

Specificity, methodology and psychopathology of Emotional Attention: An introduction to the special issue

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Standing in the midst of a crossroad when a sudden loud noise of a car crash immediately draws your attention and interrupts the conversation you were having with a colleague; the spider phobic who is sitting in a meeting room and is the first to detect an arachnid crawling down from the ceiling; a depressed person trying to make sense of negative events that have occurred and not being able to disengage attention away from self-referential thought and rumination. All these instances are examples of the many different possible situations where some form of “emotional attention” plays a major role in determining how external events are processed and behavioral responses are prepared. Emotional attention refers to the instances where emotional information is critical in eliciting a distinctive attentional response. This term inherently suggests that there is something special about the relationship between attention and emotion, although this is actually still a matter of debate and controversies. The past decades have witnessed major changes in research on emotional attention. Where research initially focused on demonstrating the existence of emotional attention in a variety of circumstances or situations, contemporary research focusses on the neural mechanisms associated with emotional attention and the functional role of emotional attention in the processing of information. This shift in research focus allows a much more fine-grained analysis of attentional mechanisms involved in processing of emotional information.

Multiple lines of evidence in cognitive and affective neuroscience concur and suggest that attention control processes are of utmost importance for adaptive and flexible goal-directed behavior, because they provide powerful selection or gating mechanisms that can operate rapidly at multiple levels and in parallel along the processing hierarchy in the human brain, and shape which information or stimulus content can eventually access awareness. Hence, at first sight, the realm of attention control processes seems to be immensely rich or intricate, and consequently also hard to grasp or model, to some extent. To overcome this problem, classically, a core distinction has been made in the literature between bottom-up and top-down factors during the guidance of selective attention, in order to account for these complex mental processes and delimit plausible anatomical as well as functional boundaries or landmarks. While the former usually refer to perceptual or low-level physical properties able to reflexively guide attention control, the latter correspond to high-level cognitive functions such as expectations or task demands that influence attention control effortlessly or volitionally. Although this dominant framework has proven extremely valuable for the identification and characterization of several

non-overlapping fundamental attention control processes in the human brain, the question arises today as to which extent such a dichotomy can also accommodate differential effects triggered by specific emotional stimuli or affective states, which necessarily provide yet another source of variance or noise for these specific attention control processes.

Indeed, the high propensity of emotional stimuli to readily bias or influence attention control processes appears to be a fundamental and ubiquitous process as well, enabling humans to swiftly prioritize the processing of these motivationally-significant stimuli and foster adaptive behavior, such as approach or avoid and/or flee or fight. However, whether these essential effects should be conceived as reflecting primarily bottom-up or top-down attention control processes, as outlined above, remains an open and highly debated question currently in the literature (see Okon-Singer et al., this issue; Pourtois et al., this issue). Hence, whether and how emotional attention brain mechanisms can be dissociated from brain systems involved in the control of attention (either exogenous or endogenous) devoid of emotion continues to pose a challenge to many researchers and existing neuro-anatomical models in the field.

This special issue gathers the original contributions (i.e., eight empirical and three review papers) of several leading experts in various domains of Biological Psychology, who directly address this theoretical question in their articles. Each manuscript provides new insights into the brain mechanisms as well as putative psychological processes giving rise to what has recently been coined “emotional attention”, which is the first main contribution of this special issue. A more precise working definition of emotional attention refers here in this special issue to dynamic and measurable changes in (various) attention control (brain) mechanisms arising as a consequence of the differential processing of (external) emotion-laden stimuli or situations, or even (internal) affective states. In this perspective, emotional attention is therefore not bound to one class of stimuli or specific mental processes per se, but instead, it probably encompasses an extraordinary rich scope of effects or phenomena, ranging from early sensory perception (operating equally on visual and auditory stimuli; see Steinberg et al., this issue), emotional word reading (see Kissler & Herbert, this issue), to the active regulation of emotions or affective states (Vanderhasselt et al., this issue; Yiend et al., this issue), with the assumption that dedicated or generic attention control processes play each time a fundamental causal role in the preferential processing of these emotional stimuli.

A second complementing goal of the special issue is to bring together a tapestry of the different methods to examine emotional attention. Because brain effects of “emotional attention” can potentially be delineated by means of different imaging methods or modalities resting on different assumptions regarding the mapping of brain functions onto neural activity, such as EEG/ERP (Schupp et al., this issue; Hajcak et al., this issue), MEG (Steinberg et al., this issue), or fMRI (Sabatinelli et al., this issue; Vanderhasselt et al., this issue; Kanske & Kotz, this issue), it remains challenging nowadays to obtain a full or integrated picture of the actual organization or architecture of neural mechanisms underlying emotional attention, as well as its precise electrophysiological time-course. Accordingly, the second main contribution of this special issue is to bundle several empirical and review articles based on the use of these different imaging methods, either when they are used alone or in combination with other methods (see Hajcak et al., this issue; Kanske & Kotz, this issue; Sabatinelli et al., this issue). Such an integration is highly informative about the typical neural effects and distinctive electrophysiological time-course associated with emotional attention brain processes (see Pourtois et al., this issue).

The third aspect highlighted in this special issue is closely related to the clinical and experimental psychopathology of emotional attention. The guidance of attention control processes by emotion can be altered selectively in specific (abnormal) psychopathological conditions, such as anxiety, depression (see Kanske & Kotz, this issue) or psychopathy (see Yiend et al., this issue), with some characteristic neural effects starting to emerge in the literature, as outlined across several articles included in this special issue. In these articles, abnormal attention control processes are usually seen by the authors as a strong vulnerability factor for these pathologies, reinforcing the assumption that (abnormal) emotional attention brain processes could actually cause significant impairments during information processing at multiple levels (see Berggren & Derakshan, this issue). Hence, these articles also provide a better understanding of the actual nature and extent of emotional attention deficits (and corresponding brain changes) typically observed in these specific patient populations, or also, to a lesser degree, in healthy adult participants with elevated (sub clinical) levels of negative affect (Kanske & Kotz, this issue). The effort made by the authors of this special issue to link more directly fundamental cognitive neuroscience research to clinical psychology and practice is extremely valuable and worthwhile because it undoubtedly helps refine and set up new therapeutic

revalidation strategies for these patients, primarily aimed at restoring normal attention control functions towards specific emotion-laden stimuli or situations

In sum, this special issue provides a unique window into recent theoretical developments and methodological advancements in Biological Psychology regarding brain mechanisms of emotional attention. The different articles included in this special issue outline different modern theoretical frameworks and experimental paradigms typically used in the literature in order to investigate and account for the complex interplay between attention and emotion control brain processes. Because each of them provides new specific information regarding the specificity, methodology and psychopathology of Emotional Attention, this special issue contributes to better anchor this construct in the literature on either emotion processing or attention control. Moreover, as many of these individual articles emphasize, a better characterization of these brain processes as well as their selective alterations in high anxious participants or clinically depressed patients might ultimately help stimulate the validation of new revalidation strategies focusing directly on these impaired attention control brain mechanisms in these individuals. In order to optimize treatments, it is important to target not only the content or product of cognition, such as negative thoughts, but also the attention specific processes giving rise to these specific (negative) emotional experiences.

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