

Maren Wehrle

Introduction. Access and Mediation: Attention Beyond Selectivity

Basically, everyone seems to know what attention is. It is a phenomenon that we encounter every day in our own experience, where it appears as a subjective performance in the form of a deliberately executed concentration. In psychology as well as in philosophy, attention is mostly regarded as an expression of the selective character of perception and thought, one that allows us to occupy ourselves with certain things usually for a particular purpose, while allowing other possible contents of consciousness to fade into the background and away from our focus. In this respect, the definition of attention by the psychologist William James has not lost its meaning: “Everyone knows what attention is. It is the taking possession of the mind, in clear and vivid form, of one out of what seems several simultaneously possible objects or trains of thought. [. . .] It implies withdrawal from some things in order to deal effectively with others [. . .].” (James 1890, 403–404).

The failure to concentrate or to employ selective attention strategies would seem to prevent our ability to execute a task, to work or to perform acts of thinking effectively; a lack of attention is seen as a distraction, as mind-wandering, or it can be defined in its more pathological forms as Attention Deficit disorder. Since the industrial revolution, from the mechanization of labor up to the recent digitalization of work and of our private environments, such ‘lacks’ of attention have increasingly become a problem for science, education and for the economy to solve. Starting with the sensory and informational demands of the technological workplace, such as the cockpits of British pilots in World War II, early cognitive psychology began its research on attention with the aim to respond to informational overloads. Such research assumes a limitation of the human processing system, in which only a few pieces of information can be processed properly per given time frame. In this sense, attention was understood as a kind of filter mechanism, one that ‘decides’ which information is permitted access to a deeper level of processing and thereby may find its way into our consciousness and memory. In the history of experimental research in cognitive psychol-

Acknowledgments: The editors would like to thank Karoline Mertens and especially Sören Fiedler at the Institute for Philosophy of the University of Würzburg for their help in editing the manuscript.

ogy from 1950 onwards, we continue to see attention conceptualized mostly as a selective cognitive or neuronal mechanism in the form of an auditory filter (Broadbent 1958), a visual spotlight (Posner et al. 1980), an attentional set (Folk et al. 1992) or saliency map (Jonides and Yantis 1988), and which is either spatially, task or goal oriented, or driven by salient stimuli. Even though, since James's insight in the 19th Century, we have acknowledged that we have the capacity to vividly possess objects or thoughts with our mind, how we might (better) control, capture or guide this capacity for 'attention', and ultimately avoid distractions, seems to remain a problem.

Today, one is not only confronted with an increasing amount of, and accelerated, visual stimuli and linguistic information within one's workplace, but, with the advent of ICT's (Internet Communication Technologies) and social media, the stimuli and information distinctions between the public and private domains are increasingly blurred. In the age of the internet, where social media sites, companies and influencers fight for our time, clicks, and feedback, attention is indeed the most valuable currency. The pressing question, here, seems to concern whether we are in fact in control of our own attention; do we possess the modern stream of information or does the world of infinite content and click-bait rabbit-holes possess us instead? That said, attention is about more than control over our own capacity for it: after all, we need and do in turn seek inter-personal recognition and hence we strive to capture, and perhaps even manipulate, the attention of others.

1 No One Knows What Attention Is

Although attention seems more important and existentially needed than ever before, do we really know what we seek, lack or want to control about it? What do we even mean by 'attention'?

If we take a closer look at the empirical research on attention in the last few decades, we might come to doubt the self-evidence of James' statement about what attention is. Instead, we are confronted with the tension between two methodological perspectives. First, from a personalistic perspective, attention is described as a human behavior, as is demonstrated in James' formulation: the 'taking possession of the mind' (op. cit.). Second, from a naturalistic perspective, attention is seen as a neuronal or functional mechanism. This latter perspective does depend on the former: while empirical cognitive psychology departs from the (mere) descriptive phenomenon or problem of attention, its empirical methods continue to rely on the observation and on the interpretation of

the attentional behavior of subjects. Despite this, the definition of attention is now formulated merely in a naturalistic way, that is, as a system “responsible for maximizing the efficient utilization of our limited capacities to process, store, and retrieve information” (Hommel 2019, 2290).

The shift from the description of a behavioral phenomenon or an experience of concentration, called ‘attention’, to the assumption that attention is nothing but a mechanism that causes or explains the respective behavior in question reflects another, less heuristic, shift from reflecting on attention as something, a phenomenon, that should itself be explained (the *explanandum*) to the cause or explanation of attentional behavior (the *explanans*). When, and how, did this happen? And, indeed, is the naturalistic definition able to explain what attention is or, even, why it is relevant to understand it? Even if we put aside the utilitarian wording and usage of economic and technical metaphors of this definition – which employs adjectives such as ‘maximizing’, ‘efficient’, ‘utilization’, ‘limited capacities’, ‘processing’, etc. – we are still left with the problem of circular reasoning, where an observed behavior is aligned with an underlying (set of) mechanism(s) that in turn causes and explains this behavior.

However, in an obvious discrepancy to this simple and general definition, when opening a psychological textbook or, simply, researching attention online, one cannot help but be confronted by an overwhelming variety of attentions or its sub-functions. Here, we find attention defined as *vigilance* (general status of high awareness), as *feature integration* (ability to selectively integrate information belonging to one event within and across sensory modalities; cf. Treisman and Gelade 1980) or as *selective attention* (ability to ignore misleading information or an irrelevant spatial location). Furthermore, it is differentiated between *spatial attention* (ability to prioritize processing of events from a particular location); *focused attention* (selection of external events for further internal processing); *involuntary attention* (processing of irrelevant information); attention as *visual search* (where one systematically searches for a target object or event); *divided attention* (ability to perform multiple tasks at one time which is enhanced through training and habit formation); *selective attention for action* (where attention is the ability to control spatial parameters of eye movements to select features or objects relevant for a task at hand); *goal-centered attention* (where attention enables us to prioritize one goal over another); *object-centered attention* (where attention allows us to prioritize one object, memory item, thought or conscious representation over others); and, last but not least *sustained attention* (the consolidation of information for later use, and/or the concentration in anticipation of a possible event over some time) (cf. Hommel 2019, 2290; Eysenck and Keyne 2000; Styles 2006).

In light of this variety of forms or subfunctions of attention, it would seem highly unlikely that one might be able to identify only one set of either functionally or neuronally-defined mechanisms. Moreover, all of the above identified forms of attention are directly related to the empirical research designed to test specific and isolated attentional tasks or subfunctions rather than the processes themselves. For example, attention is often studied via visual search tasks, in which subjects are asked to identify a target with respective features, such as a simple picture of a geometrical figure, like a colored circle or square, with the influence of distractors or location cues; attentional success is based on the time it takes to find the search target. The choice of tasks, therefore, represents how individual researchers operationalize ‘attention’ or ‘attentional behavior’. Debates in the history of attention research are thus necessarily related to specific experimental designs and paradigms that measure specific tasks, which the researchers then assume to represent ‘attention’ or attentional behavior as such.

Since the 1950s the research debates in cognitive psychology centered around, among other things, the following questions: is attention voluntary or involuntary? Conscious or automatic? Stimulus driven or, rather, task-driven? Controlled either exogenously or endogenously? Where does the supposed selection occur: at an early stage of sensory processing (visual features)? Or, at later stages (identified objects, linguistic meanings)? Does attention refer merely to input control or also to behavioral output (action control)? Such questions imply opposing or binary solutions. Indeed, viewed from a philosophical, especially phenomenological or enactive perspective (cf. D’Angelo 2020), these debates appear at times artificial as they tend to lose the connection to attention as a dynamic real-life phenomenon: within these highly specialized and isolated debates, some of which span over decades, one can seldom find an attempt to understand what attention is in a more comprehensive or integrative way.

The analytical psychological approach to attention, which invokes the neat separation of different functions like attention, intention, decision-making, perception, and relates them to separate functional and or physiological systems, seems to make the task of understanding attention increasingly difficult. If one wants to neatly differentiate between what psychology understands as ‘intention’ (i.e., the willingly carried out action or focusing behavior) and ‘attention’, then one must render the latter concept a mere selection of sensory input that is not in any way related to action (i.e., output). But, would this definition have anything in common then with the phenomenon we started out explaining? Why should a human subject or organism choose this stimuli, object or event over a variety of others if it is not in any way related to what one needs, wants or has to do, understood in a practical, aesthetic or epistemological sense?

Why are some stimuli, objects or events more relevant, preferred or salient in the first place? These terms are by definition relative, especially with regard to the (experienced) environment, that is, the objective context or spatial horizon, or with regard to the organism in question. Something emerges as salient in contrast to other stimuli or objects, like a red tomato within a green field but not within a field of red tulips. Moreover, what is salient for living beings, like humans, is not only relative to the natural, spatial or featural context, but to the respective bodily needs, conditions and skills in relation to their environment. In this sense, not every object or environment affords the same attention or action for all organisms. For cultural beings, like humans, saliency is also relative to what one has experienced and learnt before (what one is used to), what one individually, socially or culturally prefers or finds relevant in general or with regard to a current task, project or goal.

Even a brief consideration of attention research in cognitive psychology brings us to the conclusion that, contra James, “no one knows what attention is” (Hommel et al. 2019). Given this situation, Hommel et al. argue for an alternative approach: instead of the common analytical approach – that starts with a complex phenomenon or concept and tries to subdivide it into simpler parts – they suggest to take a *synthetic* approach. By synthetic, they mean starting from a simple function or mechanism that has been shown to be behaviorally relevant. In this context, Hommel et al. turn away from the search for brain regions or functional mechanism that cause or explain attention and instead try to identify the development of relevant neuronal circuits in the evolution of early vertebrates that have enabled “animals to select and control interactions with their environments to achieve goals and avoid negative outcomes” (Hommel et al. 2019, 2297). They argue that what one actually finds when investigating neuronal circuits is not a separate mechanism but rather a set of interacting processes that ultimately create the phenomenon of selectivity. These processes interact not because they belong to the same dedicated system but because “the human brain and body evolved this way and selectivity was a necessary feature to achieve efficient behavior” (ibid., 2298).

The critique provided by Hommel, among others, aligns well with the conceptual critique coming from philosophy, which understands attention not as a separate mechanism or cognitive mode but rather as a structuring quality or unity within different modes of consciousness, cognition or sensory experience (Mole 2010; Watzl 2017). In their special emphasis on evolution, behavior and action, the proposed synthetic approach furthermore connects well with ecological (Gibson 1979), embodied (Varela et al. 1991; Gallagher 2005; Thompson 2007) and enactive approaches (Noë and O’Reagan 2001; Noë 2004) in cognitive science, philosophy of mind and phenomenology (cf. Husserl 1973, 1989; Merleau-Ponty

2012; Doyon and Wehrle 2020). Independent of internal variations and conceptual differences, all of these approaches agree that perception and action cannot be investigated separately and that cognition in general must be understood as embodied, enactive, embedded and extended.

2 Attention Beyond Selectivity

At a closer look, however, this synthetic and more comprehensive approach seems to suffer from a reductive tendency or un-reflected presupposition. Attention is conceptualized here primarily as selectivity, where selectivity is understood as means to an end of an efficient action or outcome. Although selection is surely behaviorally relevant and can be interpreted as basis or precursor for what we describe as attention, it does not have to follow that (a) the function of attention is merely or always selective or that (b) selection necessarily relates to goal-oriented behavior.

Firstly, if one defines selection in a merely exclusive way, one assumes that selection (and thus attention) is an all-or-nothing phenomenon, where stimuli are either selected (processed) or not. Furthermore, the reason why an animal or human selects some stimuli over another is exclusively understood in relation to efficiency or avoidance of negative outcomes. This seems in wording very similar to the ‘conventional’ definition of attention, which the synthetic approach also criticized. However, the need for a selection of stimuli or objects must not be equated with an exhaustive or definitive exclusion of other stimuli. Rather, selection could be one aspect of an overall structuring and integrating function. As such, one has to take not only the spatial but also the temporal dimension of the respective subject-environment relations into account. Attentional structuring therefore means that an organism temporarily engages more vividly with some stimuli than others. This does not imply, however, that other stimuli, features, aspects, objects or events are not processed or experienced at all or will not be relevant at a later stage or where previously focused.

Secondly, attention as a phenomenon might have evolved with regards to goal-directed actions, but it cannot – at least in its distinguished human form – be reduced to mere goal-oriented behavior. Attention does play a role in meditation, in play and creative behavior as well as in thinking, in imagining in aesthetic experience, in social interactions, and in empathy, but none of these essential human behaviors are, in the strict sense of the word, goal-oriented or merely aim at efficiency or at the avoidance of negative outcomes. One could even go so far as to argue that goal-oriented behavior is not primary for the evolution and

development of most animals and humans, but rather is an open way of exploring and getting to know one's environment. This can be observed in the playful way some animals and human children discover their world and learn how to orientate themselves within it. Moreover, such a playful or explorative behavior in humans and other primates is not merely individual but also social; it is accompanied, supported and/or guided by caregivers and calls for imitation, interaction, and empathy. Most real-life selection or attention is thus not primarily individual or goal-directed in a strict sense, but indirectly or directly social. Attention is *indirectly* social in that one is implicitly guided not only by the natural but also by the social relevance and affordances of one's environment; it is *directly* social in the form of joint or shared attention which is the condition for any form of human cooperation and communication, and as such also 'behaviorally relevant' for survival.

To illustrate why it is important to look beyond (mere) selectivity when investigating attention as a dynamic phenomenon, a closer look at the concluding statement of Hommel et al.'s paper (2019) might be useful. The authors state: "everything an individual does throughout their life (distant and recent past) creates, reinforces, and shapes selection. Turning to the left makes us ignore stimuli on the right, picking one apple makes us overlook the others, saying one word prevents us from uttering any other. And each of the different selections results in all ranges of rewards, from positive gains to negative losses. Selection and reward are thus inherent ingredients of all our lives and the way we lead them" (Hommel et al. 2019, 2298; cf. also Allport 1987).

But does turning to the left really make us 'ignore' or 'overlook' the stimuli to our right? Rather, would it not be more appropriate to say that they are still conscious in the background, implicitly retained as that which we have previously perceived (i.e., before turning to the right)? These stimuli are in our minds but their presence may not necessarily be explicit; regardless, they impact what we expect to see and how we see new stimuli, including that which is to the left of us. Turning to the left enters the prior stimuli on the right into the temporal horizon of perception or stream of consciousness. This suggests that stimuli on the left (towards which we have now turned) are perceived in light of, and integrated with, what we have previously seen (Husserl 1991).

Picking one apple makes this apple and not all other apples available for closer inspection or ready to eat – that is true. But does this mean that we overlook all other apples? Again, the other apples are still there as the spatial horizon or thematic field (cf. Husserl 1983, 195ff., Husserl 2001, 42ff.; Gurwitsch 1964), in which the apple we now pick is spatially but also thematically embedded. The other apples are not currently picked by us, but are nonetheless experienced in the spatial horizon or periphery. They are ready to be picked by us (at a later

time) or by other animals. The fact that we can pick *one* apple already implies that there are more apples from which we can choose. On the side of the organism, it implies that we have a need, interest or appetite for apples; and, even more importantly, that we are able to pick this apple such that we have the bodily condition (free moving arms and legs) and acquired the habitual skill (of how best to pick apples) (cf. Merleau-Ponty 2012). Picking apples thus presupposes an ‘I-can’ on the side of the organism (Husserl 1989, 159; Merleau-Ponty 2012, 139), which translates to a specific affordance with regard to apples (as something that affords us to be picked, cf. Gibson 1979).

Of course, it is also not possible to utter more than one word at a time, but this one word, like a tone in a melody, can only be uttered and in turn heard as part of a temporal context of other words (e.g., the words uttered/heard before or uttered/heard after). Moreover, a word would not have the meaning of a ‘word’ (and not mere noise) if it were not for other words. For a word to be uttered, it must be integrated into the meaningful context of other words, which is to say in the context of a language as a whole. The subject in turn must know and understand this language, and be physically and mentally able to utter words that are understandable to others.

What hopefully becomes clear in this short illustration is that selection is never an all-or-nothing, nor indeed an ‘either/or’ phenomenon, but one always embedded in an overall attentional behavior. Selection is not an exclusion or erasure of other not-selected objects, but rather is one aspect of a more general change of structure (foreground and background, before-after). This structuring enables, on the one hand, a closer, more detailed engagement with some of the available stimuli or objects, while embedding and integrating them within a coherent and meaningful experience on the other. The selected stimuli are thereby part of an overall spatial and temporal horizon of experience. Without these other objects and contexts the selected stimuli would be neither meaningful nor relevant for the respective organism.

“Everyone knows what attention is” – James’ seemingly self-evident definition of attention points to the fact that for our experience and action not all possible objects, events or aspects of the world are equally important or present (more or less vivid, detailed, thematic) to us at a given time and within a given spatial context. Attention thus, in principle, represents a subjective differentiation or structuring of that which is objectively perceivable or noticeable – or, in the language of cognitive psychology, processable or computable. This specific engagement thereby goes beyond the scope of mere perception, it is more and less than just perception. Attention is more specific than perception in that it refers only to the singled-out feature(s), space, events, task(s) and divides the general perceptual field into a foreground and background, theme and thematic

field (Gurwitsch 1964), focus and horizon. It goes beyond the scope of mere perception because its objects are present in a more thematic, vivid or detailed way, but also because attention cannot be reduced to the level of sensory perception, but is characteristic of all kinds of cognition as well as action. One could say, attention as engagement is an action, that is, we *turn* our attention towards something either mentally or literally when moving our eyes and body, and perspective (Wehrle 2013; Wehrle and Breyer 2015).

In this latter sense, attention is not merely a *static possession of a selected item*, the *result of a differentiation of a given visual field* into parts or stimuli we focus on and those we merely vaguely notice in the periphery. Approached dynamically, attention is a turning towards or away from something: a change of perspective; a striving and aiming for something. In this sense, attention determines *what we come to see*, that is to say, it opens up future horizons of perception and action. While static attention is the function of (selective) structuring of the given (cf. Gurwitsch 1964; Mole 2010; Watzl 2017), dynamic attention in its intertwining of (habitual or current) subjective interest and external affection is the motor of every future perception and action (cf. Husserl 1973, 2004; Wehrle 2010, 2015).

3 Attention as Access and Mediation

Already in 1945, Maurice Merleau-Ponty criticized the opposing definitions of rationalism and empiricism and their binary conceptualizations of attention. Attention, according to Merleau-Ponty, is neither rational or empirical, top-down or bottom-up, initiated or controlled by the mind or the world, but rather it characterizes our specific, situated and explorative relation to the world. As he puts it in *The Phenomenology of Perception*:

How could one real object among all objects be able to arouse an act of attention, given that consciousness already possesses them all? What was lacking for empiricism was an internal connection between the object and the act it triggers. What intellectualism lacks is the contingency of the opportunities for thought. Consciousness is too poor in the first case and too rich in the second for any phenomenon to be able to *solicit* it. Empiricism does not see that we need to know what we are looking for, otherwise we would not go looking for it; intellectualism does not see that we need to be ignorant of what we are looking for, or again we would not go looking for it. They are in accord in that neither grasps consciousness *in the act of learning*, neither accounts for this “circumscribed ignorance,” for this still “empty” though already determinate intention that is attention itself.

(Merleau-Ponty 2012, 30).

Taking this phenomenological description as our source of inspiration and starting point, this volume endeavors to define *attention* by embarking on a more comprehensive approach and thereby moving beyond seeing it as a static act of selection of environmental aspects, however behaviorally relevant. Therefore, we – the editors and authors alike – will address attention as a general *possibility* and specific *ability* that is learnt, socially shaped, enabled, skilled and/or impaired, *to access* one's environment in a differentiated, structured, integrative and meaningful way. This 'access', as we see it, occurs on *different levels*: from sensory reception to practical action, to focused perception, thinking and reflecting. Each level is characterized by different modes of self and world-awareness, that is, from implicit and operative to explicit and thematic awareness, and they can be descriptively distinguished by *different modes* of cognition and action (e.g., practical-bodily, focal, global, joint, shared, aesthetic or moral attention).

By drawing attention to a notion of *access*, we want to point to the dynamic nature of attention itself and hence emphasize its temporality and operative character; indeed, to access something is an *action* and, as such, it *takes time*. Our understanding of access therefore includes implicit and/or explicit relations of access to oneself as an actor, and is in this sense closely related to the concepts of agency, skill and/or habits. This point will emerge as salient in a number of chapters of this volume (cf. D'Angelo; Solomonova and Carr; Sandoval and López; Hayes and Loaiza; de Boer).

At the same time, *access* points to the fact that *there is more than one way to access*, disclose or address the world or information within it; one can never access all aspects of a given world or the information it contains simultaneously. Every *access* is thereby concretely *situated*, which is to say that it is dependent on natural, cultural, social conditions and contexts as well as on the experiential past, skills and current goals of the individual. The chapters of this volume will draw out this point (cf. León; Segundo-Ortín and Satne; Hayes and Loaiza; van der Weele). As such, we understand attention as an ability, current act or as the possibility of access to an organism's environment. This means that attention cannot be a mere spotlight or mere highlighting of something that one already knows, possesses or has in one's mind or consciousness. Accessing something means, by definition, the possibility of *exploring or finding something new* that is or was formerly unseen and/or unknown (at least by that particular subject). In turn, attention as access cannot be reduced to the objective implication of external stimuli, something that one only needs in order to register or to select independently of individual or cultural circumstances.

Accessing something is thereby *not limited to a voluntary or explicit form of intentionality* (or directedness) towards the world, ourselves or others. Every active

access or selection relies on passive processes or on operative intentionality, as Husserl and Merleau-Ponty would define them. Before we explicitly turn towards something or single something out in perception, it first has to affect us passively, has to be given or made present to us in some way (cf. Depraz). The fact that we can thematically access things, that is, focus or inspect something in more detail, and thus pay attention to them, does not mean that the other aspects of our perception (i.e., what is not yet or not anymore in the center of our attention) are excluded, unconscious or unprocessed, nor does it mean that this renders our overall experience unchanged. Every *new* experience, *access* or sense of the world *re-frames, re-arranges the current and possible field of experience*.

Finally, approaching attention in terms of approach calls for a *transdisciplinary approach*. Attention is not only studied systematically, then, with regard to its different levels or modes, but it is also approached from the point of view of different disciplinary perspectives that themselves have approach to different insights and methodologies. With such a transdisciplinary approach, descriptive and explanatory, first-person and third-person, behavioral observation or subject reports, and objective measurement must seek to be combined in fruitful ways.

However, concretely-speaking, current acts of attention are always *mediated* – that is, shaped by one’s material, biological, economic, cultural or social circumstances, that is, concrete situation. In this regard, the concrete environmental, that is, spatial, temporal and social, context of attentional behavior becomes crucial. Especially nowadays specific cases of attention are often mediated in the literal sense by technologies. In line with post-phenomenological approaches (cf. Ihde 1990; Verbeek 2005), we understand technologies not as neutral intermediaries, but as mediums that do actively shape how one experiences and understands themselves and the world. Print media, telephone connectivity, television and smartphones, Internet Communication Technologies, search engines, virtual reality, the Internet of Things, all of these technologies shape how and what we can access of the world. They mediate how the world becomes present to people who relate to them in turn, and thereby co-constitute what stands out as relevant for us. Moreover, they also shape how we (scientifically) conceive, understand and conceptualize phenomena such as attention (cf. Wellner). Digital and augmented technology as well as internet communication devices can therefore be depicted as extensions of our bodily, sensory and informational access to the world. Even as extensions, however, mediated access can both broaden and limit one’s experiential horizon; it can open up new perspectives and possibilities, but also close-off other perspectives and forms of access, especially when it is too selective, individualized or restricted. Personalized algorithms, for example, may present you with custom-fit information, tailored to past, present and supposedly future individual preferences, which has its uses when looking for suitable products and booking a

vacation, but becomes problematic if what you are looking for needs to be grounded in information that is depersonalized and more objective. While personalized algorithms are problematic because we are not aware of the ways in which information is selected for us, self-tracking technologies in turn make us overly attentive to our behavior and habits.

Attention is in this sense an expression of the situated and mediated as well as interested (and thus selective) and meaningful (coherent and integrative) ways in which we are affected, directed and can address our environment, ourselves and others. On the one hand, attention is needed to access, which is to say to notice, to order, to concentrate, to integrate and to make sense of information about the world and others. On the other hand, humans, persons or social groups need the attention of others in order to be seen and heard, which consists in our participating of the cultural, social and/or political mediating of this very world.

4 Contents

In this volume, we propose a transdisciplinary framework that views attention from a particular angle: as a means of approaching, thereby disclosing the world in a practical and meaningful way. Moreover, we seek to focus on how attention is and can be technologically *mediated*, that is, how attention is shaped by technology, and how in turn technology can help us understand attention through the ways it enables and/or limits subjects to access information and participate in a shared world. Under the umbrella of access and mediation, this volume brings together theoretical, applied and empirical approaches to the subject matter, including the history of philosophy; philosophy of mind; philosophy of aesthetics; phenomenology and post-phenomenology; enactive theory; embodied cognitive science and cognitive neuroscience; ecological psychology and psychiatry; media studies and social theory. All of the contributions emphasize the dynamic and social character of attention by focusing on the role of the body, motricity/action, agency, temporality, habit, affordances, interaction, sociality, culture and technologies.

In the first part of this volume – *Attention as Access* – the chapters investigate the relation of attention to agency, aesthetics, and to joint action and social norms. In this regard, the volume reflects on the different levels and modes of attention as well as on the role of specific forms of access and attention that are in play in either philosophical or scientific research.

In his contribution, *Diego D'Angelo* (philosopher) carefully poses the question and discusses to what extent we need to be attentive in order to feel like we are the authors or owners of our actions. Indeed, in addition to this, to what extent can we access our own mental states and intentions, and how are introspection and agency related? He argues that, although (some) attention to the things we are doing is necessary for a sense of agency, this does not imply introspection. Rather this experience related to attention refers to an implicit feeling of being bodily active that has to accompany every action we assign agency to.

Susanne Schmetkamp (philosopher) emphasizes the normative character of attention, which is seldomly addressed in empirical research on attention. Schmetkamp introduces, in this regard, a differentiation between a usual perceptual or practical operative attention and a specific form of aesthetic attention. She argues that aesthetic attention is an integral part of aesthetic experience. Aesthetic attention is not only characterized by its (somehow aesthetic) object, but it must be defined by its qualitative character; it is an intensified and unified experience that differs from mere interest. In this sense, it is not a task-related but an intrinsic form of attention, which is to say that it comes with a change of perspective: we literally see something differently when we attend to it aesthetically. Aesthetic attention is thus a specific style of disclosure or access that is related to mindfulness, which in turn also has ethical implications and impact.

That attention is a social rather than merely individual behavior becomes obvious when we look at research on joint and shared attention. The investigation of attentional employment involves more than one person and occurs in joint or triadic ways. Attention is as such necessarily a communicative and social phenomena, a fact which is mostly underrepresented in empirical attention research in cognitive psychology. In his chapter, *Felipe León* (philosopher) shows why approaches that understand attention as an organizing or shaping experience, rather than as a mere selective or filtering function, are better suited to explain the transition from solitary to joint attention. Thus, he argues for a mutual enlightenment between research on attention in cognitive psychology and that on joint attention in philosophy, evolutionary anthropology and developmental psychology.

Attention as a phenomenon of access can and must be shared, and is in turn motivated and shaped by shared (social) environmental affordances. *Miguel Segundo-Ortín* and *Glenda Satne* (philosophers) introduce a long-needed relational account of social affordances, which is distinguished from a representational account. They distinguish between affordances that are provided directly by dyadic or triangular relations of agents and collective affordances that operate indirectly and lie at the basis of socio-cultural forms of life. A mail box, for example, is only

salient for subjects who have the intention to mail a letter. Moreover, a mail box only invites those who want to mail a letter and, presumably, who live in a community or society with a shared analogue writing culture and a postal system. Affordances thus only exist in relation to a shared socio-normative context, and yet such a context relies on direct social interaction at its basis.

In this regard, the question of the extent to which we must share attention and affordances in order to access and guarantee an objective world, a world that is valid for all, is again made urgent. And, in what sense is attention as access necessary for mutual empathy and understanding? *Natalie Depraz* (philosopher) understands attention in this regard as the basic capacity for a vigilant openness towards the world. The fact that we can focus or reflect on something specific or that we can be affected by it already presupposes a general state of sensitivity or responsiveness. This aspect of attention as an initial openness or tendency to explore and to being curious about the world has been long ignored in the history of the philosophy of attention. Nonetheless, such an openness or responsiveness is not only the condition of every specific access to information, but also of empathy and ethical behavior. In this sense openness or responsiveness can be intentionally and methodologically cultivated as practices of meditation or reflection. The phenomenological epoché introduced by Edmund Husserl, for example, is based on a shift of our attention from the perceived objects in the world to the very way this world (and object) is accessed by us, and motivates in turn an inquiry into the conditions of this access.

When we reflect on our experience, our attention shifts, for example, from the objects of our experience towards the experience of the objects. However, the way this experience is addressed either philosophically or scientifically is rather different. In their contribution, *Yuko Ishihara* (philosopher) and *Olaf Witkowski* (computational scientist) take the phenomenological method of ‘bracketing’ or epoché as their starting point in order to distinguish between three different ways of reflection on experience, the physical, psychological and the phenomenological-transcendental reflection. In developing a formal notation of these different ways of access, they provide a methodological framework which helps to clarify, compare, and translate philosophical and scientific accesses into each other and avoid logical misunderstandings. Moreover, the introduced matrix, which clarifies the conditions in which variables and operators require careful translation, helps to apply, mediate and implement philosophical differentiations into scientific research.

This leads over to the *second part* of our edited book – *Attention and Mediation* – which focuses on concrete, specific cases of attention (as in dreams, pathologies, musical performance, or social behavior) that often is mediated or investigated by way of technologies.

In the first chapter of this part, *Elizaveta Solomonova* and *Michelle Carr* (cognitive scientists), who both study the psychophysiology of sleep, investigate attention as a means of accessing and mediating the dream world. In their enactive approach to dreams, dreams are understood as embodied imagination. By way of this approach, they argue that attention is (a) a constitutive factor and (b) a trainable practice or skill that provides access and can mediate dream experience. Attention provides access to dreams via practices of recording and sharing dreams that enable, recall and enhance the richness of the dream experience; attention, in this respect, is a mediator of dreams in the sense that incubation, imagery rehearsal, and ultimately lucidity can be cultivated as cognitive skills enabling agency in the dream experience.

Luis Sandoval and *Betzamel López* (psychologists) also emphasize the role of attention as a trainable skill that can help patients to cope with psychosis. Schizophrenia, and other similar mental illnesses, are often accompanied by cognitive and attentional deficits. Sandoval and López thus combine interpersonal therapy with computerized neurocognitive treatment to improve cognitive abilities such that one might train attentional skills which then help patients to improve higher-order attention in schizophrenia. This treatment allows patients to quiet and ‘encapsulate’ their auditory hallucinations, which in turn expands their social skills and enables them to participate in social interactions again.

While in dream research and psychiatry, attention is revealed as a trainable skill that helps to establish or regain agency in limit cases, self-tracking technologies are explicitly designed to enhance agency and control of our bodies in everyday life. Contrary to personalized algorithms that are designed to capture and manipulate our attention, these health care technologies are designed with the purpose to help people lead a healthier lifestyle. In his contribution, *Bas de Boer* (philosopher) provides us with a careful analysis of how self-tracking technologies re-structure our attention in that they turn our body and habits into visible objects of relevance, indeed, objects that must be continuously attended to. Self-tracking devices are therefore not neutral technologies: they embody normative assumptions that pre-structure what it means to be healthy (e.g., taking at least 10,000 steps per day), and privilege certain ways of turning our habits into explicit ‘projects’. Self-tracking devices thereby shape the attention of users by making some aspects of the world stand out at the expense of others.

Technologies do structure and shape what we see of the world and how we approach it. This is also true when we look at how different technological developments have influenced and framed our concepts and research on attention itself. In her chapter, *Galit Wellner* (philosopher) provides us with a genealogy of attention through the lens of major shifts in media development, from print media,

telephone, television to cellphones and the internet. She argues that the concept of attention and the development of these technologies has been co-constitutive. The implication of this is that the dominant concept of attention as selective, which results from the dichotomy perceived between focus *versus* distraction, is in part attributable to the technologies available at the time. However, at least with the rise of the use of the mobile phone, which has made multi-tasking an everyday phenomenon, one has to admit that attention in the plural is possible or even that such multi-attentions are the norm rather than the exception.

What becomes obvious in this case is that the way we address and understand attention is mediated by technologies, but also by cultural and social pre-assumptions. Being distracted is not only considered epistemologically, evolutionary or economically problematic (as less efficient or a disadvantage for survival) but also socially problematic. Being distracted means that we are not able to concentrate on what is relevant (e.g., work) or to provide something or someone with the attention they deserve or demand. Being focused or paying attention is in this sense evaluated as socially and even sometimes morally good, whereas being distracted or seeking attention (as opposed to giving) is assumed to be a negative personal character trait. For this reason, *Cor van der Weele* (philosopher and biologist) asks why is it that seeking attention has such a bad moral reputation? This moral bias towards attention leads to a strategic ignorance in research when it comes to the investigation of the behavior of seeking attention. However, if we look at attention as a social phenomenon it becomes clear that we not only give but also hope to receive attention. Cor van der Weele appeals to a more sympathetic approach to attention-seeking. In an experiment she conducted with her own students, she was able to show that an explicit reflection on one's attention-seeking behavior can lead to more social understanding and acceptance.

Last but not least, *Lauren Hayes* (sound artist and researcher) and *Juan Loaiza* (philosopher) investigate attention in technologically-mediated musical improvisation. Digital technologies enable new participatory forms of musicking that in turn provides researchers with the possibility to investigate attention in action. In this respect, Hayes and Loaiza argue for an enactive and ecological psychological approach that can account for the dynamic, temporal and interactive dimension of attention. They investigate how attention unfolds in different temporalities, and how it depends on sensorimotor as well as social histories of past experiences (or input). In the context of musical improvisation that involves processes of sense-making and co-creation, the necessity of a sort of attention that is embodied and participatory becomes evident.

References

- Allport, D. A. (1987). "Selection for Action: Some Behavioral and Neurophysiological Considerations of Attention and Action". In: H. Heuer; H. F. Sanders (eds): *Perspectives on Perception and Action* (395–419). Hillsdale: Lawrence Erlbaum.
- Bekkering, H.; Neggers, S.F.W. (2002). "Visual Search Is Modulated by Action Intentions". *Psychological Science* 13, 370–374.
- Broadbent, D (1958): *Perception and Communication*. London: Pergamon Press.
- Comoli, E.; Das Neves Favaro, P.; Vautrelle, N.; Leriche, M.; Overton, P. G.; Redgrave, P. (2012). "Segregated Anatomical Input to Subregions of the Rodent Superior Colliculus associated with Approach and Defense". *Frontiers in Neuroanatomy* 6, 9.
- Craighero, L.; Fadiga, L.; Rizzolatti, G.; Umiltà, C. A. (1999). "Action for Perception: A Motor-Visual Attentional Effect". *Journal of Experimental Psychology: Human Perception and Performance* 25, 1673–1692.
- D'Angelo, D. (2020). "The Phenomenology of Embodied Attention". *Phenomenology and the Cognitive Sciences* 19, 961–978.
- Doyon, M.; Wehrle, M. (2020). "Body". In: D. De Santis; B. C. Hopkins; C. Majolino (eds.): *The Routledge Handbook of Phenomenology and Phenomenological Philosophy* (Chapter 9). New York: Routledge.
- Eysenck, M.W.; Keane, M.T. (2000). *Cognitive Psychology: A Student's Handbook*. 4th edition. Philadelphia: Psychology Press.
- Fagioli, S.; Hommel, B.; Schubotz, R. I. (2007). "Intentional Control of Attention: Action Planning Primes Action Related Stimulus Dimensions". *Psychological Research* 71, 22–29.
- Folk, C.L.; Remington, R.W.; Johnston J.C. (1992). "Involuntary Covert Orienting is Contingent on Attentional Control Settings". *Journal Experimental Psychology: Human Perception & Performance* 18, 1030–1044.
- Gallagher, S. (2005). *How the Body Shapes the Mind*. Oxford: Oxford University Press.
- Gibson, J.J. (1979). *The Ecological Approach to Visual Perception*. Boston, MA: Houghton Mifflin Harcourt.
- Grossberg, S. (1973). "Contour Enhancement, Short Term Memory, and Constancies in Reverberating Neural Networks". *Studies in Applied Mathematics* 52, 213–257.
- Gurwitsch, Aron (1964). *The field of Consciousness. Theme, Thematic Field, and Margin*. In: *Phanomenologica. Collected Works III*, ed. by R. M. Zaner. Dordrecht: Springer.
- Herrero, L.; Rodriguez, F.; Salas, C.; Torres, B. (1998). "Tail and Eye Movements Evoked by Electrical Microstimulation of the Optic Tectum in Goldfish". *Experimental Brain Research* 120, 291–305.
- Hommel, B.; Chapman, C.S.; Cisek, Neyedli, H.F.; Song, J.-H.; Welsh, T.M. (2019). "No One Knows what Attention Is". *Attention, Perception & Psychophysics* 81, 2288–2303.
- Hommel, B. (2010). "Grounding Attention in Action Control: The Intentional Control of Selection". In: B.J. Bruya (ed.): *Effortless Attention: A New Perspective in the Cognitive Science of Attention and Action* (121–140). Cambridge, MA: MIT Press.
- Husserl, E. (2004). *Wahrnehmung und Aufmerksamkeit. Texte aus dem Nachlass (1893–1912)*. In: *Husserliana XXXVIII*, ed. by T. Vongehr/R. Giuliani. Dordrecht: Springer.

- Husserl, E. (2001). *Analyses concerning Passive and Active Synthesis. Lecture on Transcendental Logic*. In: Collected Works LX, trans. by A. Steinbock. Dordrecht: Kluwer Academic Publishers.
- Husserl, E. (1991). *On the Phenomenology of the Consciousness of Internal Time (1893–1917)*. In: Collected Works IV, trans. by J. B. Brough. Dordrecht: Kluwer Academic Publishers.
- Husserl, E. (1989). *Ideas pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. Second Book. Studies in the Phenomenology of Constitution*. In: Collected Works III, trans. by R. Rojcewicz/A. Schuwer. Dordrecht: Kluwer Academic Publishers.
- Husserl, E. (1983). *Ideas pertaining to a Pure Phenomenology and to a Phenomenological Philosophy. First Book. General Introduction to a Pure Phenomenology*. In: Collected Works II, trans. by F. Kersten. Dordrecht: Kluwer Academic Publishers.
- Husserl, E. (1973). *Experience and Judgement. Investigations into a Genealogy of Logic*. New York: Routledge and Keagan Paul.
- Ihde, D. (1990). *Technology and the Lifeworld: From Garden to Earth*. Indianapolis: Indiana University Press.
- James, W. (1890). *The Principles of Psychology*. Volume 1. New York: Henry Holt & Company.
- Jonides, J.; Yantis, S. (1988). “Uniqueness of Abrupt Visual Onset in Capturing Attention”. *Perception & Psychophysics* 43, 346–354.
- Kahneman, D. (1973). *Attention and Effort*. Englewood Cliffs, NJ: Prentice-Hall.
- Luck, S. J.; Gaspelin, N.; Folk, C.L.; Remington, R.W.; Theeuwes, J. (2021). “Progress toward Resolving the Attentional Capture Debate”. *Visual Cognition* 29:1, 1–21.
- Merleau-Ponty, M. (2012 [1945]). *The Phenomenology of Perception*, trans. by D. E. Landes. New York: Routledge.
- Mole, C. (2010). *Attention is Cognitive Unison. An Essay in Philosophical Psychology*. Oxford: Oxford University Press.
- Mysore, S. P.; Knudsen, E. I. (2011). “The Role of a Midbrain Network in Competitive Stimulus Selection”. *Current Opinion in Neurobiology* 21, 653–660.
- Navon, D. (1984). “Resources – a Theoretical Soup Stone?”. *Psychological Review* 91, 216–234.
- Noë, A.; O’Reagan, K. (2001). “A Sensorimotor Account of Vision and Visual Consciousness”. *Behavioral and Brain Sciences* 24:5, 883–917.
- Noë, A. (2004). *Action in Perception*. Cambridge, MA: MIT Press.
- Posner, M. I. (1980). “Orienting of Attention”. *Quarterly Journal of Experimental Psychology* 32, 3–25.
- Styles, E.A. (2006): *The Psychology of Attention*. Second Edition. New York: Routledge.
- Suchman, R.G.; Trabasso, T. (1966). “Color and Form Preference in Young Children”. *Journal of Experimental Child Psychology* 3, 177–187.
- Thompson, E. (2007). *Mind in Life. Biology, Phenomenology, and the Sciences of the Mind*. Harvard: Harvard University Press.
- Treisman, A.; Gelade, G. (1980). “A Feature-Integration Theory of Attention”. *Cognitive Psychology* 12:1, 97–136.
- Varela, F.; Thompson, E.; Rosch, E. (1991). *The Embodied Mind. Cognitive Science and Human Experience*. Cambridge, MA: MIT Press.
- Verbeek, P.P. (2005): *What Things Do: Philosophical Reflections On Technology, Agency, and Design*, trans. by R.P. Crease. Pennsylvania: The Pennsylvania State University Press.
- Wang, X. J. (2002). “Probabilistic Decision Making by Slow Reverberation in Cortical Circuits”. *Neuron* 36, 955–968.

- Watzl, S. (2017). *Structuring Mind: The Nature of Attention and How It Shapes Consciousness*. Oxford: Oxford University Press.
- Wehrle, M. (2015). ““Feelings as the Motor of Perception””? The Essential Role of Interest for Intentionality”. *Husserl Studies* 31:1, 45–64.
- Wehrle, M.; Breyer, T. (2015). “Horizontal Extensions of Attention: A Phenomenological Study of the Contextuality and Habituality of Experience”. *Journal of Phenomenological Psychology* 47:1, 41–61.
- Wehrle, M. (2013). *Horizonte der Aufmerksamkeit: Entwurf einer dynamischen Konzeption der Aufmerksamkeit aus phänomenologischer und kognitionspsychologischer Sicht*. München: Wilhelm Fink Verlag.
- Wehrle, M. (2010). “Die Normativität der Erfahrung – Überlegungen zur Beziehung von Normalität und Aufmerksamkeit bei Edmund Husserl”. *Husserl Studies* 26, 167–187.

