., ‘AAA’), then the center item can be reported correctly (as opposed to an array like ‘arm’, in which the center item cannot be reported). Block does not cite any experimental findings regarding this figure. Rather, he cites an experimental demonstration of a similar result using triples of slashes and backslashes (Petrov and Popple 2007). In this case, the stimulus ‘///’ is correctly identified 96% of the time in a forced choice from an array of eight triples consisting of / and \ (Petrov and Popple 2007, p. 4).

Block has two burdens with respect to establishing (1):

- (a) demonstrating that there is not attention in the case of so-called identity-crowding, and
- (b) demonstrating that there is phenomenal experience of objects that constitutes a relevant kind of seeing in the case of identity-crowding.<sup>2</sup>

With respect to (a) there are two major concerns: first, is identity-crowding crowding? Second, does identity-crowding (in contrast to other crowding) indicate that the stimuli are below the threshold of attention?

For the sake of argument I will assume, with respect to (1), that the objects perceived in identity-crowding are below the grain of conscious attention and therefore unattended in that sense. The focus of my objection to (1) is that Block has not convincingly established (b).

### **Seeing textures and seeing objects**

Crowded items are frequently described as being perceived as part of “textures” (Cavanagh, He, and Intriligator 1999; Cavanagh 2001; Intriligator and Cavanagh 2001;

Parkes et al. 2001). For Cavanagh conscious experience is limited by attention; while textures can be attended, the items contributing to them cannot be individuated for further processing, accessed or inspected (Cavanagh, He, and Intriligator 1999, p. 41, 43, quoted by Block 2013). Block accepts the claim that textures are seen in crowding, but argues, *pace* Cavanagh, that nevertheless individual objects are seen in cases of identity-crowding. Block writes:

It may be said that we do not count as seeing an object if we see it as part of a texture. This would be a fatal objection because I am claiming that in one kind of crowding, one sees an individual object—as part of a pattern—but without attending to it. (2013, p. 4)

I accept the description of what is seen in these cases as textures for the sake of continuity of discussion, though I question whether this is the best way to describe these or other peripheral experiences (Richards 2012). What seems correct about this description is precisely that the phenomenal quality of object perception is disrupted. What remains is sometimes an impression of some of the characteristics of the items that constitute the crowded stimulus. That said, subjective reports of impressions during these experiences suggest a confused experience that is difficult to describe. Block quotes one subject saying “It looks like one big mess . . . I seem to take features of one letter and mix them up with those of another” (Pelli, Palomares, and Majaj 2004, p. 1139). Parkes et al. (2001) note that “Despite this invisibility [of a crowded item], an overall impression of clockwise tilt may be seen”.

Block (2013) writes that,

Since identity-crowding allows detection (i.e., distinguishing between presence and absence), differentiation from the background, discrimination from other items and visual identification of the items—all consciously—it is difficult to see a rationale for denying that one can consciously see them. (p. 6)

Given that crowded experiences generally confound report accuracy and have been acknowledged to have a phenomenology of something like a jumbled texture, the burden is on Block to show that in this one kind of crowding objects are seen, even as part of a pattern, that detection, differentiation, discrimination, and identification occur in identity-crowding.<sup>3</sup>

I will argue that there is a better explanation of successful reports in the identity-crowding cases. Specifically, subjects have unconscious perceptions that are more useful in identity-crowding than in other instances of crowding, yet they fail to consciously individuate the items presented. The phenomenal character of the perceptual experience is a texture in this as in other cases of crowding, but it is accompanied by a judgment based on unconscious experience, and there is a phenomenal character associated with this judgment. This same kind of non-perceptual phenomenology of propositional intentional states can account for the phenomenal experience of tilt or letterness accompanying perceptual experiences of textures.

### Support for unconscious processing in crowding

In addition to the phenomenal character of other cases of crowding there are general reasons to think that peripheral experience will lack detail, information, unity and integration and will be unconscious, that is, to favor the texture perception without individual object perception thesis just outlined.

Projection from the retina to the cortex decreases drastically outside the fovea (Hubel and Wiesel 1974; from Anstis 1998). Further, the ventral stream associated with conscious experience primarily makes use of foveal information and ignores low-resolution information from the periphery (Milner and Goodale 2008, p. 783). What information processing there is in the periphery is typically dorsal stream and unconscious.<sup>4</sup>

Further, a failure of feature integration or binding, feature pooling, is commonly cited as at least part of the explanation of crowding (Petrov and Popple 2007). In the case of identity-crowding, all the crowded stimuli are the same, so intuitively there is less chance of confounding the unconsciously perceived or consciously perceived and unintegrated features. Of course, Block can also appeal to this fact to explain why the items are seen. The key point here is that given the nature of peripheral processing in general and the phenomenology of the experience there is a bias in favor of the unconscious processing explanation of the successful identification in identity-crowding. Also, success here provides little evidence that the *individual* items are seen.<sup>5</sup>

Block's own change detection examples provide further support for the thesis that there is texture perception without individual object perception (Freeman and Pelli 2007). Interestingly, subjects are good at reporting whether there was a change (80% accuracy), and crowding does not result in any significant difference. This experiment is based on the same paradigm as Lamme (2003) and *pace* Block (2013, p. 11), can be explained in terms of texture perception with unconscious. Identification of the initial stimuli is poor (40% for uncrowded letters; under 20% for highly crowded letters), and change reports when cued after the initial stimulus is removed are frequently successful. This suggests that there is processing of some relevant information, but not integrated, phenomenally conscious experience of the specific character of the individual items. Given the positive correlation of crowding and identification failure, and the unconscious, low-resolution nature of the peripheral experience, texture perception without object perception this seems a very good explanation.<sup>6</sup>

Block allows that the letter-representations in Freeman and Pelli (2007) are unconscious until cued, so his intention is to avoid leaning on this controversial material and use it mainly as an example of unconscious seeing without attention (2013, p. 12). But in that case, Freeman and Pelli (2007) provides no additional evidence of conscious letter perception in identity-crowding, conscious vision having a finer grain than attention, or specific conscious contents unsupported by additional unconscious perception.

### Unconscious perception and phenomenology of thought

Though there are textured sensory experiences, postulation of non-perceptual phenomenal states can account for phenomenal impressions that go beyond textured (or generic) ones in some cases.

If a subject reports a general impression of rightward tilt, or the feeling that the middle item is an 'A', or if she is able to successfully report '///', and if the individual items composing the stimulus array are below the grain of attention, then the subject's overall phenomenal experiences will consist of perceptual phenomenology of texture, and possibly generic content, and additional non-perceptual phenomenology associated with other mental states. These mental states are thoughts associated with reflection on the perceptual experience and judgments and guesses about the items constituting the stimulus array.

In identity-crowding cases, unlike ordinary crowding cases, there is enough consistency in the unconscious information to permit correct judgments, and these judgments have an associated phenomenal character. I will assume that the character is itself sensory (i.e., in this case, mental images, or the like), but I do not exclude the possibility of non-sensory phenomenology associated with propositional attitudes. The unconscious information may even influence the nature of the phenomenal state associated with the judgment. Graham, Horgan, and Tienson (2007) have argued for non-sensory propositional phenomenology inseparable from the intentional content of a given propositional attitude state; everyone who has a certain non-sensory phenomenal state will have a certain intentional content, and everyone with that content will have that state. I oppose this view (Bailey and Richards *forth coming*). The idea here is that unconscious perceptual information may influence non-perceptual phenomenology in some less systematic way, producing more or less detailed sensory or non-sensory phenomenology. Nevertheless, the unconscious perceptual states influence the phenomenal states associated with a given judgment such that an unsupported guess would not have the same phenomenology.

One worry might be that these seemingly unconscious contributions are degraded phenomenal perceptual experiences. The phenomenon of blindsight is usually understood as one in which subjects are able to make successful forced reports or guesses despite damage to the visual system resulting in 'blind' sections of the visual field where there is no conscious visual experience. The idea that blindsight is unconscious has recently been questioned because of a positive correlation between reported clarity of stimulus and report accuracy in blindsight (Overgaard 2008; Overgaard and Grünbaum 2011). The claim is that there is merely severely degraded experience in blindsight and not unconscious experience. Brogaard (2011; 2012) has defended unconscious content:

I hypothesize that blindsight, when carefully examined, is best understood as a kind of genuinely visually-phenomenally unconscious process. The consciousness involved in blindsight most plausibly is a kind of consciousness that arises from making a correct guess about the location, orientation or color of the stimulus. The visual process itself most likely does not correlate with distinctly visual consciousness. (2011, p. 459)

Likewise in crowding, especially considering the heavily dorsal processing in the periphery, the best explanation is sensory phenomenology of textures and an accompanying non-sensory phenomenology associated with judgments that are more successful when the stimuli are uniform.

Importantly, in the identity-crowding cases there is not a sudden, clear, or typical foveal experience of ‘AAA’ or ‘///’. In anecdotal trials on naive subjects with the ‘AAA’ stimulus they report that: “there are a bunch of ‘A’s”; “I’m not sure how many there are”; and “I can’t really see the center one”. These same subjects on the same trials also guess that there are three ‘A’s. Accurate judgments are not an indication of completely normal experience, free of degradation, but it seems Overgaard’s theory would predict clear experiences with such a high degree of accuracy (98% for ‘///’). Further, with accurate identification, or even prompted guesses, there may be a tendency to report corrupted or generic experience as uncorrupted or specific (Bondurant et al. 2012).

### Singling out and seeing an object

Recall that Block claims that identity-crowding allows “detection (i.e., distinguishing between presence and absence), differentiation from the background, discrimination from other items and visual identification of the items—all consciously” (2013, p. 6). With respect to identifying items, Block claims that the ‘AAA’ example, the ‘///’ from Petrov and Popple (2007), and an illustration from Intriligator and Cavanagh (2001) in which an array of vertical lines or bars in the periphery cannot be counted, are cases where the component objects can be consciously perceptually identified. Block writes that the middle ‘A’ can be seen “well enough to be pretty sure it is an ‘A’ and the lines in Figure 4 [the vertical array] well enough to know that, for example, they are not tilted at 45 or horizontal” (2013, p. 7).

Of course, successful judgments can be made in these cases. The issue is what is seen, what *perceptual* phenomenology is had, and what is *identified on the basis of that phenomenology*. Block seems to pursue three distinct strategies (all intended to be independent of attention):

- (i) **Conscious Individuation (CI)**: the items are individuated and identified on the basis of phenomenal perception.
- (ii) **No Conscious Individuation (NCI)**: the items are consciously seen, and seen as distinct and having their own properties, *without* being individuated. They are identified based on this seeing.
- (iii) **Indistinct Seeing (IS)**: the items are consciously seen and identified, but are neither individuated, nor seen as distinct.

In identifying these strategies I have focused on individuation, in this case the ability to differentiate and count objects on the basis of conscious visual experience. I take visual individuation and singling out to be equivalent, but when pursuing at least some of the strategies above Block does not. For example, Block thinks that in some cases there is not singling out by attention (2013, p. 1, 7) but that there is singling out for *de re* thought

(2013, p. 8). Despite an inability to count or individuate the objects (because of failure to single out by attention), they are, according to Block, still visually singled out and seen in a way that supports *de re* thought. I will argue that identity-crowded items are not individuated ( $\sim$ CI), there is no intelligible sense in which items are consciously visually singled out and seen as distinct without being individuated ( $\sim$ NCI), and that items are not identified, or seen in any relevant sense, when they are indistinct and merely contribute to the pattern or texture ( $\sim$ IS). In each case, without being individuated the object is not seen and therefore is not identified on the basis of seeing.

(i) **Conscious Individuation (CI)**

Block clearly states CI (p. 6, quoted above). He also claims that counting is sufficient for attention, but unnecessary for seeing the individual bars (or lines). He quotes Tye's explanation of the failure to count the bars:

Surely because it is not the case that each bar on the right is clearly marked out or differentiated in the phenomenology of your experience. But then surely even though you are conscious of the bars on the right, it is not true that you are conscious of each individual bar. (2010, p. 414)

Tye also insists that to see an object it is necessary that one can "mentally point" to it (Tye 2010). Block replies: "... that just seems a way of saying that one cannot attend to it, and seeing without attention is just what is at issue" (2013, p. 8). Block insists that the lines are "differentiated in one's experience from the background. One can see the white space in between the items" (2013, 8). But this seems to miss the point. The white spaces cannot be counted either. This does not help seeing an individual bar, individuating a bar. CI is in trouble. Of course, as Block notes, pointing to, and counting, do seem to require attention, so Block thinks those are not required for object-seeing. But this seems to be a clear failure of individuation. Block must retreat to NCI.

(ii) **No Conscious Individuation (NCI)**

How can our thoughts be about the location or identity of one object in an array or cluster of objects that are below the threshold of attention? This is akin to throwing a dart in the dark. John Campbell (2002) has argued that conscious attention is necessary for knowledge of the reference of a demonstrative. Likewise, unless we can individuate a single object on the basis of experience we cannot be said to see that object, in the relevant sense. Block argues that the individual items are seen because "I can attend to the rough spatial area of these letters but since they are crowded below the grain of attention, not to the letters themselves" (2013, p. 8). That sounds like NCI. According to Block, this satisfies the object-seeing criteria of a number of philosophers by enabling *de re* thoughts about objects (Peacocke 1981; Siegel 2006; Dretske 2007; Tye 2010). However, it is evident that in the absence of some kind of conscious visual singling out one cannot have *de re* thoughts about the individual bars or letters.

It is odd that Block seems to think that there can be singling out by vision, in the absence of counting or mental pointing, which he acknowledges require attention. What is the basis of this distinct item seeing without conscious visual individuation? It is supposed to be due to the finer grain of vision, but it seems that grain should allow pointing and singling out or neither; however, if it did allow both, how would it be distinct from attention? And why does this visual grain enable seeing individual objects in this kind of crowding but not others? It seems there should be either seeing and attention, or no seeing and no attention. Without some explanation of how visually singling out on the one hand, and mental pointing and counting on the other, come apart, NCI appears unintelligible. Experience and introspective reports suggest that there is not individuation in these cases, so CI is false, but objects must be seen as distinct and NCI has not given any intelligible interpretation of being consciously, visually-perceptually distinct, or singled out, without being individuated. If consciously singling out and individuating are equivalent, as they seem to be, then NCI fails.

(iii) *Indistinct Seeing (IS)*

Reporting that a line or an 'A' is present is not compelling evidence that an individual item is consciously visually-perceptually identified when all the items presented are the same, especially given that it can't be mentally pointed out, and that unconscious processing offers a parsimonious alternative interpretation. The only intelligible claim remaining is that attention to the "rough spatial area" results in seeing the individual items as part of the pattern but not individuated within the pattern. In this case the items are consciously seen and identified, but neither individuated, nor seen as distinct (IS).

It might be possible to visually single out an object for *de re* thought by seeing the pattern; it could be thought about by thinking about the pattern. Block alludes to an example (Dretske 1969; Siegel 2006) to show that identification is not required for seeing. Something might be seen, a dark semicircular mass, that happens to be a flock, though that is not visually apparent. Even this extensional sense of seeing the flock requires that it be individuated from other visual objects. It may stand out against the sky, but in the same circumstances, the individual geese cannot be so individuated. This is more like seeing the textured pattern without the elements. Even if someone did want to say that the individual geese are seen in the extensional sense (Dretske (1969, p. 59) does not), the subject would not be aware that she is seeing geese, much less be able to individuate or identify them. It is clear that this is not an interesting instance of phenomenally seeing an object in the absence of attention. Thus, in the relevant sense, the flock is attended and seen; the geese are neither.

## **There is unconscious object-seeing without attention**

In this section I assume that there is unconscious visual perception of the individual items in these examples, and focus on whether there is also object-attention in these cases.

Block thinks consciousness is not necessary for seeing, and that consequently, even instances of unconscious object-seeing support his thesis that there is seeing despite the lack of object-attention to crowded items. He writes:

The role of Freeman and Pelli in my argument is to give an added boost to my case—made earlier—that in identity-crowding, there is object-seeing without object-attention. The boost derives from Freeman and Pelli’s demonstration that object-seeing (*if only unconscious object-seeing*) is compatible with the lack of object-attention engendered by crowding. (2013, p. 13, my italics)

Let’s assume that individual items are unconsciously *seen* in this experiment. Why would we expect the processing of unconscious objects and their features (whether or not they are actually processed as objects), to be beholden to the grain of *conscious* object-attention? That we can unconsciously experience objects that are not consciously attended is not surprising, and is removed from the interesting questions surrounding the claim discussed in the first section (the claim that there is conscious object-seeing without attention). A considerable amount of unconscious information processing happens in the periphery, to guide immediate action, independently of conscious experience, and with little regard for the attentional load. For this reason it does not seem that Freeman and Pelli (2007) can boost Block’s original case; at best it provides evidence for a less controversial claim about a distinct subtype of seeing.

It is more interesting to ask whether there is unconscious object-seeing in the absence of unconscious attention. Block acknowledges that unconscious attention in this case would be damaging to his claim.<sup>7</sup> It is likely that there is some kind of unconscious attention-like selective processing operative here since it is not possible to process all the information available, and the information processed is pertinent to the task at hand (it is about the individual items). (Richards manuscript). In “attentional spreading,” attending a feature consciously, results in that feature, and other features of objects with that feature, being selected (for example, Saenz et al. 2002). If a red dot is consciously attended, then other unconscious red dots will be selected and other features of those dots, for example movement, processed (Melcher, Papathomas, and Vidnyanszky 2005). This seems relevant in the case of identity-crowding since the items in the array share all their features (except location), and it is likely that selection of an unconscious object could proceed through conscious attention to one of the more easily identified flanking items (or features of).

## Conclusion

There is not object-seeing in the absence of object-attention, except perhaps in the attenuated extensional sense of seeing the constituents of texture without knowing, individuating, or consciously identifying them. Nor are the individual items seen as part of the texture pattern. To be seen in the relevant sense it is necessary to be phenomenally discerned, individuated, singled out, or pointed to mentally, and these all require attention.

Block agrees that successful reports in identity-crowding are not accompanied by the ordinary attentive object-seeing which is involved in mental pointing and counting. The subjects do not see a certain number or even distinct objects. Rather, the reports are the result of unconscious information processing and the unusual phenomenology, insofar as it is more specific than the texture pattern, may be the result of non-perceptual phenomenology accompanying thoughts and judgments about the stimulus. It is likely that there is an attention-like selective process called “attentional spreading” aiding the unconscious information processing in identity-crowding. Thus, even unconscious seeing involves something like attention.

## Notes

- 1 Block’s arguments focus on object-attention, though he often talks about attention in general. I will do the same.
- 2 The “seeing” here must be seeing in the sense that is usually taken to require attention. I will return to the topic of what counts as seeing and what kinds of seeing are relevant to the issue at hand in the “Singling out and Seeing” section.
- 3 Of course, it would be hasty and question begging to conclude, against Block, that identity-crowded experiences are not cases of object-seeing simply because they are crowded.
- 4 The degree to which peripheral perception is unconscious may be obscured in everyday experience by saccades and the constant efforts of the ventral stream to supply the high-resolution needed for conscious perception.
- 5 Seeing individual items is discussed further in the section “Singling out and seeing an object”.
- 6 This can even support Block’s critics who claim there are only generic conscious contents and unconscious specific contents in Lamme (2003) and Sperling (1960). See Block (2007, 2011).
- 7 Though interestingly it is not damaging to the claim that there is unconscious object-seeing in the absence of conscious object-attention, which is the focus of Block’s article. It is only damaging if the claim is that there is no object-attention of any kind.

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