Proposal Diploma Thesis –

How the brain processes violent video game scenes and real video sequences in male video game players – an explorative fMRI-study.

The effects of violent video games (VG) on children's and adolescents' related arousal, cognitions and emotions has been thematized in numerous studies (Anderson, 2004; Anderson & Bushman, 2001; Anderson & Dill, 2000; Bensley & Van Eenwyk, 1999; Browne & Hamilton, 2005; Dill, 1998 ; Dominick, 1984). A potential relationship between violence in video games and aggression in children was discussed in the context of heterogeneous empirical findings: some authors reported a linkage between violence in video games and aggression, others did not (Williams & Skoric, 2005). Although most studies led to the assumption of a relationship between violent video game playing and short-term intensification of aggression-related components (measured by questionnaires or free play examinations) in children and adolescents (Griffith, 1999), the interpretation of the empirical data considered is limited by methological comparability and generalizability (Sherry, 2001). Furthermore, little is known about the effects on adult players (Williams & Skoric, 2005).

One of the biggest problems in the evaluation of aggression-related behavioural effects caused by violent video games is a lack of longitudinal studies. The effects of daily exposing oneself to active, albeit virtual, violence have marginally been explored (Bensley & Van Eenwyk, 2001; Griffiths, 1999). An investigation of Williams and Skoric (2005) did not support the hypotheses that violent video game playing resulted in beliefs of more accepting violent behaviours or that it led to more aggressive social interactions.

Several psychological theories provided relevant information to explain a possible influence of violent video games in relation to aggression (for review, see Bensley & Van Eenwyk, 1999; Dill, 1998; Williams, 2005). The General Aggression Model (GAM) by Anderson and Bushman (2002) integrated social learning, arousal, cognitive processing, individual (e.g., aggressive personality) and social variables. The crucial aspect concerned by this theory could be described as follows: In a situation where exposure to violent media primed aggressive thoughts, increases hostile feelings or arousal, short-term increases in aggression might be expected. If, as a result of *long*-term video game playing, aggression-related knowledge-structures or "scripts" were changed, one could consider these as long-term effects (Bensley & Van Eenwyk, 1999). Long-term exposure to violent video games could, therefore, shape the cognitive landscape in a way that makes aggressive cognitions and emotions chronically available to a person. According to the Cognitive Neoassociation Model of Aggression (CNA, Berkowitz, 1993) repeated exposure to aggression created elaborated and inter-connnected aggression-related thought-networks. Exposure to an aggressive scene could then trigger related feelings and bring up knowledge about aggression-related skills, memories and beliefs (Dill, 1998). This provided an explanation of how violent video-game-related long-term effects might influence actual behaviour.

The aim of the presently planned diploma-thesis fMRI-study is to explore whether long-term exposure to

violent video games take an effect on adults´ neural processing of violent virtual- and reality-related situations. Two groups of adult participants should be compared: participants with and without a history of long-term violent video game playing experience.

In an experimental condition participants will be visually presented short scenes in which they "act" during scenarios that are captured from violent video game sequences or parallelized realistic violent video clips. The scenarios are conceptualized in an ego-view fashion (the spectator is involved in the situation as his perspective is identical to the camera position) compiled by three parts: (part 1; ~ 3 sec) The participant virtually comes along, runs around a corner and is confronted with (a) an enemy bearing a weapon, (b) a friend bearing a weapon or (c) no one. (part 2) The presentation stops, showing a still picture (waiting for the participants´ response after a break of at least 300 ms). (3) The participants respond with the right index finger pushing a button to react in a defined way (situation progresses for ~2 sec) as (a) shooting the enemy (= aggressive situation), (b) approach the friend (= non-aggressive situation, baseline) or (c) continue running through the scenario with no persons present (= low level baseline). Both sets of situations will be constructed in a video-game- and a reality-related fashion (two modalities). The button press serves as an executive component demanding real acting by the participants.

The aim of the study is to examine adults automatic neural processing during violent situations in two different contexts – video game versus real. Additionally, two groups will be examined: experienced video game players and individuals who do not frequently play video games. Video game experienced individuals may show a different pattern of brain activation between aggressive video game and real situations in comparison to not experienced participants. As a hypothesis, we expect video game players to distinguish between game and reality, because they normally follow strategic goals in those violent games filtering out the violent aspects, whereas not experienced individuals might process both virtual and real context in the same conceptual and, therefore, similar form at neural level.

Additionally, personality and aggression questionnaires will be applied to explore possible confounds in relation to imaging data.

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