Avatar’s Neurobiological Traces in the Self-Concept of Massively Multiplayer Online Role-Playing Game (MMORPG) Addicts

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Psychometric studies suggest that observed self-concept deficits in addicted massively multiplayer online role-playing game (MMORPG) are compensated through the replacement of their ideal (i.e., how an individual would like to be) by their own avatar (i.e., graphical agent in the virtual world). Neurobiological studies indicate that increased identification with their own avatar in regular MMORPG gamers is possibly reflected by enhanced avatar-referential brain activation in the left angular gyrus (AG). However, the neurobiological correlates reflecting the relations of the avatar to addicted gamers’ self and ideal are still unexplored. Therefore, we compare these relations between addicted and nonaddicted MMORPG gamers. A sample of \(n = 15\) addicted and \(n = 17\) nonaddicted players underwent functional MRI (fMRI) while completing a Giessen-Test (GT)-derived paradigm assessing self-, ideal-, and avatar-related self-concept domains. Neurobiological analyses included the comparisons avatar versus self, avatar versus ideal, and avatar versus self, ideal. Psychometrically, addicts showed significantly lower scores on the self-concept subscale of ‘social resonance,’ that is, social popularity. In all avatar-related contrasts, within-group comparisons showed addicted players to exhibit significantly higher brain activations in the left AG. The between-groups comparisons revealed avatar-related left AG hyperactivations in addicts. Our results may suggest that addicted MMORPG players identify significantly more with their avatar than nonaddicted gamers. The concrete avatar might increasingly replace the rather abstract ideal in the transition from normal-controlled to addictive-compulsive MMORPG usage.

Keywords: massively multiplayer online role-playing games, identification with avatars, self-concept

After the Internet becoming publicly available during the early 1990s, the number of Internet users rose to about a quarter of the world’s total population today (Choi & Han, 2013; Petersen, Weymann, Schelb, Thiel, & Thomasius, 2009; Sagan & Leighton, 2010). Accordingly, the significance of Internet overuse gains increasing importance, as reflected by the condition’s uptake into the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) as “Internet Gaming Disorder” (IGD), a “condition warranting more clinical research and experience” (see Section III; American Psychiatric Association, 2013). Although not entirely classified based on the DSM-5 due to insufficient research, hitherto literature refers to the condition as “Internet gaming addiction,” which shall be adopted here.

MMORPGs, the most prevalent subcategory of online gaming addiction, have a rather unexplored role (Leménager et al., 2013; Petersen et al., 2009). With their characteristics of being socially interactive, endless, and time-consuming, as well as by enabling fast achievements and adventures unmet by real life, MMORPGs have addictive potential (Bessière, Seay, & Kiesler, 2007; Charlton & Danforth, 2010; Smahel, Blinka, & Lodahl, 2013).

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