Don’t get boxed in

Impact

Chronic pain affects approximately 20% of the population and can be seriously debilitating. Scientists and clinicians alike consider biological, psychological as well as social factors to play important roles in the development and maintenance of chronic pain disability. Contemporary fear-avoidance models of pain emphasize the importance of excessive avoidance behaviors specifically. For example, when pain is experienced while lifting a heavy box with a bent back, not repeating this movement could prevent harm to the body. However, when avoidance spreads to harmless movements and activities, such as bending over slightly to pick up a piece of paper, this can be seriously disruptive in daily life, as this may interfere with valued activities. The main objective of the current research project was to investigate potential intervention targets to reduce the spreading (or generalization) of pain-related avoidance behavior in an experimental lab setting.

First, we provided evidence that pain-related avoidance can spread (or generalize) to a certain degree toward safe movements that are similar to pain-associated ones in healthy, pain-free participants. This provides evidence for the idea that generalization could contribute to avoidance becoming excessive in the context of pain, as proposed by contemporary fear-avoidance models of chronic pain. Moreover, we provided further evidence that the experience of relief when pain is avoided may play a role in generalized avoidance persisting. Next, we provided evidence for an association between proprioception – the sense of movement and position of the body (segments) – and pain-related avoidance behavior, indicating that proprioceptive accuracy is a potential intervention target. This is an important finding because impaired proprioception has been documented in various chronic pain conditions. This work has mostly been published in the field of physiotherapy and exists largely separated from the pain-related fear and avoidance conditioning literature. The current PhD project bridged this gap between the fields of physiotherapy and pain psychology by proposing that excessive avoidance behavior may be the missing link between impaired proprioception and chronic pain disability. Moreover, in the process of researching this link, we developed the dynamic movement reproduction task, a reliable task to assess proprioceptive function of the upper limb with high precision. This task can be a useful tool for both researchers and clinicians to quantify proprioceptive function. Finally, we showed that experimentally induced positive affect is associated with less generalization of pain-related avoidance, thus confirming that positive affect is a promising intervention target. This finding contributes to a growing literature showing the important role of positive affect in pain treatment.

Results from the current PhD project have been presented at various international conferences in the fields of pain (e.g., Annual Pain Research Meeting) and psychology (e.g., Annual

Convention of the Association for Psychological Science). Furthermore, they have been published in scientific journals with significant impact (e.g., The Journal of Pain), and these publications have been promoted through social media platforms (e.g., Twitter). Such efforts will be continued and findings that are currently unpublished will be submitted to scientific journals as well (i.e., Chapter 6). Informing the scientific community about our findings is crucial to push research into intervention targets forward; for example, replication and further investigation (e.g., underlying mechanisms) of our findings is essential. Importantly, our findings are not only relevant for chronic pain, but also for other disorders where avoidance is considered to play a key role (e.g., anxiety disorders). Furthermore, impact beyond the scientific community could be achieved by integrating our findings into teaching activities and disseminating them to a broader audience (e.g., practitioner conferences, patient societies).

A fundamental understanding of how avoidance becomes excessive and how this may be countered can help develop and optimize treatment strategies, and boost their application in clinical practice. Current treatments have shown to be effective, albeit only to a certain extent. Novel insights may improve effectivity and therefore help reduce suffering further. For example, proprioceptive deficits could indicate that proprioceptive accuracy training leads to improved outcomes. However, adapted treatment strategies based on novel insights need systematic investigation before they are implemented widely in clinical practice. To bridge the gap between the lab and clinical practice, close collaboration between scientists, practitioners as well as patients could prove fruitful. Such collaborations can help to translate experimental findings effectively into clinical interventions, and generate novel questions for experimental research to tackle.