Altered Frontoinsular Activation and Cortical Gyrification Associated with Daily-Life Negative Affect in Emotional Distress Disorders

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Individuals with emotional distress disorders experience high levels of daily-life negative affect. Furthermore, the ability to effectively use emotion regulation strategies, such as positive reappraisal, is impaired in emotional distress disorders. Altered frontoinsular functioning in regions important for emotion regulation, such as default mode network hubs (e.g., medial prefrontal cortex [PFC]) and insula, has been found in these disorders. Cortical structural abnormalities, such as morphological aberrations related to gyrification, surface area, and thickness, have also been found in emotional distress disorders and could be indicators of aberrant underlying neural connectivity. However, the relationship between frontoinsular emotion regulation task activation and cortical morphology with daily-life negative affect is still relatively unknown. In the current study, individuals with emotional distress disorders (n = 27) completed multimodal neuroimaging consisting of both positive reappraisal emotion regulation task-based fMRI and structural MRI. Daily-life emotional distress symptoms were measured using an ambulatory assessment approach, whereby participants reported negative affect levels in their daily lives for two weeks (average number of daily-life affective assessments = 80). Increased medial PFC activation during positive reappraisal was associated with increased daily-life negative affect. In contrast, *decreased* positive reappraisal task activation in the left insula, as well as cognitive flexibility regions such as the cerebellum and putamen, was associated with

increased daily-life negative affect. Additionally, hypergyria of the left insula and hypogyria of the right inferior/posterior parietal cortex were associated with increased daily-life negative affect. These results provide converging multimodal evidence that altered frontoinsular emotion regulation task activation and cortical gyrification abnormalities may be important markers and treatment targets in emotional distress disorders.