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Social and Physical Pain in Borderline Personality Disorder

Autor: Melanie Bungert
Institut / Klinik: Zentralinstitut für Seelische Gesundheit Mannheim (ZI)
Doktorvater: Prof. Dr. M. Bohus

Patients with Borderline Personality Disorder are characterized by instability in interpersonal relationships and affect, an unstable self-image together with low self-esteem, impulsive, as well as self-harming behaviors and high suicidality. An intense fear of abandonment or rejection is a central feature of social relationships for individuals with Borderline Personality Disorder and is reflected in enhanced rejection sensitivity, a cognitive-affective disposition to anxiously expect rejection in social situations. Experimental studies have provided increasing evidence that social rejection is linked to an enhanced experience of social pain in this patient group. On the other hand, patients with Borderline Personality Disorder are characterized by a hyposensitivity to physical pain. Social and physical pain are assumed to rely on comparable phylogenetic old brain structures and to influence each other. Due to the opposing alterations of social and physical pain, Borderline Personality Disorder constitutes a pathological state of special interest for the interconnection between both pain types.

The overall aim of the present thesis was to get a better understanding of the experience and neuronal processing of social and physical pain and the interplay of both pain systems in Borderline Personality Disorder by using functional magnetic resonance imaging methodology in an experimental setting (study 1). To assess social pain, social exclusion and inclusion were induced with the Cyberball-Paradigm in 20 unmedicated patients with Borderline Personality Disorder and 20 healthy control subjects in a block-design. Additionally, a control condition with predefined rules was added. Physical pain was administered in form of tonic heat pain with a subjective pain intensity of 60%. To link both pain types, each Cyberball block was followed by either the painful or a non-painful temperature stimulus.

Regarding social pain (study 1a), patients with Borderline Personality Disorder reported enhanced experiences of exclusion during social inclusion and the control condition, which further support the idea of a biased perception of social participation in Borderline Personality Disorder. On a neuronal level, patients with Borderline Personality Disorder showed enhanced activation of the dorsal anterior cingulate cortex and medial prefrontal cortex in comparison with healthy control subjects independent of the social context. This might reflect an increased sensitivity of the neural alarm system and the social monitoring system, and might also be one neuronal correlate of the enhanced rejection sensitivity which characterizes patients with Borderline Personality Disorder. Whereas during the rule driven condition healthy controls disengaged brain structures of the 'social brain' like medial prefrontal cortex, insula and precuneus, patients with Borderline Personality Disorder did not differentiate between the three conditions. The patients seem to have problems in differentiating different forms of social situations, which might be explained by hypermentalizing during 'neutral' situations.

Regarding physical pain and its modulation by social pain (study 1b), we could first replicate previous findings of a generally reduced sensitivity to physical pain in Borderline Personality Disorder. Second, the experience of social pain led to a hypersensitivity to physical pain in both groups which was accompanied by enhanced activation in the anterior insula and the thalamus during pain after exclusion compared to inclusion. Stronger engagement of the posterior insula in Borderline Personality Disorder during pain following exclusion suggests alterations in the integration of the sensory, cognitive, and affective pain components. Third, we could show that the individual level of rejection sensitivity is a relevant factor in the interplay between social and physical pain, particularly in Borderline Personality Disorder. In this group, activation differences between pain after exclusion and inclusion in the insula and the amygdala decreased with enhancing rejection sensitivity.

Besides this experimental study, we conducted an additional study to gain further insight into the relationship between Borderline Personality Disorder and rejection sensitivity (study 2). We collected self-report data from a huge Borderline Personality Disorder sample to look for associations between childhood maltreatment, rejection sensitivity and borderline symptom severity. Current, as well as

remitted borderline patients reported enhanced levels of rejection sensitivity. Lower self-esteem was related to both, increased borderline symptom severity and higher rejection sensitivity, and mediated the relation between the two. Despite the relevance of childhood maltreatment for the development of rejection sensitivity and Borderline Personality Disorder, no direct link between those variables could be observed.

Taken together, the results of the presented studies provide further evidence for an enhanced sensitivity to social pain in Borderline Personality Disorder, not only on a subjective, but also on a neurobiological level with altered activation in brain regions associated with the processing of social pain. Our results further point to a specific role of physical pain in the regulation of social pain in Borderline Personality Disorder. The sensitization effect of social on physical pain observed in patients with Borderline Personality Disorder might not only be a reason for the effectiveness of self-injurious behavior after the experience of rejection, but can also be helpful for further skills development. Our results further underline the importance of enhanced rejection sensitivity not only in current, but also in remitted borderline patients. The enhanced rejection sensitivity might be one relevant factor for the impaired social functioning which is still present after the reduction of the acute borderline symptomatology and should be considered for future treatment development.