Towards an integrative view of cognitive biases in pain

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Contemporary cognitive-affective accounts of (chronic) pain posit that cognitive biases - referring to a distortion in the way people process incoming information and consisting of attention, interpretation and memory biases - play a pivotal role in explaining exacerbation and maintenance of pain, associated distress, and disability.1,4 To date, the nature and impact of pain-related attention bias has gained a lot of attention, whereas systematic research on interpretation bias and memory bias is only recently emerging.1,3,4 While some evidence supports the existence of attention, interpretation and memory biases in people with a current concern about pain as well as the negative causal influence of these cognitive biases on pain outcomes, research findings are at times puzzling and remain inconclusive. For example, a recent meta-analysis combining available research on attention bias indicated that effect-sizes for observed attention biases in chronic pain patients are small and show substantial heterogeneity that remains unexplained by hypothesized theoretically-relevant constructs such as pain-related fear.1 Likewise, while some studies indicate attention bias towards pain contributes to negative pain outcomes, other studies suggest deleterious pain outcomes are particularly pronounced amongst those showing attentional avoidance of pain. While investigation of individual cognitive biases may shed light on their emergence or specific nature (e.g., time course of bias) as well as their unique impact on pain outcomes, the investigation of cognitive biases simultaneously is critically missing in the pain literature. Indeed, despite the fact that theoretical accounts of pain assume that various cognitive biases influence each other and may simultaneously exert their impact1, they have predominantly been discussed and investigated in isolation.

In the current issue of the European Journal of Pain, Todd and colleagues pointed at this critical gap within pain literature. The authors should be applauded for their efforts to simultaneously investigate attention and interpretation biases and their aggregate impact upon pain in a threatening context. Their study is among the first to look at the interplay between interpretation and attention bias.2 By using an indirect task to measure interpretation bias (and eye-tracking to capture attention), their study furthers earlier research investigating the impact of interpretational processes on attention bias which only used self-report measures to assess interpretation processes. Despite some limitations – which the authors properly discussed - their study sets the stage for future research investigating whether and how cognitive biases influence each other and potentially act in concert in explaining pain outcomes.

Current appeal for simultaneously researching (the nature/interrelationship and impact of) various cognitive biases is not new, and has some successful predecessors in the field of social anxiety and depression.2 The lack of concurrently investigating cognitive biases may not just be a footnote in pain research. Indeed, investigating cognitive biases simultaneously may help to clarify inconsistent findings in cognitive bias literature. For instance, it may well be that memory biases are at the basis of interpretation and attention biases and explain why particular individuals show an attention bias towards pain while others show an attention bias away from pain in a similar context. The reverse may likewise be true. That is, people who selectively attend to pain or have a tendency to interpret ambiguous information as threatening may memorize situations as more painful than initially experienced. Systematic investigation of the interplay between attention, interpretation and memory bias will allow to elucidate whether these cognitive biases coexist, how they are interrelated with each other and enable to detect underlying mechanisms of action (such as a threatening context) that fuel their existence and potential co-occurrence. Further, it will also enable us to investigate the existence of joint effects of cognitive biases and hence, give an indication on how particular combinations of cognitive biases may have an increased negative effect upon pain outcomes compared to their isolated impact.

Systematic research on the interplay between cognitive biases and their impact will require the development of novel paradigms that allow to measure cognitive biases and its dynamics in a reliable manner. Indeed, paradigms that are employed to investigate attention, memory and interpretation bias are often characterized by low reliability, but also low ecological validity and inability to capture the dynamics of pain-related information-processing.2 For instance, findings using the dot-probe paradigm give only a snapshot of the dynamics of attention bias. The use of eye-tracking methodology, here applied by Todd
and colleagues, represents a step forward to address the dynamic nature of attention bias. Yet, more steps need to be taken. This may be particularly the case in the domain of interpretation and memory biases, where research methodology has, compared to attention bias research, received less attention. Of critical importance for future development of novel paradigms tapping into different cognitive biases, is the use of stimuli that are of personal relevance. Using stimuli with unknown or lacking personal relevance - often used in current cognitive bias studies - may insert unwanted noise in research findings. The use of somatosensory stimuli or (visual) cues predicting personal pain in the investigation of various types of cognitive biases may be one way to increase personal relevance and overcome this problem. Furthermore, using somatosensory stimuli or (visual) cues with comparable personal relevance across the various paradigms that tap into various cognitive biases, will allow more reliable assessment of interrelationships between different cognitive biases and their potential joint impact. In addition, using somatosensory-related materials may be preferred above the use of symbolic materials (e.g. pain-related words or pictures) as it would help to increase ecological validity of the paradigms.

Increasing insights into the interplay between memory, interpretation, and attention bias in the context of pain is likely also vital to improve interventions aimed at targeting cognitive biases. For instance, better understanding of the interplay between various cognitive biases, its determinants as well as its combined impact may help to identify the circumstances under which it is helpful to target a particular (sequence of) cognitive bias(es). By initiating the investigation of multiple cognitive biases simultaneously, current work of Todd and colleagues introduces an innovative angle for future research to address puzzling findings in the field of cognitive biases.

References