The traumatized brain

Chalavi, Sima

Chapter 2

Outline of the Thesis

Dissociative identity disorder (DID) is a relatively rarely diagnosed disorder, and hence finding a homogeneous group of DID patients who are in a phase of the therapy enabling them to participate in a brain imaging study provides a great challenge. Decreasing the travel time to the imaging facilities could possibly increase the subjects' willingness to participate and hence increase participation rate. Therefore, neuroimaging data for this thesis was acquired from two different centers in the Netherlands (University medical center Groningen (UMCG) and Amsterdam Medical Center (AMC)). However, one important confound of combining images from different scanners is that the quality of MR images (such as the contrast between different brain tissues) can be dependent on scanner characteristics, MRI protocol, data-reconstruction, differences in scanner upgrades and scanner software. Considering that both manual and automatic methods of image segmentation are dependent on the quality of brain scans, it is therefore important to prepare a condition in which MR images from the two scan centers have minimum quality differences. Therefore, to optimize the comparability of the scans from both centers, a calibration study was performed. ***Chapter 3*** describes the methodological steps of this calibration study, which was performed prior to acquiring neuroimaging data from the DID and PTSD patients and healthy controls. This step provided us with an optimized sMRI protocol that was found to be highly reproducible across the two centers and over time.

Chapter 4 describes a whole-brain gray matter volumetric study. The aim of the study in this chapter was to compare subcortical gray matter volume, cortical thickness, cortical surface-area and cortical volume between the DID and PTSD patients and healthy controls

Chapter 5 focuses on the abnormalities of the volume and shape of the hippocampus in DID and PTSD patients and whether it is linked to childhood trauma. Stress has been shown to have selective effects on different subfields of the hippocampus. Therefore in this chapter a novel technique based on the manual tracing of the hippocampal boundaries and modeling of the hippocampal surface was used to investigate volume and shape differences between DID patients,

PTSD patients and healthy controls. Furthermore, associations of childhood trauma with hippocampal volume and shape were investigated to obtain further evidence that not only DID is a trauma-related but also it is linked to childhood maltreatment.

Chapter 6 presents a study that focuses on structural connectivity of the brain. In this study DTI data were analyzed to compare the abnormalities of the white matter integrity in the DID and PTSD patients relative to healthy controls.

Finally in ***Chapter 7*** the main findings of the presented studies are summarized and discussed, and concluding remarks with respect to the etiology of DID and directions for future research are provided. This chapter will discuss how the studies presented in this thesis are important for unraveling the neurobiological mechanisms involved in DID.