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Cortical abnormalities associated with pediatric and adult obsessive-compulsive disorder: findings from the ENIGMA Obsessive-Compulsive Disorder working group

In December 2017, the *American Journal of Psychiatry* released the online (https://ajp.psychiatryonline.org/doi/abs/10.1176/appi.ajp.2017.17050485) results from the second study undertaken by the ENIGMA (http://enigma.ini.usc.edu) obsessive-compulsive disorder (OCD) consortium. This is the largest brain imaging collaboration to date; it brings together brain scans of children and adults with OCD from around the world. The study allows a detailed assessment of the cortex of the brain in children and adults with OCD, and demonstrates that brain measures are altered in OCD.

OCD is a psychiatric disorder characterized by intrusive thoughts (obsessions) and repetitive behaviors (compulsions). Symptoms often start in childhood, and in many patients continue into adulthood. Thirty years of brain imaging studies in OCD point towards brain alterations in the circuits implicated in cognitive (e.g. attention, memory, reasoning) and emotional processing. However, a key issue with brain imaging studies is the lack of reproducibility due to small sample sizes (due to high costs of the technique) and variation in analysis techniques.

An elegant way to solve the lack of reproducibility is to analyze as many brain scans as possible using the same technique. Drs. Premika Boedhoe, Odile van den Heuvel (both from the VU university medical center in Amsterdam, the Netherlands) and Dan Stein (from the University of Cape Town, South Africa), together with 69 researchers across the world joined forces and shared brain scans to perform the largest study to date on MRI scans of 1,905 OCD patients and 1,760 healthy controls, including scans of both children and adults, collected by 27 different research institutes worldwide.

The parietal cortex, located at the posterior part of the brain, was affected both in adults and children with OCD. These results might indicate an altered development of this brain region in OCD patients, although further confirmatory work following patients during the lifespan is necessary. The abnormalities in this part of the brain help us to understand the repetitive nature of OCD symptoms.

Adults with OCD on medication showed more abnormalities throughout the brain, and children with OCD on medication showed abnormalities mainly in frontal parts of the brain. There was no difference between unmedicated patients and healthy controls. However, the

study did not allow a reliable investigation of medication effects because of its cross-sectional design and lack of detailed information on medication. The medication effects must therefore be interpreted with caution, and definite conclusions about the effect of anti-OCD medication cannot be made. Further efforts, such as studies with direct comparisons before and after medication, are required to draw valid conclusions on the impact of medication use on the brain in patients with OCD.

Taken together, these findings highlight the involvement of the parietal cortex in the development of OCD and the importance of accounting for medication when investigating brain structure in patients with OCD.

Figure 1: Indicated by the orange color is the parietal cortex which is affected in adults and children with OCD