

Exploring the fear-avoidance model after brain injury

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Chapter 9

Scientific and Societal Impact



Research presented in this thesis: main objective, results and conclusions

In this thesis, six studies are described to explore if a new theoretical model could help understand why a subgroup of patients with mild traumatic brain injury (mTBI; also known as concussion) fails to recover timely. Group studies showed that full recovery could be expected within three months after the injury, but this subgroup fails to recover within this timeframe. These patients report persistent post-concussion symptoms (PCS). PCS encompasses physical (e.g., headache), cognitive (e.g., memory problems), emotional (e.g., depressive feelings), and/or behavioral symptoms (e.g., easily annoyed). The theoretical model studied was the fear-avoidance (FA) model, originally developed to explain disability in chronic lower back pain, and adapted by us to the PCS-related FA model. The PCS-related FA model uses a biopsychosocial approach, meaning that it combines biological (e.g., brain injury) and psychosocial factors (e.g., anxiety) to understand recovery patterns (e.g., chronic disability) after mTBI. This FA model states that the way people think about their symptoms influences their behavior and if they recover timely or not. For example, a patient could think that his/her headaches are a sign of permanent brain damage, therefore avoiding mental activities (e.g., reading and participating in meetings), and calling in sick for a longer period.

The results of the studies in this thesis support the idea that anxiety and thoughts about symptoms, as suggested by the PCS-related FA model, play an important role to understand PCS for various groups of people. Our studies extend the FA model now to patients with multiple sclerosis (MS), patients with mild to severe TBI, and healthy adults. Our studies also show that if “thoughts about symptoms” are taken into consideration, we can better predict who avoids cognitively challenging tasks or reports chronic disability. This is the case if we add “thoughts about symptoms” as a predictor to a set of more commonly used predictors such as injury severity, sex, age, and psychological vulnerability. Moreover, the results highlight that we can better understand recovery patterns after TBI if we use a biopsychosocial approach (i.e., combining biological and psychosocial factors). Above all, our study results support the importance of considering psychological factors if we want to understand how people react to and recover from a biological injury, with special importance for TBI. Therefore, patients with PCS could potentially be helped with therapies applying also a

biopsychosocial approach, such as incorporating cognitive behavioral therapy, targeting thoughts about symptoms, into rehabilitation programs.

All in all, the presented studies show that researchers and clinicians should consider the PCS-related FA model as possible theoretical understanding of prolonged recovery of patients struggling with PCS. The full potential of the PCS-related FA model still needs to be investigated, especially taking into account that the FA model will only be applicable to patients with catastrophizing thoughts and fear-avoidance behavior as disabling factors. Studies investigating the FA model as a disease process over time and its associated treatment are still needed as future steps.

Relevance of study results for science and society: now and in the future.

For the scientific community, the results are presented at conferences for scientific audiences and published in several international peer-reviewed publications. The findings (see previous section) are relevant for various research fields including (but not limited to): (1) clinical neuropsychology (e.g., recovery after mTBI or other relevant neuropsychological conditions such as minor stroke); (2) clinical psychology (e.g., a biopsychosocial model as theoretical basis for understanding a disease process linked to an evidence-based cognitive behavioral therapy); (3) rehabilitation medicine/neuropsychiatry (e.g., understanding suboptimal recovery after a (brain) injury of which one is expected to recover completely); (4) experimental psychopathology (e.g., understanding individual differences in behavior, emotion, and cognition, especially how people think about common symptoms and act upon these thoughts and beliefs). Furthermore, the results warrant continuation of the PCS-related FA model research line, especially studies investigating the FA model as disease process over time and the development and evaluation of individualized cognitive behavioral therapy, such as PCS-related exposure therapy. Depending on the complexity of the consequences a patient experiences, exposure therapy can be considered as a stand-alone psychological therapy or incorporated into a multidisciplinary rehabilitation treatment. Essential in this therapy is that patients are exposed to activities that they normally avoid due to catastrophizing thoughts and beliefs. With exposure therapy, these beliefs are corrected and patients feel able to

resume their daily activities. In general, the emphasis on psychological factors and not merely on biological factors stimulates a biopsychosocial approach in future studies to further understand the individual impact of medical conditions. Our results suggest that better understanding, and therefore reducing chronic disability in patients with injuries of which one is expected to recover completely, is most likely achieved by further exploration of a biopsychosocial approach and adaptation of psychological processes. Finally, the results are presented in educational lectures and could be incorporated in the educational program of various healthcare providers, such as general practitioners, neurologists, rehabilitation physicians, and (neuro)psychologists.

For society, the results are relevant for healthcare professionals, policy makers, insurance companies, and patients themselves. Patients with PCS seek help to relieve their burden, empower their abilities, and improve their quality of life. However, an evidence-based treatment option for patients with PCS-related disability after mTBI is still lacking. This is associated with many costs on the individual level (e.g., chronic disability, suboptimal levels of participation, and loss of quality of life) and societal level (e.g., societal costs associated with inability to work and high long-lasting healthcare consumption). Society would benefit most from evidence-based, individualized, cost-effective treatment options targeting this patient group. Our results have helped to improve our current understanding of why some people do not recover timely after mTBI and highlight psychological factors as an essential element. Psychological factors should be treated using psychological therapies. Specifically, the FA model and its first treatment of choice (exposure therapy) is well studied in other patient groups experiencing longstanding symptoms such as chronic pain, tinnitus, and chronic fatigue. The next logical step would be studies investigating the PCS-related FA model over time and developing PCS-related exposure therapy.

At this stage, clinicians could be aware of the PCS-related FA model during their intakes, administer questionnaires assessing factors related to the FA model (e.g., catastrophizing with the Post-Concussion Symptoms Catastrophizing Scale (PCS-CS) and fear-avoidance with the Fear of Mental Activity scale (FMA)), and compare the scores with reference data of our healthy adult cohort. Deviating scores should be reported back to the patient and openly reflected upon, followed

by information about possible psychological processes such as the impact of thoughts about symptoms on symptom experience. Filling in an individualized FA model together with the patient, including his/her own symptoms and thoughts, can be helpful during this reflective session. Understanding behavior in this way could normalize the disease process that has taken place for the patient, resulting in understanding of suffering from symptoms, and if necessary with extra treatment, potentially breaking through the cyclic pattern posed by the FA model. It is important to mention that although the FA model shows promising findings in our first exploration, this explanation would not be applicable to all patients. Even if our findings are confirmed in follow-up studies, the FA model only applies to patients with catastrophizing thoughts and fear-avoidance behavior as disabling factors.

All in all, researchers and clinicians should not avoid the mental challenges PCS pose, but confront these challenges by thinking beyond diagnosis: ask the patient about his/her thoughts and feelings about PCS and take these into account in the efforts to help a person struggling with life's curveballs.