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Psych 347

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### *Analysis on Visual Attention & Awareness*

The central issue being studied in this research study is whether attention is a *sufficient* condition for awareness. This is a weighty issue as it has heavy implications for consciousness. Indeed, in the words of the authors - “this relationship is one of identity, what one attends to and what one is conscious of being [are] one and the same thing.” To go a bit more in depth, it’s possible for attention and consciousness to be related, but they cannot be the same, if attention is either a) not necessary for awareness or b) it is not sufficient for awareness. It’s with this conundrum in mind that this research study should be evaluated.

Given the issues described above, the researchers had very specific requirements for their experimental design as well as their participant. In the previous paper, during the detection task the experimenters couldn’t tell when cueing led to response bias and when GY could actually discriminate the target. The simple task of a dot on a screen and whether it’s there or not was not exposed the study to the risk that GY was just guessing sometimes. However, on the other hand, if a participant can tell the orientation of a target, it has significantly greater implications. Their design was influenced by three major ideas. First, they wanted to innovate on their first study and found that discrimination was a far better indicator for their problem than detection. Second,

in another improvement compared to their first study, they decided to vary the interval between the presentation of cues and targets with the intention of removing any accidentally introduced bias. And finally, to maintain the closest possible standard to objectivity, they decided not to have GY comment on each trial. With respect to their participant, the neurological condition of blindsight was seen as an advantage. Again, blindsight here refers to the phenomenon where an individual who is cortically blind due to lesions in their striate cortex can still respond to visual stimuli that they do not consciously see. This allows the researchers to test the second possibility described above, where attention may not be a sufficient condition for awareness, and to test whether cues which do not themselves elicit any conscious response can nevertheless capture attention.

The key methodology in this study used to test the aforementioned second possibility is the discrimination task. This kind of task allows the researchers to robustly test their hypothesis because they can test whether spatial attention leads to a shorter reaction time to become aware of the target. Being able to consistently discriminate between vertical and horizontal cues illustrates that GY is aware of the target (and its orientation). The primary results of this study illustrate that attentional cueing was effective in reducing reaction time and that it cannot be the case that reaction time advantages accompanying valid-cueing are obtained as a consequence of diminished accuracy. However, it's important to note that these are *primary* results and must be caveated by the researchers' assertion close to the end of the study that "the interaction between SOA and validity in the present data was not statistically significant."

This study demonstrates two key conclusions that are central to the researchers' hypothesis. Milner and Goodale's hypothesis that spatial attention is mediated by an anatomically distinct part of the visual system that is not involved in visual awareness - spatial attention and visual awareness are distinct processes, they are not (always) in identity. Again, in the researchers' own words, "visual spatial attention is not a universally sufficient condition for visual awareness." The first conclusion of this study is GY's demonstrated ability to consistently maintain steady fixation despite his neurological condition. The second conclusion based on this research is that GY's ability to discriminate the orientation of lines even in the absence of any explicit attentional cues.

These are results central to the study and extremely relevant to the researchers' hypothesis about whether attention is a sufficient condition for awareness. Despite blindsight (this research study's proxy for a lack of attention), GY can consistently maintain steady fixation and discriminate line orientation without cues. In other words, GY doesn't need to pay attention in order to be aware. In their discussion, the researchers also address the apparent paradox of blindsight patients being able to attend to an "unseeable" location. As theorized by the researchers, this could largely be a consequence of the spatial map in which attention is allocated as it has remained intact despite GY's lesion and compromised vision. This research ultimately addressed and potentially resolved a multidimensional question about consciousness, awareness, and attention by surmising that at least within the confines of this study, visual spatial attention was not a sufficient condition for visual awareness.