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Influence of violent video gaming on determinants of the acquired capability for suicide

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ABSTRACT

The interpersonal theory of suicidal behavior proposes that fearlessness of death and physical pain insensitivity is a necessary requisite for self-inflicted lethal self-harm. Repeated experiences with painful and provocative events are supposed to cause an incremental increase in acquired capability. The present study examined whether playing a first-person shooter-game in contrast to a first-person racing game increases pain tolerance, a dimension of the acquired capability construct, and risk-taking behavior, a risk factor for developing acquired capability. $N=81$ male participants were randomly assigned to either play an action-shooter or a racing game before engaging in a game on risk-taking behavior and performing a cold pressor task (CPT). Participants exhibited higher pain tolerance after playing an action shooter game than after playing a racing game. Furthermore, playing an action shooter was generally associated with heightened risk-taking behavior. Group-differences were not attributable to the effects of the different types of games on self-reported mood and arousal. Overall these results indicate that action-shooter gaming alters pain tolerance and risk-taking behavior. Therefore, it may well be that long-term consumption of violent video games increases a person's capability to enact lethal self-harm.

1. Introduction

Suicide is a significant public health concern, with more than one million people worldwide dying from suicide every year (World Health Organization, 2013). Suicide is among the three leading causes of death among those aged 15–24 years and is the tenth leading cause of death for all ages in the United States (American Association of Suicidology, 2013). Males complete suicide at a rate 3–7 times that of females (Nock et al., 2008). In about 3.8% of the cases, suicidal persons impact other individuals (Large et al., 2009), sometimes in the form of spree killings, usually ending in the suicide of the perpetrator (Scheithauer and Bondü, 2011). A regularly discussed hypothesis concerning the possible causes of spree killings and school shootings is an increased engagement of the contraveners in violent video games, in which virtual enemies must be killed by different means (Anderson, 2004). Anderson (2004) assumes that action-shooter games reinforce killing and aggressive behaviors, which in turn might lead to a transfer of these behaviors into the real world. Yet, it is unclear if action-shooter games can be considered a risk factor for attempting or completing suicide and if so, which mechanisms link the frequent use of action-shooter games to increased suicide risk.

According to the *Interpersonal Psychological Theory of Suicidal Behaviour* (Joiner, 2005) three proximal, causal and interactive risk factors must be present in order for someone to both desire and be capable of suicide: The most dangerous form of suicidal desire is said to be caused by the simultaneous presence of *thwarted belonginess* – the experience that one is alienated from others, not an integral part of a valued group – and *perceived burdensomeness* – the view that one's existence burdens family, friends, and/or society. Yet, Joiner (2005) claims that desire to die by suicide is not sufficient to lead to lethal suicidal behavior – rather individuals have to have developed a fearlessness of pain, injury and death to be capable to act on the desire for suicide. According to this theory, the so-called *acquired capability for suicide* arises from repeated exposure to painful and/or fear inducing experiences. Van Orden et al. (2010) distinguish two dimensions of acquired capability: *lowered fear of death* and *increased tolerance for pain*.

Joiner (2005) proposes that the most direct route to acquiring the capability for suicide is by engaging in suicidal behavior, either through suicide attempts, or practicing and preparing for suicidal behavior. In line with this assumption, past suicide attempts are

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one of the strongest predictors of future suicide attempts – even after controlling for hopelessness and various psychopathological syndromes (e.g. Joiner et al., 2005). However, Joiner (2005) points to the fact that one can also become less fearful of pain, injury and death by experiences other than suicide attempts, e.g. childhood abuse, combat exposure, painful and provocative events like physical fights, promiscuous sex, playing contact sports etc. All of these experiences are supposed to increase the risk for lethal suicidal behavior because they are physically painful and/or sufficiently frightening to engage habituation and opponent processes (Solomon, 1980).

Evidence for the credibility of the suicidal theory is accruing, with a growing number of studies demonstrating profound associations between the theory's key variables and different markers of suicidality: Thus it has been shown that individuals with a history of suicidal behavior exhibited higher levels of the acquired capability than individuals with no history of suicidal behavior and that acquired capability is predictive of suicidal behavior (Van Orden et al., 2008; Anestis and Joiner, 2011). In general, men exhibit higher levels of acquired capability than women and soldier-samples exhibit higher levels than student-samples (Bryan et al., 2010; Witte et al., 2012). In accordance with the theoretical assumptions, higher levels of painful and provocative experiences significantly predicted higher levels of acquired capability and combat experiences characterized by violence and high levels of injury and death are strongly associated with the acquired capability (Van Orden et al., 2008; Bryan and Cukrowicz, 2011). With regard to the pain-tolerance dimension of acquired capability, several studies found that individuals with recent suicidal behavior demonstrate elevated physical pain tolerance (as measured by electric shock and thermal pain), compared with non-suicidal psychiatric patients and individuals in the community (Orbach et al., 1996a; Orbach et al., 1997) and compared with individuals admitted to the emergency room due to accident injuries (Orbach et al., 1996b). The latter finding indicates that elevated pain tolerance is likely specific to suicidal behavior rather than physical injury (cf. Van Orden et al., 2010). Bender et al. (2011) found self-reported experiences of painful and provocative events as well as acquired capability to be significantly associated with pain tolerance in a pressure algometer task and Franklin et al. (2011) could show that pain tolerance – assessed with a cold pressor task (CPT) – partially mediated the association between self-reported experiences of painful and provocative events and acquired capability. Finally, it has been found, that experiences with painful and provocative events mediated the relationship between impulsivity and suicidality: This means that impulsive individuals tend to have higher levels of acquired capability for suicidal behavior because they have experienced more painful and provocative events in their lives (Bender et al., 2011).

To date, no study has examined the role of violent video games in the development of acquired capability for suicide. There are studies showing that playing violent video games is associated with an increase in aggressive thoughts, feelings and behaviors, leading to desensitization to violence and also to decreases in pro-social behaviors and empathy (Anderson and Warburton, 2012). For example, Carnagey et al. (2007) found that participants who had previously played a violent video game for 20 min exhibited reduced physiological arousal while watching films of real violence thereafter, demonstrating a physiological desensitization to violence. Furthermore, video games that glorify risk-taking behavior have been shown to be associated with more risk-taking behaviors, cognitions, attitudes and risk-positive emotions (Fischer et al., 2011). Yet, it is unknown, whether dimensions and indicators of the acquired capability of suicide are also influenced by playing first-person shooter games. The current study addresses this issue. Thus, the study examined whether playing action-shooter games in contrast to engaging in an action-packed non-violent racing game was associated with elevated levels of pain tolerance – as one of the key dimensions of acquired capability – in a sample of healthy young males. Additionally, – building on the notion that impulsivity or risk taking behavior contribute to the acquisition of capability for suicide – we examined whether playing an action-shooter game led to an increase of risk-taking behavior and whether this increase was greater than the change after playing a racing game.

2. Method

2.1. Participants

The study included 81 men, aged from 18 to 39 ($M=26.2$, S.D.$=5.2$ years). All participants were Caucasian. To take part in the study, participants had to be between 18 and 50 years old. Due to their influence on pain tolerance and risk-taking behavior, exclusion criteria were female gender, diagnosis of a psychiatric disorder, substance dependency or abuse, cardiovascular diseases and intake of psychoactive drugs, beta-blockers, analgesics as well as current suicidal ideation. In addition, participants were required not to have consumed alcoholic beverages on the day of the experiment.

Ten men (12%) were married, 24 men (30%) lived in a stable relationship and 47 of them (58%) were singles. Three participants (4%) reported having completed 10 years of education, 42 men (52%) had finished their A-levels, five participants (6%) had received their vocational baccalaureate diploma, 21 participants (26%) had graduated from a university and 10 participants (12%) had a professional qualification. Seventy-three subjects (90%) had at least once in their lifetime played *video games* for a mean length of 12 months. Twenty-nine participants (36%) had never played an action-shooter game. At present, 31 individuals (38 %) reported playing action-shooter games at least once a week. Fifty participants (62 %) denied playing action-shooters at the present time. None of the participants reported having ever attempted suicide.

All participants provided full, informed, and written consent for research participation. Study participation was voluntary and there was no monetary compensation for study participation. The study was approved by the Ethic Committee of the Faculty of Psychology at the Ruhr-Universität Bochum.

2.2. Procedure

Potential participants were approached face-to-face or via posted flyers recruiting healthy male volunteers for a study on gaming, pain and impulsivity. Inclusion and exclusion criteria were displayed on the advertisements. Persons who responded to the advertisement were given a code to access an internet-based questionnaire and screening tool. Participants were questioned about sociodemographic data, medication intake, substance use, lifetime suicide attempts, known physical and psychiatric disorders and acquired capability for suicide. Using the Suicide Subscale of the Depression Severity Index (DSISS; Joiner et al., 2002) and the Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977) it was ascertained that none of the participants had suicidal intentions (DSISS-score ≥ 1) or suffered from acute depression (CES-D-score ≥ 23). None of the potential participants had to be excluded from study participation.

After study intake participants were randomly assigned to four different conditions: There were two experimental groups (EG1 and EG2) and two control conditions (CG1 and CG2). Participants in all conditions started the experiment by playing a video game – either an action shooter game (EG) or a non-violent sports game (CG). Afterwards, half of the participants in either group received an experimental pain induction before engaging in a game of risk-taking behavior (EG1 and CG1). Half of the participants in either group started the game of risk-taking behavior before receiving the pain induction (EG2 and CG2). Participants' current mood was assessed directly before and after playing the video games. The investigation was conducted by two experimenters located in two separate laboratories: In laboratory 1, participants were randomized and conducted the video game. In laboratory 2, participants engaged in the pain induction and the risk taking game with the experimenter in laboratory 2 being blind to the experimental condition. Given that experimenter gender has been shown to impact experimentally assessed pain tolerance (Kállai et al., 2004), experimenter gender was held constant across the entire investigation – with a male researcher in lab 1 and a female researcher in lab 2. All participants were monitored individually.

2.3. Experimental tasks

2.3.1. Video games

Subjects in both experimental groups played the action-shooter game "*Counter Strike: Source*: *level de_chateau*". In this game participants act as member of a terrorist group and are instructed to kill soldiers of an anti-terror squad without getting killed themselves. Subjects in both control groups played a car race