Neurobiological correlates of physical self-concept and self-identification with avatars in addicted players of Massively Multiplayer Online Role-Playing Games (MMORPGs)

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HIGHLIGHTS

• FMRI-based correlates of self-concept and avatar identification in MMORPG addiction
• Addicted players show a worse body image compared to regular gamers.
• They exhibit decreased bilateral AG activation during self- vs. other-perception.
• They display higher bilateral AG activation during avatar- vs. self-perception.
• First hint of associations between self-concept and AG-function in MMORPG addiction

Aims: MMORPG addiction has been associated with self-concept impairments and increased identification with the own avatar. Yet, the underlying neurobiological mechanisms of self-identification with avatars, especially reflected in the left angular gyrus (AG), have only been assessed in regular gamers. Therefore, the study aims to examine neurobiological processes in addicted MMORPG players while evaluating their own and their personal avatar’s body image (physical self-concept).

Methods: Sixteen addicted and seventeen non-addicted gamers underwent functional Magnetic Resonance Imaging (fMRI) while viewing images of themselves, their own avatar and unfamiliar persons. The Body Image Questionnaire (FKB-20) and Visual Analog Scales (VAS) assessing the degree of attractiveness, sympathy and gender identity of the self, of the avatar as well as of the unfamiliar persons were applied.

Results: Addicts showed a significantly extended negative body image and lower gender identity levels as well as decreased bilateral brain activations in the AG and the middle occipital gyrus during self-perception. They further exhibited higher activations in the left AG during avatar-perception. Regression analyses in the overall group and in addicted gamers indicated a significant positive correlation between gender identity and brain activation in the left AG during self-perception.

Conclusions: Our results confirm addicted MMORPG players to have physical self-concept deficits which may be related to hypoactivations in the AG. The findings further indicate addicted gamers to have a tendency to identify