Robin Bekrater-Bodmann, Dipl.-Psych.

1. Narrative academic profile

I studied Psychology at the Braunschweig Technical University and completed my studies with a diploma in 2007. Since 2008, I have been working at the Central Institute of Mental Health (CIMH) in Mannheim: first as a doctoral student and from 2012 as a postdoc at the Institute of Cognitive and Clinical Neuroscience (head: Herta Flor), Heidelberg University, interrupted by a six-months stay abroad (funded by the Deutsche Forschungsgemeinschaft, DFG; BE 5723/2-1) at the Department of Psychology (head: Manos Tsakiris), Royal Holloway, London University, in 2017. In 2021, I switched to the CIMH's Department of Psychosomatic Medicine and Psychotherapy (head: Christian Schmahl). Since 2016, I head the CIMH's research group 'Body plasticity and memory processes'.

My team and I are interested in a) the neurobiological mechanisms underlying bodily self-experiences in health and disease, b) the role of dysfunctional learning processes for body perception in mental disorders and other clinical conditions, and c) the implications of these results for the treatment of disorders, with a focus on chronic pain. We take advantage of and develop further paradigms for the induction of bodily illusions, and assess its cognitive, behavioral and (neuro)physiological effects, either in the lab or in the environment of a magnetic resonance imaging (MRI) scanner.

Since I started working at the CIMH, one main focus of my research was on the neuroplastic processes after limb amputation that are associated with disturbed body perception and phantom pain, and how manipulation of body perception can be used as intervention for post-amputation pain. One result of this early work was my most-cited paper on the behavioral and neurophysiological effects of mirror therapy for phantom pain, for which my co-authors and I received the Advancement Award of the German Pain Society in 2015. My involvement in establishing one of the world's largest scientific databases of limb amputees (the Phantommind cohort, with almost 4,000 entries) enabled me to perform large-scale epidemiological studies on post-amputation pain, and further allowed the realization of well-powered lab and MRI studies on phantom pain (past and ongoing). In my own DFG project (BE 5723/4-1), we deepened the research on body perception in limb amputees by focusing on the effects a prosthesis has on the amputee's cognition, behavior, and neurophysiology. Our aim is to understand the processes underlying prosthesis embodiment, that is, the cognitive integration of a prosthesis into the amputee's body representation. For the research on the relationship between prosthesis embodiment and phantom pain, I received the EFIC-Grünenthal Grant from the European Pain Federation in 2018. My projects benefit from national (e.g., Erlangen-Nürnberg University) and international collaborations (e.g., Zürich University). I am particularly proud of a collaboration with Bigna Lenggenhager (Konstanz University): we are the first who behaviorally and neuronally compare limb amputees with individuals suffering from a certain sub-type of Body Integrity Dysphoria – a relatively new disorder – that is characterized by the desire to have a healthy limb amputated. This collaboration holds since 2016 and is ongoing.

Another scientific interest is related to perceptual disturbances in borderline personality disorder (BPD). I have been working as a postdoc in the first funding period of the DFG Clinical Research Unit 256 (KFO256: Mechanisms of Disturbed Emotion Processing in Borderline Personality Disorder) where I was awarded a start-up funding for conducting my own project on dissociative body experiences in BPD. In both projects, we compared pain and body perception in individuals with current and remitted BPD; this enabled us to characterize the psychopathological processes for which remission is associated with normalization or for which problems persist even within the remission phase. For this research, I received the Hamburg

Personality Disorder Award from the Society for the Research and Therapy of Personality Disorders e.V., one of the most valuable science prizes in psychiatry in Germany. From 2015 to 2018, I became principal investigator (BE 5723/1-2) in the second funding period of the KFO256, where we not only intensified our research on pain perception in BPD, but further related these processes to positive affective somatosensory stimulation in terms of pleasant touch. Our results show that individuals with BPD perceive this kind of stimulation as unpleasant, which is of particular importance given its relevance for interpersonal communication. Currently, a new research proposal on this topic is under review; if positively evaluated, we will explore the neural mechanisms of disturbed pleasant touch perception and its potential value for therapeutic purposes.
Since 2012, I am involved in teaching activities for medical students at the Medical Faculty Mannheim, Heidelberg University, in the context of the Mannheim reformed curriculum for medicine and medical-related professions (MaReCuM). Here, I was mainly covered teaching for the disciplines 'Medical Psychology and Sociology' and 'Physician-patient relations', which benefited from receiving the Baden-Württemberg ministerial certificate of medical didactics, a nationwide recognized proof of medical didactic qualification, in 2015. From 2017 to 2020, I also was topic coordinator in the MaReCuM. In addition, I was a lecturer for psychology students at the Mannheim University (2017-2019), and taught psychological content to nursing professionals in training (2005-2011).

2. Key output of the years 2020-now

In the last two years, I have published sixteen original and two review papers (twelve as a first or last author). I would like to direct particular emphasizes on the studies on prosthesis embodiment, for which we a) adapted a standard paradigm of behavioral science (attenuation of self-touch; Fritsch et al., 2020), b) identified a cognitive interaction with phantom limb experiences (Bekrater-Bodmann, 2022), c) demonstrated its relationship to prosthesis satisfaction (Bekrater-Bodmann, 2021), and d) showed – using a large cohort of almost 2,400 prosthesis using limb amputees – that prosthesis embodiment negatively predicts the severity of phantom pain (Bekrater-Bodmann et al., 2021). In this context, one milestone was the development of a validated questionnaire, the Prosthesis Embodiment Scale (Bekrater-Bodmann, 2020), which already attracted attention in the scientific community, with independent requests for translation in other languages than German or English. In collaboration with researchers from Italy, we currently further validate the instrument using Rasch analysis, and the concept of prosthesis embodiment and its positive rehabilitative effects are described in a textbook chapter aiming at prospective prosthetists. I reported on the topic at the 1st International Conference on Phantom Limb Pain (ICPLP) in Sweden in 2021; a recording of the talk can be accessed at: https://www.youtube.com/watch?v=lj9HPqsem50. Further, we published papers on the perception of positive and negative somatosensory processing (e.g., Chung et al., 2020; Löffler et al., 2022) as well as on body perception in BPD (e.g., Löffler et al., 2020); two co-supervised PhD students who worked on these topics, Boo Young Chung and Annette Löffler, submitted their PhD thesis.

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