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Inhibition of Return (IOR): Is it Consciousness of an Object without Attention or Attention without an Object and Consciousness?

***Czy efekt hamowania powrotu uwagi (IOR) to
świadomość przedmiotu bez udziału uwagi czy
uwaga bez przedmiotu i udziału świadomości?***

Abstract

The crux of the dispute on the mutual relations between attention and consciousness, and to which I have referred in this paper, lies in the question of what can be attended in spatial attention that obviously resonates with the phenomenological issue of intentionality (e.g., the *noesis-noema* structure). The discussion has been initiated by Christopher Mole. He began by calling for a commonsense psychology, according to which one is conscious of everything that one pays attention to, but one does not pay attention to all the things that one is conscious of. In other words, attention is supposed to be a condition which is sufficient but not necessary for consciousness, i.e., consciousness is a necessary concomitant of attention, but attention is not a necessary concomitant of consciousness. Mole seeks to validate his stance with data from psychology labs. His view is, however, partly confronted, for instance, by Robert Kentridge,

Lee de-Wit and Charles Heywood, who used their experimental research on a neurological condition called blindsight as evidence of a dissociation between attention and consciousness, i.e., that visual attention is not a sufficient precondition for visual awareness. In this meta-theoretical *state of affairs*, I would like to focus on the cognitive phenomenon most often referred to as *Inhibition of Return* (IOR) and suggest that, following its micro dynamics from the perspective of micro-phenomenology, it can be used to actually showcase all of the options on both sides of the argument. One of my leading goals would be also to follow Mole's attempt to link attention with agency but where we differ is that I wish to heuristically articulate the matter in terms of Merleau-Ponty's phenomenological notion of embodied pre-reflective intentionality.

Keywords: inhibition of return (IOR), attention, consciousness, intentionality, embodied cognition

Abstrakt

Zagadnieniem kluczowym w dyskusji na temat związku uwagi ze świadomością, do której nawiązuje poniższy tekst, staje się pytanie o to, co może stanowić przedmiot uwagi wzrokowo-przestrzennej. Można je oczywiście także odnieść do fenomenologicznej problematyki intencjonalności (np. sprawy relacji *noeza-noemat*). W dyskusji tej Christopher Mole przywołuje obecne na gruncie psychologii potocznej przekonanie, zgodnie z którym jesteśmy świadomi wszystkiego, na co zwracamy uwagę, ale nie zwracamy uwagi na wszystko, czego jesteśmy świadomi. Innymi słowy, uwaga traktowana jest tutaj jako warunek wystarczający, ale niekonieczny dla świadomości. Mole przywołuje również na poparcie tej tezy wyniki badań z zakresu psychologii eksperymentalnej. Jednakże, badania chociażby Roberta Kentridge'a, Lee de-Wita i Charlesa Heywooda, dotyczące zaburzenia neurologicznego zwanego ślepowidzeniem (*blindsight*), częściowo podważają tezę prezentowaną przez Mole'a, wskazując na możliwość dysocjacji uwagi i świadomości w sytuacji, gdy uwaga wzrokowo-przestrzenna nie jest warunkiem wystarczającym dla świadomej percepcji. W kontekście przywołanej dyskusji tematem obecnego artykułu jest efekt poznawczy określany najczęściej jako *hamowanie powrotu* [uwagi] (*Inhibition of Return* – IOR). Sądzę mianowicie, że przy zastosowaniu tzw. metody mikrofenomenologii można w zależności od momentu dynamicznej mikrostruktury tego fenomenu wskazać w jego przebiegu wszystkie opcje, które pojawiają się w powyższej dyskusji. Jednym z wiodących zagadnień artykułu jest również propozycja Mole'a powiązania pojęcia uwagi z problematyką sprawczości (agency). Niejako w odpowiedzi podjęta zostanie tutaj próba rekonceptualizacji pojęcia uwagi w kategoriach ucieleśnionej

prerefleksyjnej intencjonalności sformułowanej na gruncie fenomenologii przez Maurice'a Merleau-Ponty'ego.

Słowa kluczowe: hamowanie powrotu uwagi (IOR), uwaga, świadomość, intencjonalność, ucieleśnione poznanie

1. The Attention-Consciousness Problem: Introductory Remarks

According to Brentano's famous dictum, "[e]very mental phenomenon includes something like object within itself ... We can, therefore, define mental phenomena by saying that they are those phenomena which contain an object intentionally within themselves."¹ Brentano's claim, and that of Husserl which followed,² of the "inexistence" of objects within intentional acts was, however, challenged by Merleau-Ponty.³ According to his notion of pre-reflective intentionality, it is a condition of directing intentional acts *towards* the *lifeworld* rather than being *of* or *about* anything specific.⁴ This fundamental issue of the relationship between an intentional act and its object resonates throughout the dispute between Christopher Mole⁵ and Robert Kentridge, Lee de-Wit and Charles Heywood⁶ on the mutual relations between attention and consciousness, which has been chronicled in the *Journal of Consciousness Studies*, even though the authors do not choose to explicitly situate it in this context. They have mainly focused on the question of what can be attended to in spatial attention.

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- 1 Franz Brentano, *Psychology from an Empirical Standpoint*, eds. Linda L. McAlister, Antos C. Rancurello, Dailey B. Terrell, Engl. trans. Linda L. McAlister (London: Routledge and Kegan Paul, 1874/1973), 88–89.
 - 2 Edmund Husserl, *Ideas Pertaining to a Pure Phenomenology and a Phenomenological Philosophy. First Book: General Introduction to a Pure Phenomenology*, Engl. trans. Fred Kersten, Collected Works, Vol. II (The Hague: Martinus Nijhoff, 1913/1982).
 - 3 Maurice Merleau-Ponty, *Phenomenology of Perception*, Engl. trans. Colin Smith (Routledge & Kegan Paul, London/New York, 1945/62).
 - 4 On this point see also Martina Reuter, "Merleau-Ponty's Notion of Pre-Reflective Intentionality," *Synthese* 118, no. 1 (1999): 69–88.
 - 5 Christopher Mole, "Attention and Consciousness," *Journal of Consciousness Studies* 15, no. 4, (2008): 86–104; *idem*, "Attention to Unseen Objects," *Journal of Consciousness Studies* 21, no. 11–12 (2014): 41–56.
 - 6 Robert W. Kentridge, Lee de-Wit, Charles A. Heywood, "What is attended in spatial attention?," *Journal of Consciousness Studies*, 15 (2008): 105–111.

The context for this dispute is the renaissance of interest in the question of consciousness on the part of experimental psychologists. Having previously considered it too ephemeral a topic, due to its subtle conceptual nature and wishing to avoid its inherent philosophical ambiguity, they began to reintroduce consciousness under the code name of attention, applying theories and findings to it which had been derived in attention labs. This tactic of philosophy-avoidance and hunting for correlations has already been revealed in the “word of warning” by Alan Allport.⁷ From the phenomenologist’s purview, it is reminiscent of Virgil’s *Timeo Danaos et dona ferentes* phrase, with experimental psychologists playing the role of the devious “Greeks.” Giving consciousness a deflationary treatment and accounting for it in terms of attentional processes may only further obfuscate the mutual relationship of both categories in a way that it would be dubbed as the attention-consciousness problem, or perhaps more adequately – the consciousness-attention problem. This categorial ambiguity was highlighted by Mole, who initiated a discussion with the intention of shedding more light on the issue.

He began by calling for a commonsense psychology, according to which one is conscious of everything that one pays attention to, but one does not pay attention to all the things that one is conscious of, seeking to validate it with data from psychology labs. In other words, attention is supposed to be a condition which is sufficient but not necessary for consciousness, i.e., consciousness is a necessary concomitant of attention, but attention is not a necessary concomitant of consciousness. Initially, he partly confronted this view with the stance of Kentridge, Heywood and Weiskrantz⁸ who used their experimental research on a neurological condition called blindsight as evidence of a dissociation between attention and consciousness, i.e., that visual attention is not a sufficient precondition for visual awareness. Blindsight is a consequence of damage to the primary visual cortex, as a result of which patients become blind in part or all of their visual field. They are, however, still able to perform visual tasks, although they do not have conscious experience of the stimuli to which they are responding. In their experiments, the blindsight patient was asked to make guesses about whether a target appears either in a cued or an uncued locations or not, both of which were in the blind part of

7 On this point see p. 113 in Alan Allport, “Attention and performance,” in *Cognitive Psychology: New Directions*, ed. Guy Claxton (London: Routledge and Kegan Paul, 1980), 112–153.

8 Robert W. Kentridge, Charles A. Heywood, Lawrence Weiskrantz, “Attention without awareness in blindsight,” *Proceedings of the Royal Society (London) Series B: Biological Sciences* 266 (1999): 1805–1811.

his visual field. His performance improved if the target was presented in the cued location, although he denied he had had any experiences of the targets. Mole⁹ initially claimed that this is not a case of the dissociation between attention and consciousness since the subject did not actually attend to the stimuli but rather to the space they occupied. Consciously attending to the space resulted in facilitated processing of the stimuli of which the subject was not conscious. Thus, this absence of awareness and attention applied to different objects: stimuli and space respectively. Challenging this, Kentridge, de-Wit and Heywood¹⁰ reviewed evidence which was supposed to support their claim, namely that spatial attention is not deployed unless to determine the properties of objects occupying the attended region of space. In other words, there is no spatial attention without the specific object in attended space. Thus, space itself cannot be an object of spatial attention. In conditions like blindsight, attention is oriented to enhance the processing of predefined objects before they occur, although the blindsighted person is not aware of this processing *in statu nascendi*. This is seen by the authors as an argument supporting their claim that spatial attention is not a sufficient precondition for visual awareness. Mole eventually also subscribed to this point of view, although he contended that a necessary concomitant of attention must be agency.¹¹ In the dispute, the crux of the consciousness-attention problem thus lies in the question of reference to an object, in line with traditional discussions concerning intentionality as an essential feature of mental processes.

In this *state of affairs*, I would like to highlight the cognitive phenomenon most often referred to as *Inhibition of Return* (IOR). It was discovered independently by Posner and Cohen¹² as well as by Tassinari, Aglioti, Chelazzi, Marzi and Berlucchi¹³ under laboratory conditions using the cuing task (or the cost and benefits) paradigm. The onset of the cue in the periphery automatically leads to faster and more accurate responses to targets at this location than other ones, a finding which seems to be

9 Mole, "Attention and Consciousness," 100–103.

10 Kentridge, de-Wit, Heywood, "What is attended in spatial attention?," 105–111.

11 Mole, "Attention to Unseen Objects," 41.

12 Michael I. Posner, Yoav Cohen, "Components of visual orienting," in *Attention and performance X: Control of language processes*, eds. Herman Bouma, Don Bouwhuis (London: Erlbaum, 1984), 531–556.

13 Giancarlo Tassinari, Salvatore Aglioti, Leonardo Chelazzi, Carlo Marzi, Giovanni Berlucchi, "Distribution in the visual field of the costs of voluntarily allocated attention and of the inhibitory after-effects of covert orienting," *Neuropsychologia* 25 (1987): 55–71.

in accordance with common sense since it can be easily explained by the capture of attention by the cue. However, such processing enhancement only takes place at short stimulus onset asynchronies (SOAs). At longer SOAs (approximately 300 ms) the diverse effect occurs and the efficacy of detection responses to targets at the cued location drops and increases at the uncued locations. The phenomenon of IOR is canonically explained in terms of inhibitory bias against returning attention to places previously attended to and thus promoting attentional activity elsewhere. However, the mechanism and even its very nature are considered to be so vague that there are arguments against using the very label of ‘inhibition of return’ since it may turn out to be a misleading one.¹⁴

In the present paper, I suggest that the phenomenon of IOR, when analyzed in its dynamic microstructure, can actually serve to showcase all of the options considered by the adversaries in the aforementioned debate over what can be attended to in spatial attention in the wider perspective of the attention-consciousness question. I will argue that, over the course of events in the cuing task during which the IOR effect occurs, there are also moments that could be described as: attention without an object, hence without consciousness of it, and consciousness of the object without paying attention to it. The paper is thusly primarily of meta-theoretical character to propose a joint perspective for experimental psychology and phenomenology to tackle the problem which has been articulated by the authors. My main goal, however, is also to follow Mole’s attempt to connect attention with agency. Asking a “What is X?” kind of question,¹⁵ I will seek to heuristically formulate the latter in terms of Merleau-Ponty’s phenomenological notion of pre-reflective intentionality in order to test whether this can help us find the essence of IOR as an attentional process, at least from the phenomenologist’s standpoint. Thus, I propose conceptualizing IOR as the body-subject’s act of turning away from the area of space which s/he has already inspected and not turning back, rather having the intention of handling objects in new areas.

14 On this point see Giovanni Berlucchi, “Inhibition of return: A phenomenon in search of a mechanism and a better name,” *Cognitive Neuropsychology* 23, no. 7 (2006): 1065–1074.

15 Roman Ingarden, “O pytaniach esencjalnych,” in *Z teorii języka i filozoficznych podstaw logiki* (Warszawa: PWN, 1972), 327–507.

2. Inhibition of Return (IOR): An Exception to Brentano's Famous Dictum?

The starting point of the debate on the attention-consciousness problem, which I have introduced above, is the presumably commonsense formula, according to which one is conscious of everything that one pays attention to, but one does not pay attention to all the things of which one is conscious.¹⁶ Analyzing this approach to attention as a sufficient, albeit not necessary, precondition for consciousness, it can easily be noticed that it rests on an assumption of a *noesis-noema* structure of attention in the sense that attention leads to consciousness, provided that attention has an object of which one can be conscious. Following this line of argumentation, it could be logically inferred that if there was attention without an object of which one can be conscious, there could be attention without consciousness, i.e., consciousness of an object. Kentridge, de-Wit and Heywood also subscribe to the assumption of a necessary bond between spatial attention and its object, although they use it, somehow paradoxically, to argue against Mole's stance and for a possible dissociation between attention and consciousness. For example, a blindsighted individual is able to orient attention towards an object which results in dealing with its properties more effectively, although it is an object that s/he is not conscious of.¹⁷

Situating the question of objects at the heart of the attention-consciousness problem, especially while the controversy concerning the relation between intentional acts and their objects still seems to be a lively issue,¹⁸ calls for reconsidering the question as to whether attention must indeed have an object. I am inclined to think that a phenomenon worth analyzing in this context is *Inhibition of Return* (IOR) as a cognitive effect discovered within an experimental procedure called the cuing task paradigm or the cost and benefits paradigm developed by Michael Posner and collaborators.¹⁹ Over the sequence of events in a version of the procedure called an exogenous cuing task (Fig. 1), a subject is supposed to fixate his/her sight at a central point on a computer screen and

16 Mole, "Attention and Consciousness," 86.

17 Kentridge, de-Wit, Heywood, "What is attended in spatial attention?," 105–111.

18 Reuter, "Merleau-Ponty's Notion of Pre-Reflective Intentionality," 69–70.

19 Michael I. Posner, "Orienting of attention," *Quarterly Journal of Experimental Psychology* 32 (1980): 3–25; Michael I. Posner, Mary Nissen, William Ogden, "Attended and unattended processing modes: The role of set for spatial location," in *Modes of perceiving and processing information*, eds. H.L. Pick, E. Saltzman (Hillsdale, NJ: Lawrence Erlbaum Associates, Inc. 1978), 128–181.

then to react to a target stimulus presented at one of two locations, each marked by one peripheral box, one to the right and the other to the left of the fixation. A variable time before the target appears (SOA – stimulus onset asynchrony), an intermediate stimulus is presented to cue the target appearance at one of the two possible peripheral locations. The cue may be, for example, an increase in luminance of the outline of one of the boxes. Responses to targets presented at the cued location are faster and/or more accurate than responses to targets at the uncued location. From the most popular point of view, which was originally advanced by Posner himself, less effective reactions towards targets presented at uncued locations result from an involuntary shift and capture of attention at the cued location. After a target stimulus is presented at the uncued location, attention must be reoriented to the non-attended but stimulated location. This reorienting of attention takes time and therefore causes a delay in the latency of a voluntary response towards the target.

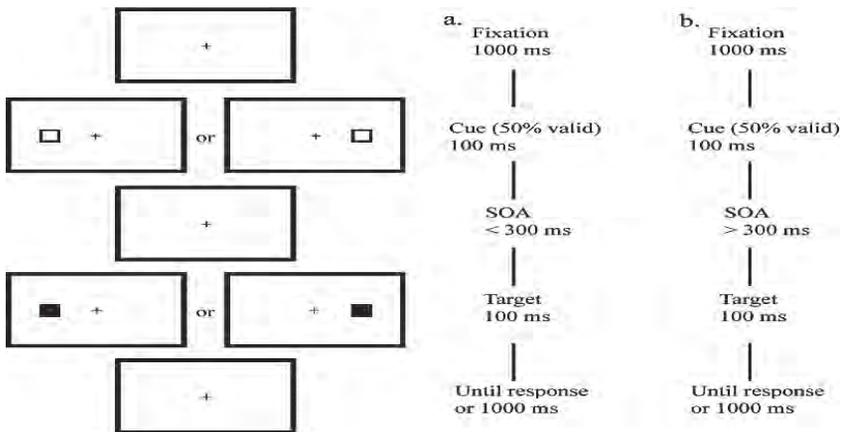


Fig. 1. The sequence of events in the exogenous cueing task.

Analyzing this canonical explanation, one may employ micro-phenomenology²⁰ to come up with the proposal of a more detailed description of a sequence of events for the whole process. Having been instructed to fixate at a central point and to respond to a target, a subject detects stimulation by a cue which results in an involuntary shift of

20 Claire Petitmengin, Martijn van Beek, Michel Bitbol, Jean-Michel Nissou, Andreas Roepstorff, “What is it like to meditate? Methods and issues for a micro-phenomenological description of meditative experience,” *Journal of Consciousness Studies* 24, no. 5–6 (2017): 170–198.

covert attention, i.e., attention that does not express in eye movements, towards the cued location. Attention continues to be captured there after the cue disappears and before the target appears. The subject's cognitive activity is then stimulated by the target occurrence which is detected as a new stimulus. S/he either employs attention which is already there or reorients attention to the uncued location in order to recognize, i.e., to become "consciously aware" – as Giacomo Rizzolatti and colleagues put it,²¹ referring to Posner – that the stimulus is a target and subsequently voluntarily triggering the reaction. If this description adequately reflects the sequence of events, one can discern a gap between disappearance of the cue and appearance of the target when there is attention which is oriented but there is not an object that is being attended. And if one pays attention but there is not any object to it, logically one cannot be conscious of such an *un*-existing object. If so, this facilitatory effect of prior information could be considered to be a case of attention without consciousness. Moreover, when the target is presented in the uncued location, from the subject's standpoint it is initially detected as a stimulus and then attention is reoriented towards it to enhance the processing of its attributes in order to determine if it is a target and if a response should be emitted. Again, if this is so and if stimulus detection means 'conscious awareness of the stimulus' (*ibid.*), consciousness precedes attention. In other words, there is a state in the sequence of events, that the exogenous cuing task consists of, which can be described as consciousness without attention. Referring the above analysis of the overall exogenous cuing task to the presumably commonsense picture of the relationship between attention and consciousness,²² according to which consciousness is a necessary concomitant of attention but attention is not a necessary concomitant of consciousness, it could be used in support of the latter point but against the former.

The subject can attend, i.e., s/he can be in the state of allocating attention, without necessarily having an object in the world that is the object of this state, hence the object that s/he is conscious of. This is, however, a description that Kentridge, de-Wit and Heywood, would not subscribe to. They argue that spatial attention is not directed in space (like a gaze wandering in the dark or in a thick mist) unless with the intention of

21 On this point see p. 32 in Giacomo Rizzolatti, Lucia Riggio, Isabella Dascola, Carlo Umiltà, "Reorienting Attention Across the Horizontal And Vertical Meridians: Evidence in Favour of a Premotor Theory of Attention," *Neuropsychologia* 25, no. 1A (1987): 31–40.

22 Mole, "Attention and Consciousness," 86.

enhancing the processing of the specific objects which inhabit it.²³ Yet, according to the authors, they are objects that one is not always conscious of.²⁴ I think that it might be true that spatial attention is oriented with the intention of finding specific objects in space. I can even presume, at least for the sake of heuristics, that it is always the case. It would, however, still be difficult to deny the moment in the sequence of the cuing task when and where, after a cue disappears and before a target appears, attention has been captured and continues to be oriented but there is no object in space, hence there is no object that one could attend to.

I am also inclined to think that following the sequence of events further in the cuing task after the facilitatory effect finishes, one arrives at the standpoint from which the question of the relation between attention and its object in the context of the attention-consciousness problem may appear in still more light. It is when the time interval between a cue and a target exceeds approximately 300 ms. Then, reaction times to targets presented at previously stimulated locations are longer than to targets presented in new locations (Fig. 1b) which may seem to be against commonsense, since a cue imperatively captures attention and thus should pave the way for reactions at the cued locations. This aftereffect, most often referred to as “inhibition of return,” is typically described in terms of a sequence of events in which attention is first drawn to the location of an uninformative stimulus and then abandons that location and “develops a bias against returning to it.” There are doubts about this interpretation²⁵ and even about IOR being an attentional phenomenon at all.²⁶ If this canonical interpretation is, however, adequate, I would like to make it a case to be a potential challenge for Brentano’s famous dictum of necessary “in-existence” of particular objects within intentional acts, e.g., attentional ones, and for Kentridge and colleagues’ approach to follow, although not explicitly, to claim that spatial attention always has a specific object.

2.1. *Orienting Attention away from an Object not to be Conscious of It*

After some time, attention is biased away from a location which it has already attended and instead becomes biased toward novel locations or/

23 Kentridge, de-Wit, Heywood, “What is attended in spatial attention?”, 105–111.

24 *Ibidem*.

25 See e.g., Giovanni Berlucchi, “Inhibition of return,” 1065–1074.

26 See e.g., Tracy L. Taylor, Raymond M. Klein, “On the causes and effects of inhibition of return,” *Psychonomic Bulletin & Review* 5 (1998): 625–643.

and events.²⁷ Taking for granted this interpretation of IOR as a precise report on the sequence of events in the cuing task, inhibition of return could be described as being about “novelty seeking,” an explanation reminiscent of Posner and colleagues.²⁸ It would encourage orienting toward novel, potentially salient, events in the environment. In this way, it might be considered the case of attention without a particular object, hence without consciousness of it, at least until an object is presented. Of course, one could also argue that a subject is instructed to respond to the predefined stimulus in the exogenous cuing task. This is why IOR is not just about orienting to otherness and elsewhere. It encourages the orienting of attention toward new locations but in order to search for the targets specified in the instruction given to the subject, which would make it just another case of spatial attention deployed with the goal of determining the properties of specific objects occupying the attended region of space, according to Kentridge, de-Wit, and Heywood.²⁹

I would, however, again highlight the particular moment in the sequence of events in the cuing task when attention continues to be oriented before the target, i.e., an object, is presented. We did it already, referring to the facilitatory effect when attention is captured by a cue and remains at the cued location after the cue has disappeared which is supposed to result in the target being processed more effectively if it appears at this location than as it appears at the uncued one. This time, however, during IOR, it is oriented away from the cued location. Thus, it is done so not by an exogenous cue but somewhat inside-out, top-down, or from within an agent which, in anyway, requires some kind of agency – a point I will expand upon later. That is why one could also meaningfully call such an act of orienting as “endogenous,” if this term were not technically reserved for another version of the cuing task. Whatever we term it, the point is that attention is oriented toward the uncued location, although there is no object there yet, which would again make it a case of attention without an object, hence attention without consciousness (of an object). One could, of course, dismiss this interpretation by arguing that although in the cuing task a subject (re)orients attention with intention

27 Raymond M. Klein, “Inhibitory tagging system facilitates visual search,” *Nature* 334 (1988): 430–443; Raymond M. Klein, Joseph W. MacInnes, “Inhibition of return is a foraging facilitator in visual search,” *Psychological Science* 10 (1999): 346–352.

28 Michael I. Posner, Robert D. Rafal, Lisa Choate, Jonathan Vaughan, “Inhibition of return: Neural basis and function,” *Cognitive Neuropsychology* 2 (1985): 211–228. See also Kristie Dukewich, “Reconceptualizing inhibition of return as habituation of the orienting response,” *Psychonomic Bulletin & Review* 16, no. 2 (2009): 238–251.

29 Kentridge, de-Wit, Heywood, “What is attended in spatial attention?”, 105.

to engage in the target before it actually appears there, it is already bound to this intention, hence to attentional act, let us say – mentally, e.g., in working memory. For example, an observer directs her/his attention somewhere, expecting that the specific object that s/he is bearing in mind might come to exist there. In other words, the non-existence of the object in the environment at a particular point of time does not necessarily rule out the “in-existence” of it as an intentional/attentional object then. Regardless of this issue, which confronts the behaviorist’s purview with those of less hard-nosed psychologists, I am inclined to think that IOR can be considered a case of attention without an object, hence attention without consciousness, but yet consciousness without attention, because of some essential feature of this phenomenon which is rather overlooked in its “canonical interpretations.” However, I would once again like to underline that the point I am going to raise rests on the assumption that IOR is an attentional phenomenon. And given the state-of-the-art knowledge of this effect, this may still be considered an open question.³⁰

This essential point which yet seems to be either missing or left vague in the descriptions of IOR is that this is a phenomenon of orienting of attention not only in terms of attention being biased toward but also in terms of attention being biased away. The former might even be considered as *merely* being the consequence of the latter, although this is a question that might require an accompanying intellectual apparatus of ontology and logics. To interpret the matter more cautiously – they are aspects of the IOR effect that reciprocally determine each other. Turning away from some region of space or away from the objects occupying this location is also an act of directing one’s attention. Spatial attention can be directed to engage with objects at a certain region of space – but also not to engage with them. Inhibition of return would be a case of the latter. To some extent, it would then be the case of attention without an object and the term “object” would also refer to space. Thus, in regard to Mole’s stance in the aforementioned dispute on what can be attended in spatial attention, IOR can be considered as the case of attention without an object in terms of specific stimuli but also in terms of locations in space inhabited by particular objects. Moreover, by also appealing to the functional role of attention as a gateway to consciousness, i.e., as what

30 Juan Lupiáñez, Raymond M. Klein, Paolo Bartolomeo, “Inhibition of return: Twenty years after,” *Cognitive Neuropsychology* 23 (2006): 1003–1014.

makes something accessible for consciousness,³¹ IOR can be characterized as attention deployed so as not to be conscious of it. Referring this description to the typology of spatial attention widely used in experimental psychology, which includes attention as “selection-for-perception” and as “selection-for-action,” IOR would be considered “selection-not-for-perception” and “selection-not-for-action.”

Reconceptualizing the inhibition of return as an act of orienting away from objects (both as stimuli and as locations in space), and thus not being conscious of them, makes it possible to consider IOR as a case of an intentional act which does not contain an object within itself. It can be then used as an exception to Brentano’s dictum of the “inexistence” of objects within intentional acts and an argument against a necessary *noesis-noema* structure of psychological activity – according to Husserl. In this way, it could also be used in favor of Merleau-Ponty’s approach to intentionality. According to the French phenomenologist, there can be intentional acts which are not *of* or *about* anything specific but are *directed* towards the lived world (*Lifeworld*) which is inhabited by objects.³² This is why the bond between acts, e.g., attentional ones, and their objects may be rather loose.

Another potential argument for the stance that a subject can attend, i.e., s/he can be in the state of allocating attention, without necessarily having an object in the world that is the object of this state, hence the object that s/he is conscious of, might be pointed to while following further the sequence of events that IOR consists of. After about 300 ms from when a cue is presented at a given location, a bias develops against returning attention there and toward an uncued location. This bias encouraging, and thus orienting, attention elsewhere develops – what should be underlined once again – before a target is presented and then there is no other object in the visual field. That is why the question arises – what is this attentional bias toward? Of course, one can come up with a suggestion, as Kentrige and colleagues would, that the subject’s intention is to react to a predefined ‘in-existing’ target which s/he bears in mind all that time. This bias would be thus toward that particular distinctive object. Would it not, however, be more rigorous to presume that in that very moment when attention is already directed, it is rather directed at nothing which registers in consciousness? Or, that if it is directed at

31 Declan Smithies, “Attention is Rational Access Consciousness,” in *Attention: Philosophical and Psychological Essays*, eds. Christopher Mole, Declan Smithies, Wayne Wu (New York: Oxford University Press, 2011), 247–273.

32 Merleau-Ponty, *Phenomenology of Perception*, 381. On this point see also Reuter, “Merleau-Ponty’s Notion of Pre-Reflective Intentionality,” 69.

anything, it would be “an area of free space” in the “plenum of the world,” as Merleau-Ponty would dub it.³³ I will return to this question later but, whatever the answer is, his notion of pre-reflective intentionality provides a conceptual framework into which this explanation can be fitted.

3. Is IOR the Case of Consciousness without Attention?

If IOR might be explained – as I have suggested above – as attention being directed with an intention of not being conscious of objects in some regions in space, although the subject can still detect and properly react to targets in those locations, it thus seems that the term *inattentive attention* would be well suited to addressing this phenomenon. The question, however, arises as to whether it would not be more adequate to describe it as a case of consciousness without attention. In other words, if consciousness is not a necessary concomitant of attention, should attention also be conceptualized as an unnecessary concomitant of consciousness? In order to address this question, it is useful to once again look more closely at the basic vocabulary instrument employed in IOR research and the time course of the effect itself. Thus, if the “attentional bias toward” novel events which results from “inhibition of attention” to previous ones means that attention is oriented away from the cued location after about 300 ms to not return, one can assume that it is not at there. Yet, when a target is presented at the cued location, a subject is still able to react to it. S/he does so slower than when it is presented at the uncued location but still does so. At first glance, it may appear that consciousness runs ahead of attention here. I think that in order to confirm as to whether this first thought is correct, one needs to follow the leading question here, namely why are the reactions to targets presented at the cued locations slower than to targets at the uncued ones during IOR? I am also inclined to think that the most common explanation of the effect, according to which a delay in the latency of a voluntary response towards targets at the cued locations results from the time consuming reorienting of attention,³⁴ does not seem satisfying. Moreover, it may transpire that the satisfactory answer to that question requires a concept of what constitutes attention in its very essence – spatial attention in this case. To address this question, I would like to apply micro-phenomenology once again and take

33 *Ibidem*, 111.

34 Michael I. Posner, Charles R.R. Snyder, Brian J. Davidson, “Attention and the detection of signals, *Journal of Experimental Psychology: General* 109 (1980b): 160–174.

a closer look at the micro-structure of IOR, hoping to derive a possible description of its micro-dynamics.

During IOR, attention is biased toward uncued locations. What happens, when a target is presented at the cued one? According to the aforementioned canonical explanation, attention is reoriented and engaged in the target which then triggers a response to follow. This reorienting takes time which is not needed if a target is presented at the uncued location, because attention is already there in the latter case. Is, however, this explanation really as persuasive as it is commonly thought to be? Why would attention be reoriented at the cued location in the first place? Despite having sight fixated only at a central point, the whole of a computer screen is in the subject's visual field and s/he can still perceive the events happening all over it. Moreover, people have known for millennia that we can use peripheral vision to look at things and see them 'out of the corner of the eye'. This is especially true when the object to be perceived is so simple and easy to recognize in terms of its perceptual structure as the objects used in the role of a target in typical cuing tasks. That is why, using common sense, one could argue that reorienting attention toward a cued location which consumes time is simply not needed. Of course, on the other side of the argument, one could still push for an idea of attention as some kind of power which is necessary in order to make perception effective. Would not, however, such an idea of attention appear so naïve that it would provoke some researchers, including those as prominent as Donald Broadbent, to ironically term it "a mysterious asset or energy" and to suggest that avoiding the very category of attention would be "a step towards clarity?"³⁵

In the face of this vague picture of IOR, I would like to come up with two possible explanations of this phenomenon by referring it to the question as to whether it can be considered a case of consciousness without attention. I will start by suggesting that the key thing in this context is the question of how it is at all possible that attention is reoriented toward a certain location after having been biased away from it and biased toward the other one. If attention is oriented elsewhere, and it is commonly considered as a strict condition to trigger reaction, i.e., I cannot respond to a target unless I pay attention to it, what is it that triggers attention itself? The logical answer, and perhaps the only possible one, is that it must be something that precedes attention and initiates this chain reaction of responses. Thus, this cognitive process which runs

35 On this point see p. 253 in Donald E. Broadbent, "Task-Combination and Selective Intake of Information," *Acta Psychologica* 50 (1982): 253–290.

ahead of attention must be something independent of it. In other words, one perceives things that one does not pay attention to. This process can be described in terms of stimulus detection. According to Posner who distinguishes orienting from detecting, detection “means to be aware or conscious of the stimulus.”³⁶ He goes on to describe this act –

By detecting I will mean that a stimulus has reached a level of the nervous system at which it is now possible for the subject to report its presence by arbitrary responses that the experimenter may assign. These may be verbal (“I see it”) or manual (pressing a key).³⁷

However, according to the “scenario” of IOR which I derived, such an approach would be akin to a short cut. Detecting can indeed be understood in terms of becoming aware or conscious of the stimulus but only in the sense of awareness that an object has just appeared without further specifying its attributes and possibly recognizing it as the target. In this way, although the subject’s attention is biased away from it, s/he perceives that something has just happened. So far, receiving a signal of the stimulus appearing in the unattended region is the case of consciousness without attention. And after that, attention follows being shifted to enhance the cognitive processing of this initially vague object in order to determine if it is a target and to possibly trigger the reaction, e.g., saying “I see it” or “pressing a key.” Otherwise, equating “detecting” with an object registering in consciousness as the target, without including this intermediary phase of detecting it *merely* as an unspecific object – in the way Posner seems to – would suggest that when attention is biased away and then reoriented toward the target, the subject is conscious of the target exactly at the same time when attention starts to be reoriented and before it has been reoriented in order to be conscious of it, which obviously sounds contradictory. Thus, following the sequence of events during IOR and the metaphor of attention as a doorway to consciousness, one may say that an object arrives at its threshold as an unidentified stranger, it is then attended to and becomes fully accessible for conscious use.

There is also another way to explain the difference in reaction times to targets at the cued and uncued locations during IOR, despite the fact that the whole of a scene is within the visual field, without getting involved into fuzzy conceptualizations of attention as “a mysterious asset

36 Posner, “Orienting of attention,” 4.

37 *Ibidem*.

or energy.” It thus requires addressing the question of what it is which we call attention. One of the answers may be that attention is not a distinct, i.e., modally independent, psychological entity but motor preparation, i.e., readiness for goal directed actions such as eye-movements. In this way, a bias toward events at uncued locations resulting in longer reaction times to targets at the cued ones during IOR can be explained in terms of the subject’s readiness and being prepared for motor actions at the locations which have not yet been attended.

4. Attention and Embodied Agency

Over the course of the dispute concerning the closeness of the bond between attention and consciousness, Christopher Mole initially advocated the view that it is an inseparable one.³⁸ Later, he admitted that there are reasons for abandoning this claim. He retained, however, the stance that a necessary concomitant of attention is agency.³⁹ Incidentally, this approach seems to resonate with the prominent, albeit widely overlooked, claim of William James which associates attention with volition.⁴⁰ I would like to subscribe to this general point of view but also to offer a specific understanding of agency that would be deployed to address the leading question of the previous section, namely: Why are the reactions to targets presented at the cued locations slower than to targets appearing at the uncued ones during IOR? And why is it so, despite the whole of the scene being within the visual field and there being no reasons for any visual acuity deficits?

I believe that a conceptual framework which could possibly suit this purpose is the Premotor Theory of Attention (PToA). It is one of the influential, albeit controversial,⁴¹ modern accounts of attention which appears to follow the tradition of the deflationary treatment of this category as a dispensable one. According to its authors,⁴² motor preparation is both necessary and sufficient for spatial attention. “The condition in

38 Mole, “Attention and Consciousness,” 86.

39 *Idem*, “Attention to Unseen Objects,” 41.

40 On this point see in William James, *The Principles of Psychology* (New York: Dover, 1890) 424.

41 Daniel T. Smith, Thomas Schenk, “The Premotor theory of attention: Time to move on?,” *Neuropsychologia* 50, no. 6 (2012): 1104–1114.

42 Giacomo Rizzolatti, Lucia Riggio, Isabella Dascola, Carlo Umiltà, “Reorienting Attention Across the Horizontal And Vertical Meridians: Evidence in Favour of a Premotor Theory of Attention,” *Neuropsychologia* 25, no. 1A (1987): 31–40.

which action is ready but its execution is delayed corresponds to what is introspectively called spatial attention.”⁴³ Since visual attention is functionally equivalent to motor preparation, there is no need for a substantive independent theory of attention. That is also why we have not discovered specific neural correlates of visual attention as an independent, specific cognitive phenomenon.⁴⁴ The PToA has been formulated on the basis of experimental data showing that responses to stimuli presented in the cued hemifield are faster than those in the uncued one, even though the distance between cue and stimulus in the cued hemifield is greater. This phenomenon was called *the meridian effect* and explained in terms of the temporal cost of reprogramming the vector of eye movements which is to result in the latency of the saccade in the opposite direction being longer.⁴⁵

In light of the PToA, inhibitory bias against returning attention to the previously attended regions that results in attentional bias toward events in the unattended ones, which is what IOR is about, is not so much a consequence of a program or a plan for motor actions directed at stimuli located in the uncued areas as it *is* motor preparation for reactions at there as such. If spatial attention is to be functionally equivalent to the preparation of motor activity, i.e., some readiness to execute eye-movements in a certain direction, the condition in which this preparation is impaired should also have an impact on the effect of IOR. The experimental data suggest that it might be true. Michalczyk, Paszulewicz, Bielas and Wolski have recently demonstrated, with the use of an eye abduction technique, that preparation of eye movements disrupted in the temporal half-space results in IOR attenuation in that area, compared to the nasal part of the visual field in which eye movement was not restricted and IOR did not diminish.⁴⁶ To sum up, the results suggest that it is enough to disrupt oculomotor programming, or to put it plainly – motor ability, to reduce the attentional bias expressed in the IOR effect, although there are no visual acuity deficits. That is how they support the Premotor

43 Laila Craighero, Luciano Fadiga, Giacomo Rizzolatti, Carlo Umiltà, “Action for perception: a motor-visual attentional effect,” *Journal of Experimental Psychology: Human Perception and Performance* 25 (1999): 1673.

44 Giacomo Rizzolatti, Lucia Riggio, Boris Sheliga, “Space and selective attention,” *Attention and performance*, XV, 15, (1994): 231–265; Laila Craighero, Giacomo Rizzolatti, “The premotor theory of attention,” in *Neurobiology of Attention*, eds. L. Itti, G. Rees, J. Tsotsos (Burlington, MA: Elsevier, 2005), 181–186.

45 Rizzolatti et al. “Reorienting Attention Across the Horizontal” 37.

46 Łukasz Michalczyk, Jakub Paszulewicz, Jacek Bielas, Piotr Wolski, “Is Saccade Preparation Required for Inhibition of Return (IOR)?”, *Neuroscience Letters* 665 (2018): 13–17.

Theory of Attention which reduces spatial attention to motor preparation. However, there is no consensus on the presumably motoric nature of spatial attention. The results presented by Michalczyk and colleagues are still rather at odds with the mainstream research findings on this matter, including the question of the mechanism underlying IOR.⁴⁷ There is, however, a growing body of research results linking spatial attention closely with the programming of eye movement⁴⁸ and I am inclined to think that it should still be considered an open question.

Reconceptualizing attention in terms of sensori-motor machinery, which seems to be embedded in the idea of embodied cognition and the vocabulary adopted by the Premotor Theory of Attention, can again be considered in reference to Merleau-Ponty's notion of pre-reflective intentionality.⁴⁹ The French phenomenologist seeks to articulate it as the basic cognitive act of directing which derives from bodily motility, making it possible for the moving body-subject to *reach out* to things in the world and to reflect on them. It means that the properties traditionally ascribed to the human subject are constituted in its bodily nature. Hence, the exercise of agency consists primarily in "motor intentionality". The subject "of movement keeps in front of him an area of free space in which ..."⁵⁰ the body "surges towards objects to be grasped and perceives them."⁵¹

Our bodily experience of movement [...] provides us with a way of access to the world and the object, with a 'praktognosia', which has to be recognized as original and perhaps as primary.⁵²

47 See e.g., Daniel T. Smith, Thomas Schenk, "The Premotor theory of attention," 1104–1114; Soazig Casteau, Daniel T. Smith, "Covert attention beyond the range of eye-movements: Evidence for a dissociation between exogenous and endogenous orienting," *Cortex* (2018), doi.org/10.1016/j.cortex.2018.11.007.

48 Daniel Baldauf, Heiner Deubel, "Properties of attentional selection during the preparation of sequential saccades," *Experimental Brain Research*, 184, no. 3 (2008): 411–425; Łukasz Michalczyk, Jacek Bielas, "The gap effect reduces both manual and saccadic inhibition of return (IOR)," *Experimental Brain Research*, 237, no. 7 (2019): 1643–1653; Łukasz Michalczyk, Jacek Bielas, Anna Schab, "Preparation of saccade sequences and eye programming affect endogenous covert attention," *European Journal of Neuroscience* 52, no. 5 (2020): 3419–3433.

49 Jacek Bielas, Łukasz Michalczyk, "Is the premotor theory of attention essentially about pre-reflective intentionality?," *Theory & Psychology* 29, no. 6 (2019): 757–774, doi.org/10.1177/0959354319834672.

50 Merleau-Ponty, *Phenomenology of Perception*, 111.

51 *Ibidem*, 106.

52 *Ibidem*, 140.

That is why pre-reflective intentionality is rather about an “I can” than an “I think.” “Bodily space and external space form a practical system, in which bodily space is the background against which objects may ... become visible and function as goals for action.”⁵³

Inspired by Merleau-Ponty’s phenomenological account, one might explain IOR in terms of the body-subject’s turning away from the region of space which has just been attended to without the intention of turning back. The body’s act of directing – i.e., becoming bodily situated in such dimensions of a lived, “phenomenal” spatiality as: “up, down,” “on, under,” “near to, far from”⁵⁴ – is in a strict sense an intention to get in touch with the objects (*manipulanda*),⁵⁵ which inhabit the *Lifeworld*, and manipulate upon them. In terms of the Premotor Theory of Attention, one would relate it to the motor preparation of body effectors to attend to the incoming stream of stimuli. From such a joint perspective, i.e., that of the phenomenologist and the experimental psychologist, the effect of IOR would be explained in terms of pre-reflective bodily intentionality or motor preparation to act upon objects at new locations rather than at the previously attended ones. Attention reconceptualized in such terms would be indeed strictly bound to the agency which manifests itself in the embodied subject’s intentionality, plan or preparation, to re-act upon objects in certain regions of space.

Thus, the controversial notion that consciousness is a necessary concomitant of attention in a way that one is conscious of everything that one pays attention to, could be reformulated into an apparently less controversial rule, according to which agency is a necessary concomitant of attention in a way that one orients bodily towards everything that one intends to attend to. And the same could be done in reference to another presumably commonsense point that attention is not a necessary concomitant of consciousness in a way that one does not pay attention to all the things of which one is conscious. According to such a new formula, attention would not be a necessary concomitant of agency i.e., one does not intend to attend to all the things that one is bodily oriented towards. The latter formula could be deployed to denote the essence of the inhibition of return. The body-subject orients away from the events in the cued locations but is involuntarily reoriented back there towards imperative

53 On this point see Reuter, “Merleau-Ponty’s Notion of Pre-Reflective Intentionality,” 73.

54 On this point see Russell Keat, *Merleau-Ponty and the phenomenology of the body* (Unpublished manuscript, University of Edinburgh, Edinburgh, UK, 1982). Retrieved from <http://www.russellkeat.net/admin/papers/51.pdf>, 8.

55 Merleau-Ponty, *Phenomenology of Perception*, 105.

stimuli which are presented in those already attended and abandoned regions. This redirecting of the action-oriented bodily organization is naturally time consuming, which explains the longer reaction times to objects in the area of space that has been left behind by the body-subject.

Analyzing the effect of IOR within a conceptual framework which includes the notion of agency could also shed some new light on the sharp division between two versions of the cuing task paradigm that are thought to depend on the types of orienting involved: exogenous or endogenous. If endogenous orienting can be understood as the manifestation of agency, such an agentic component may be traced to the very essence of IOR, even in the exogenous cuing task, because the inhibitory bias in question is induced from nowhere else but from within the organism itself and is then overcome by an outer imperative target at the cued location.

Conclusion

In the face of the controversial epistemological status of attention as a category with explanatory work to do, and of a warning against confusing it with other categories like, for example, consciousness,⁵⁶ an attempt to shed light on the relation between attention and consciousness seems particularly needed. At the crux of the dispute Mole vs. Kentridge, de-Wit and Heywood on the mutual relations between attention and consciousness, to which I have been referring in this paper, was the question of what can be attended to in spatial attention. This question can be naturally linked to the phenomenological issue of intentionality. In this meta-theoretical *state of affairs*, I proposed analyzing the phenomenon called *Inhibition of Return (IOR)*, which was discovered and studied within the cuing task paradigm, suggesting that, following its micro dynamics, it can be used to actually showcase various possibilities of relations between attention and consciousness. Over the course of events in the cuing task during which the IOR effect occurs, there are moments that could be described as: attention without an object, hence without consciousness of it, and consciousness of the object without paying attention to it. My main objective in this paper, however, was to refer the effect of IOR to the question of intentionality, something which was originally conceptualized in the field of phenomenology. I have thus also followed Mole's suggestion to link attention with agency. I propose explaining IOR in

56 Allport, "Attention and performance," 113.

terms of Merleau-Ponty's notion of embodied pre-reflective intentionality to test whether this can be a route to arriving at the essence of what is commonly called attention. From the phenomenologist's standpoint, the phenomenon of IOR would be described as the body-subject's turning away from the already attended region of space with the intention of acting upon objects in new locations. In reverse order, I also suggest that the experimental investigation of IOR can be used as an argument in favor of Merleau-Ponty's understanding of intentionality *versus* that of Husserl (Brentano), namely that intentional acts are directed *towards* rather than being *of* or *about* something.

My overriding goal in this paper, however, is obviously not so much to resolve its leading questions as to propose a meta-theoretical platform and to provoke both experimental psychologists and phenomenologists to utilizing it and tackle them.

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