Emotional effects of shooting activities : 'real' versus 'virtual' actions and targets

ICEC Conference Proceedings 2003—Essays on the Future of Interactive Entertainment. (Donald Marinelli, ed.; 2006) Carnegie Mellon University Press, pp. 181-190; © Carnegie Mellon University

EMOTIONAL EFFECTS OF SHOOTING ACTIVITIES: 'REAL' VERSUS 'VIRTUAL' ACTIONS AND TARGETS

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ABSTRACT

The results of an empirical study are presented to investigate the relationship between different action types (real versus virtual shooting) and different target types (real versus virtual targets) on the actual emotional state (well-being) of the player. The results show significantly that virtual shooting on real targets in a group (Laser-Tag game) enhances the well-being, and on the other side that virtual shooting on virtual targets (Wolfenstein game) diminishes the well-being of an individual player.

KEYWORDS

Emotional effect, mood, well-being, shooting game, Laser-Tag, combat sport, Wolfenstein game

1 INTRODUCTION

By the time a child is eighteen years old, he or she will witness on television (with average viewing time) 200,000 acts of violence including 40,000 murders [8]. Smith and Donnerstein [11] found in the three year, National Violence Television Study that:

- 61% of television programs contain some violence,
- 43% of violent scenes contain humor,
- perpetrators of violence were depicted as attractive, 44% of the time,
- no immediate punishment was depicted in nearly 75% of the violent scenes,
- many of the violent scenes depicted no harmful consequences.

Young children who see media violence have a greater chance of exhibiting violent and aggressive behavior later in life, than children who have not seen violent media [5]. Studies [2] show that, when children and young adults play violent video games, their aggressive behavior increases. 60-90% of the most popular video games have violent themes [1]. 59% of fourth grade girls and 73% of fourth grade boys say that the majority of their favorite video games are violent [1]. Children who spent more time playing video games were more active overall and playing was not at the expense of other activities. No relationship between video game play and aggressive behavior was found. Children who played video games more often were found to have a significantly higher IQ [13]. Video game play does not alter a child's activities, which include leisure activities, school activities, and peer involvement [4]. Children who played a violent video game when compared to those who played a nonviolent game displayed more aggressive and violent behavior [12].

There are several controversial research results in the specific area of violent video games and the effects on the user. A good overview over the results of several empirical studies is given by Anderson and Bush [3]. An often expressed critique against shooting games is based on the assumption that the 'killing' activity in shooting games leads to an increased aggressive behavior in daily live [9]. Several investigations could show heterogeneous results [7]. The investigation of this problem is a methodological challenge [14]. Instead of investigating the relationship between game behavior and their influence on daily life behavior, we started our investigations with the different influential factors of different action and target types on the mood and emotionality of the player before and after the activity. This paper describes an empirical study to investigate the emotional effects on the mood and well-being state of people in different active shooting contexts. Our main research question is addressed to the possible differences between real versus virtual shooting, and real versus virtual human target in their effects on the involved actor(s).

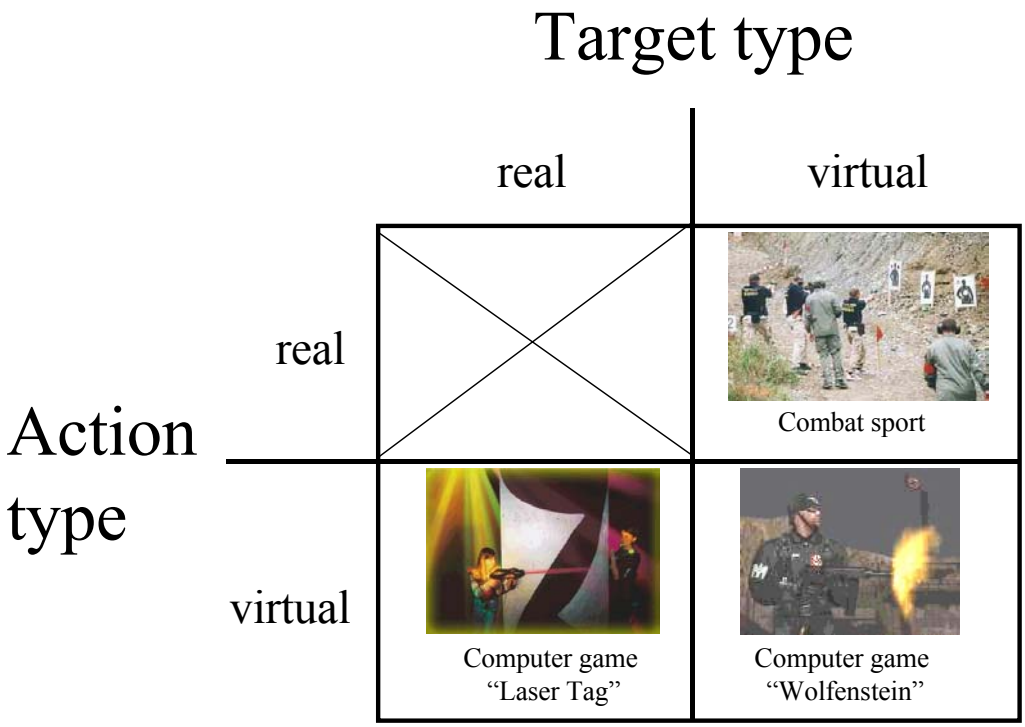
2 METHOD

To investigate our research question, one questionnaire based laboratory and two different field studies were carried out. The two main independent dimensions are (1) the type of action (real versus virtual shooting) and (2) the type of target (real versus virtual human being). For ethical and practical reasons, not all four possible combinations could be investigated: the combination 'real shooting' and 'real

[human] target' was excluded from this study. For the three other combinations we chose Laser-Tag ('virtual action' and 'real target'), the Combat sport ('real action' and 'virtual target'), and the computer game Wolfenstein ('virtual action' and 'virtual target') (see Figure 1).

The possibility to investigate the combination of 'real' target and 'real' action would be approaching soldiers with real war experiences during war activities or people acting as hunters during hunting. Both user groups were not included in this investigation.

For each possible combination between target and action type which are under consideration for this study, we were selecting an appropriate application: a group based Laser-Tag game (action type ‘virtual’, target type ‘real’), the Combat sport game (action type ‘real’, target type ‘virtual’, and the individual based computer game Wolfenstein game (action type ‘virtual’, target type ‘virtual’; see Figure 1).



[Fig. 1 Type of action (F1) and type of target (F2)]

Laser-Tag Game

Laser-Tag is a laser shootout game. The original idea is attributed to Christopher Rockhold, who has a 1988 patent for a game mimicking fictitious Old West gun fighting. In his "electronic shootout

game", several players are in a special environment to fight against each other. The weapons use laser transmitters and receivers for the shots, and players wear reflective vests to reflect a weapon's laser beam back at the weapon to be detected. Each player also has access to a display board, which provides them with game information. The weapons use wireless technology to communicate to the display boards, and the displays use serial data transmission to communicate with a central controller unit. Laser-Tag involves the use of several technologies. Laser data transmission and reception is a central feature. Communication between microprocessors using Radio Frequency (RF) and a serial interface will also be used. Finally, the many different hardware and software systems will have to be integrated in order to make the system work properly. For simplicity, Laser-Tag is divided into three main subsystems: the central controller, the display boards, and the laser weapons.

Combat Sport

Combat shooting at artificial targets (e.g. human like body targets) has been an accepted practice among police trainers. Combat shooting is nothing more than bringing the gun up and firing, thus trusting on the training and the natural ability to aim and hit a designated object. Nowadays Combat shooting is established as a sport activity, organized by sport clubs all over the world. Originally it was subject to much debate and even ridicule by some. Since that tenuous start the idea of forsaking sights during close quarter do-or-die scenarios has slowly and steadily taken root. Most police academies, world wide, teach Combat shooting. The concept has been proven to be fundamentally sound by the test of time and acceptance and practice in some of the most noted police academies. Regardless, some old disparaging myths still exists about this life-saving technique. Combat shooting is defined as the act of operating a handgun by focusing on the target, as opposed to the sights, and instinctively coordinating the hand and mind to cause the handgun to discharge at a time and point that ensures interception of the projectile with the target. Combat shooting, per se, is not new. Shotgun shooters have utilized the method on moving targets almost since the first hand held weapons were invented.

Wolfenstein Game

The PC computer game Wolfenstein is based on the following historical situation: "A highly decorated Army Ranger recruited into the Office of Secret Actions (OSA) tasked with escaping and then re-

turning to Castle Wolfenstein in an attempt to thwart Heinrich Himmler's occult and genetic experiments. Himmler believes himself to be a reincarnation of a 10th century dark prince, Henry the Fowler, also known as Heinrich. Through genetic engineering and the harnessing of occult powers, Himmler hopes to raise an unstoppable army to level the Allies once and for all".

The player must first escape from imprisonment in the castle to report the strange creatures and happenings in and around Wolfenstein to the OSA. The player's mission takes a drastic turn as s/he learns the depth of Himmler's plans and what s/he must do to defeat the evil he has unleashed. This is what the player has been trained for. The simulated game surroundings will be dangerous and hostile. The OSA is currently tracking activities believed to be associated with Himmler in locations throughout Germany including; villages overrun by the occult, hidden crypts, forests, air bases, secret weapons facilities, and genetic labs, to name only the few player has to be aware of. There are more, and the player must find them. Failure is not an option. The basic soldier is the backbone of the German Army. Whether SS or standard Wehrmacht he is always a highly disciplined and motivated fighter. Combat hardened, and proficient with a variety of small arms, the German Soldier should never be underestimated. Weapons of choice in the Wolfenstein game are MP40, Luger handgun, and Potato Masher.

2.1 TEST PROCEDURE AND TEST SUBJECTS

According to our general research questions we will have three different test conditions (see Figure 1). The concrete situation and investigated test sample for each of these three test conditions is described as follows (between subject test design).

Test Condition 1: Laser-Tag Game

The LaserDrome Entertainment Center (Grodoonia Center) in Rumlang nearby Zurich (Switzerland) was chosen as the test site for the Laser-Tag game. This center was public available throughout the whole week. This investigation took place during Saturday evening opening hours. 31 guests participated (28 male, 3 female; 16 subjects with 20 years of age or younger, 15 subjects between 21 and 30 years of age). All of these test subjects entered the LaserDrome in a group (5-10 players) to play with/against each other.

Test Condition 2: Combat Sport

The Combat Sport Club in Kloten nearby Zurich (Switzerland) was chosen as the test site for Combat Sport. This investigation took place on Sunday morning. 20% of all approached test subjects did not fill in the after activity questionnaire, and were excluded from the analysis. 8 club members filled in all questionnaires (8 male subjects of 31 years of age or older).

Test Condition 3: Wolfenstein Game

Students at the computer science department of the Swiss Federal Institute of Technology (ETH) were invited to participate in this investigation. The computer game Wolfenstein was installed on an Olivetti M380 PC, and available at the test laboratory of the Work Psychology Unit of the ETH. 8 students participated as players (8 male subjects between 21 and 30 years of age).

2.4 INDEPENDENT MEASURES

Action Context Analysis

The one main independent factor FA is defined by the three different action contexts: Laser-Tag (group activity), Combat sport (individual activity), and Wolfenstein game (individual activity).

Action versus Target Type Analysis

The two independent main factors are (factor 1, F1) the type of action ('real' versus 'virtual' shooting) and (factor 2, F2) the type of target ('real' versus 'virtual' human being).

2.5 CONTROL MEASURES

As control measures we used four different scales of the *Freiburg Personality Inventory* (FPI) [6]: FPI-1 scale 'openness' (sometimes called 'liar' scale), FPI-2 scale 'aggressiveness', FPI-4 scale 'excitability', and FPI-7 scale 'striving for dominance'. This inventory was presented to the test subject before the start of the game. In addition age, gender, educational background, actual profession, and pre-experience with the particular game activity were recorded.

2.5 DEPENDENT MEASURES

As the main dependent (outcome) measure the Bf-S 'Befindlichkeitsskala' ('well-being' scale; [15]) was used as a reliable and valid psychometric test to measure the actual emotional status of each

test subject directly before and after the activity. This psychometric test is a self-assessment scale consisting of 28 bi-polar rating items, and is in two parallel forms available. All 28 raw scores of each item are summed up in a total test score, which represents the actual emotional 'well-being' state of the test subject.

3 RESULTS

Analysis of Control Variables

We could not find a gender effect in gender allocation to test condition (DF=2, CHI**=1.6, p=0.44), which means that none of each test condition is accidentally biased by one gender (but still overall dominated by male subjects).

We could find a significant age effect among test conditions (DF=2, CHI**=55.4, p=0.001), which means that test subjects in the 'Laser-Tag' condition are unexpected younger, and test subjects in the 'Combat sport' condition are unexpected older in age.

We could find significant school education, professional background, and pre-experience effects between test conditions, too.

We could not find a significant difference among all three test conditions in regard to FPI-1, FPI-2, FPI-4, and FPI-7.

Action Context Analysis

We analyzed our data with the statistic tool StatView (version 4.02). First, we will present the results of the three different action contexts (test conditions): Factor FA 'Laser-Tag', 'Combat sport', and 'Wolfenstein game'. The mean and standard deviations of each action context are given in Table 1.

Test condition	Mean (STD)	Count
Laser-Tag	5.7 (20.5)	31
Combat sport	-4.9 (31.4)	8
Wolfenstein game	-24.1 (44.9)	8

[Table 1. Mean and standard deviation (STD) and number of test subjects (count) of the [post-pre] value difference of the psychometric test Bf-S 'well-being' for the independent factor FA.]

The result of a one-factorial analysis of variances (ANOVA) for the differences among means given in Table 1 (factor FA) is significant: DF=2, F=3.78, p=0.031. Post-hoc analysis (Scheffe F-test) shows only one significant difference between 'Laser-Tag' and 'Wolfenstein game' condition: mean difference ('Laser-Tag' minus 'Wolfenstein')= 29.8, Scheffe = 3.7, p=0.05. This result means that the emotional state 'well-being' through the action context of the group game 'Laser-Tag' changes in a *positive* direction, and through the individual computer game 'Wolfenstein' changes in a *negative* direction.

Action versus Target Type Analysis:

The result of an unpaired t-test (two tail) for the TARGET differences among mean ('target real')= 5.7, STD=21 (factor F1) and mean ('target virtual')= -14.5, STD=39 (factor F2) is significant: df=45, t-value=2.3, p=0.023, which means that virtual shooting on a real target in a group of other real players changes the emotional state in a *positive* direction, and the individual shooting (real or virtual) on a virtual target changes the emotional state in a *negative* direction.

The result of an unpaired t-test (two tail) for the ACTION differences among mean ('action real')= -5, STD=31 (factor F1) and mean ('action virtual')= -0.4, STD=29 (factor F2) is not significant: df=45, t-value=0.4, p=0.701, which means that the difference between real and virtual shooting actions does not change the emotional state of the players in one or the other direction.

4 DISCUSSION AND CONCLUSION

One of the major advantages of field studies like this one is the high ecological validity of the investigated action context. On the other side, one of the major disadvantages is the fact that the test samples of our three test conditions vary according different dimensions: age, educational background, and actual profession. This has to be interpreted as confounding factors that influence the empirical results of our main dependent variable the emotional state 'well-being' in an unknown way.

Another methodological difficulty is the different nature of the Laser-Tag game, which is inherently group or team based, and the nature of the individual computer game Wolfenstein. This could be overcome by using the computer game DOOM, where real players have to virtually shoot virtual players inside the virtual DOOM world [10]. These virtual players can be representations of other real players, so that a similar situation to the Laser-Tag context would be given.

The shooting action in Combat sport is not at all appropriate to be done in a group, although members of a Combat club can form a team e.g. to compete each other, but the shooting situation itself is individual based due to the virtual targets.

Taking these methodological constrains into account, we would like to generalize the found results at least to a similar population with the particular test sample characteristics. For young, non-college male persons the Laser-Tag game with virtual shooting on real target (other player) seems to enhance the emotional state 'well-being'. In contrast to this result, the young college male students seem to suffer significantly from playing the PC based game Wolfenstein. Due to the mentioned methodological constrains of these two field and one laboratory study, it seems to be difficult to interpret the found results in such a way that virtual shooting on real or virtual targets decreases the emotional state 'well-being'. On the other side, the group based game Laser-Tag with virtual shooting on real targets seems to increase positively, at least not to decrease negatively the emotional state 'well-being' of the players.

In which way the actual emotional state of a shooting game/sport influences the daily life behavior later on (as discussed in our introduction chapter above, e.g. towards aggressive behavior), is still open and needs further investigations.

ACKNOWLEDGEMENTS

The author thanks the following persons for their generous support: M. Isler, M. Klebl, T. Oetiker, D. Sax and D. Zuber from the Computer Science Department of the ETH in Zurich.

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