R&D Item

4. Overcoming adversity

Progress until FY2024

1. Outline of the project

This research and development item aims to identify the neural basis of perceived controllability in the face of adversity and to evaluate its predictive power for "Maemuki", resilience, mental health, and well-being.

2. Outcome so far

From this fiscal year, Dr. Michele Wessa and Dr. Klaus Lieb from the Leibniz Institute for Resilience Research (LIR) have joined the project, initiating detailed mechanistic studies on how perceived controllability under adverse conditions contributes to forward-mindedness and resilience.

● Perceived controllability and its relation to depression

To investigate the role of perceived controllability in mental health and resilience, Dr. Michele Wessa's research group conducted both an fMRI social stress study and a translational study. In the fMRI study (Kollmann et al., in prep), 120 healthy males were classified into high and low control groups based on perceived controllability, revealing that higher control was associated with less helplessness, fewer symptoms, stronger cortisol responses, and reduced insular activation. In a parallel study with 125 individuals showing subclinical depression, objective controllability reduced helplessness, stress, and negative cognitive bias, particularly buffering adverse effects in those with higher depressive symptoms. Additionally, the group performed re-analyses of cross-sectional data, identified latent control belief factors, and developed a predictive model of resilience and well-being, which informs future prospective "Maemuki" studies.

● Positive mental states and its relation to health and resilience

To investigate the relationship between positive mental states and resilience, Dr. Klaus Lieb's research group and Dr. Michele Wessa's research group developed a comprehensive rationale and timeline for a systematic review, which led to its prospective preregistration and the upload of the review protocol to the Open Science Framework. Literature searches were conducted across all relevant databases, and title/abstract screening has commenced. A first version of the study protocol was prepared for publication in BMJ Open (Max Supke et al.), in collaboration with PI Yamada (1-1) and PI Hamada (1-4). Training sessions with students were also conducted to ensure accurate and consistent screening procedures.

● Perceived controllability and its underlying neural and physical correlates

To investigate the neural and physical correlates of perceived controllability, Dr. Michele Wessa's research group engaged in a series of in-person and online meetings to discuss study designs, data collection methods, and preliminary results, in collaboration with PI Yamada (1-1) and PI Hirao (2-1). These collaborative efforts enabled the successful planning of prospective study.

● Perceived controllability as a resilience mechanism in the general population and cancer survivors

Two workshops were successfully held — one in September and one in February — in Germany and Japan, respectively, to discuss the study protocol and potential baseline measures for the longitudinal study, in collaboration with the research groups led by PIs Fujimori, Yamada, Hirao, and Hamada. Additionally, preparations for recruitment have been initiated, including the selection of LORA subjects and establishing contact with cancer units in Germany.

3. Future plans

The project will continue to explore how perceived controllability and related positive mental states contribute to resilience, mental health, and well-being. Future activities will include data re-analyses, meta-analyses, and cross-cultural studies to deepen theoretical understanding and validate findings across populations. Collaborative pilot studies and the development of shared assessment tools are planned to support longitudinal research on stress and coping. Particular attention will be given to comparing general populations with individuals facing real-life adversity, aiming to clarify mechanisms and inform practical applications in both clinical and everyday contexts.