

# The influence of experience in playing violent video games on the physiological reactivity recorded by the polygraph on Romanian youngsters

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**Abstract.** The current research emphasizes the way youngsters' experience of violent video games influences their emotional feelings when they are being exposed to violent stimuli from video games. A number of 137 young students aged between 18 and 26 years old ( $m=22.46$ ,  $S.D. =2.19$ ), male and female, rural and urban areas have participated in this research. They were selected from the beginning using the criterion "experience in violent game playing of minimum 8 years". The instruments used were the Laffayette 4000 Platinum series polygraph and a questionnaire for perception of violence in video games. The results highlighted the fact that the young participants with experience in computer video games had a statistically significant difference in reactivity ( $p<0.01$ ) whereas the ones who do not have experience in playing violent video games in the GSR amplitude and time until return, heart beat and respiratory amplitude and time until return. These emphasize the fact that youngsters who have experience in playing computer video games have perceived violence from the sequences to which they were exposed as being common, similar to with the violent environment from the games they have played. The conclusion is that youngsters who play violent games have suffered a desensitization process and they do not live emotionally the violent scenarios and youngsters who do not have experience in violent computer games live emotionally and most of the times also dramatically these violent scenes to which they are exposed.

**Keywords:** GSR, desensitization, violent video games playing environment.

## 1. Introduction

In the last decades, researchers have debated the pro and against issue of aggression and violence in video games used by youngsters [1], [2], [3], [4], [5] suggests that exposure to violent video games is a causal risk factor for increased aggressive behavior, aggressive cognition, and aggressive affect and for decreased empathy and prosocial behavior. [7] observed increase of aggressive cognition after 10 min of playing a violent computer game in the laboratory. [8] emphasized that playing violent games, are related to negative behavior and academic performance. [9], [10] highlighted that violent video games are used by teenagers to relieve stress. Opposite to them [11] stated that playing a violent game produced a significant increase in implicit aggressive self-concept relative to playing a peaceful game. Hence, in this study we started from the results of previous researches following the two models: the general aggression model [12] and the model of the effects of exposure to media violence [3] in order to highlight the physiological reactions of exposing the youngsters to audio-visual aggressive stimuli from the high rated violent movies from "Saw" series. Also, a great contribution had the previous experimental studies involving aggressive and violent scenes from movies [13], the GSR response to aggressive verbal stimuli [14], [15] and the influence of family climate on Romanian youngsters' physiological reactivity to violent video stimuli measured by the polygraph [16].

## 2. The objective and hypotheses

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## **2.1. The objective**

The objective is focused on showing the influence of experience in playing violent video games playing on the physiological reactions of youngsters recorded by polygraph of youngsters when exposed to audio visual violent video games.

## **2.2. The hypotheses**

### **2.2.1. General hypothesis**

There is a statistically significant difference between the physiological reactions recorded by the polygraph for the youngsters who have experience in violent video games the ones who do not play violent video games.

### **2.2.2. Specific hypotheses**

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the GSR amplitude recorded by the polygraph sensors for the youngsters who do not play violent video games than the ones who have experience in playing violent games.

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the GSR time until return recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games.

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the heart rate recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games.

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the blood pressure recorded by the polygraph sensors for the who do not play games than the ones who have experience in playing violent games.

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the respiration time until return recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games.

The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the respiration amplitude recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games.

## **3. The Method**

### **3.1. The participants**

The participants were 137 students from the Faculty of Psychology and Education Sciences and from the Polytechnic Institute, Faculty of Electronics, aged between 18 and 26 years old ( $m=22.46$ ,  $S.D.=2.19$ ), both male and female, rural and urban areas. They were selected from the beginning using the criterion "experience in violent game playing minimum 8 years". The first experimental group was composed out of 67 students who did not play and do not play violent games and the second experimental group was composed out of 70 students who have experience in playing violent games for at least 8 years.

### **3.2. The instruments**

The Lafayette Polygraph, LX 4000-Platinum Series, with virtual interface, windows program. The polygraph software and the GSR sensors are generally fixed about two inches apart, either to the top and bottom of the middle finger or on the base of two adjacent fingers.

The video game sequences stimuli from high rated video game "God of wars III". There were selected 25 scenes in 15 minutes sequences from the video game "God of wars III" according to the high rated sequences with audio video stimuli(were from high rated violent scenes: tearing the head of a demigod, decapitations, fire whips, blood, pieces of flesh.



Fig. 1: Visual stimuli used in second sequence.

The questionnaire for violence perception [14]. This instrument has 10 items on the Likert scale measured from 1 to 7 which aim at intensity of violence (1-minimum and 7 maximum).

### 3.3. The procedure

A polygraph examination took place in the laboratory of Experimental Psychology from the Faculty of Psychology and Education Sciences. The length of an examination was between 30-40 minutes depending on the adaptation of the participants with the environment and the polygraph sensors. The polygraph sensors recorded the GSR (Galvanic Skin Response), heart rate and respiration of both experimental groups in the experimental situation with exposure to the same violent scenes from “God of wars III”.

### 3.4. The experimental design

- The independent variables were the 25 scenes in 15 minutes sequences from the video game “God of wars III”.
- The dependent variables were the following: the Galvanic Skin Response (GSR) recorded as amplitude and return distance in pixels; the Heart Rate and the Blood Volume Pulse (BVP) and the respiration amplitude and return distance.

## 4. Findings and Results

Analyzing the data for each individual who participated in the study, exposed to the video game sequences stimuli from high rated video game “God of wars III” (fig. 1; table 1), it can be observed that during every scene, the values showing the amplitude of the GSR figure 2a return distance in pixels were significantly higher than the base line in particularly for the participants from the second experimental group with no experience in playing violent videogames (table 1).

For a detailed analysis of these indicators, table 1 shows the means and the standard deviations for each of the two experimental groups: the experimental group with experience in playing violent videogames and the experimental group “with the ones who do not have experience in playing violent games”.

Considering the fact that the video game sequences stimuli from high rated violent video game “God of wars III” show human characters mutilation and violence, one of the most important aspects of this research was the emphasis on the differences between the physiological reactivity recorded at polygraph for the first experimental group with experience in playing violent video games and the experimental group with no experience in playing video games.

Table 1. Change in reactivity during the exposure to the high rated violent video game ”God of wars III”

Variables	Reactivity to aggressive stimuli sequences			
	Experience in playing violent video games		No experience in playing violent video games	
	Mean	SD	Mean	SD
GSR Amplitude	3.24 div	2.15	23.38div	6.84
GSR return distance in pixels	9.26 sec	3.51	19.35 sec	5.61
Heart rate (max)	89.43 bpm	12.32	68.84 bpm	7.45

Blood volume pulse	43.31 mmHG	0.75	42.11 mmHG	0.19
Respiration Amplitude P1	6.54 div	1.18	3.87 div	0.82
Respiration return P1	4.7 sec	0.52	2.16 sec	1.18

Therefore, after testing the specific hypotheses 1.1, 1.2, 1.3, 1.4, 1.5 and 1.6 with the nonparametric Man Whitney test for independent groups, the hypotheses 1.1 “The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the GSR amplitude recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games, 1.2. The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the GSR time until return recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games, 1.3 “The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the heart rate recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games; 1.5 „The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the respiration time until return recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games and 1.6 „The video stimuli consisting in violent video games sequences stimuli have a statistically significant influence on the respiration amplitude recorded by the polygraph sensors for the youngsters who do not play games than the ones who have experience in playing violent games were confirmed ( $p < 0.01$ ). The hypothesis 1.4 about the influence of blood pressure was not confirmed ( $p > 0.05$ ).

Fig. 2 a and b show the following scenarios: in Fig. 2 a the physiological reactivity recorded by the polygraph sensors during the participants’ exposure to the violent stimuli (fig. 1) from the high rated violent video game “God of wars III” is higher for the participant from the second experimental group with participants who do not have experience in playing violent computer games compared to the participant to the first experimental situation from the first experimental group with experience in playing violent games. Therefore, according to the results obtained but also as it can be observed in figure 2 of the GSR amplitude and return rate for the participant with experience in aggressive games are much smaller than for the participant from figure 2b without experience in violent games. The amplitude of the pulmonary respiration is statistically significant higher for the participant who has experience in violent games than for the participant who has no experience in violent games.

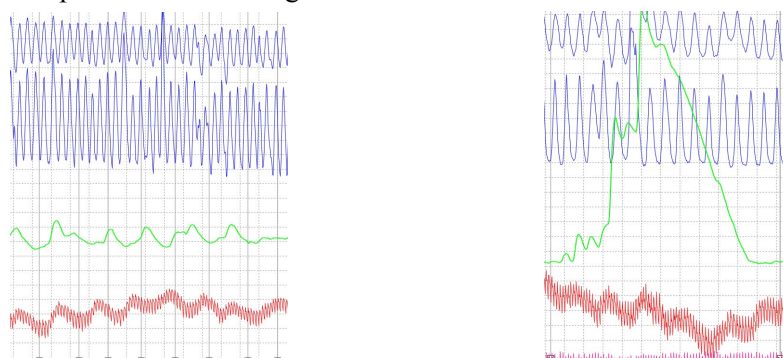


Fig. 2: Physiological reactivity to violent image of : (a) participant who has experience in playing violent games (b) participant who does not have experience in playing violent games.

By completing the questionnaire for perception of violence in video games, the results obtained come to strengthen the aspects obtained by using the polygraph, more precisely, the youngsters’ perception who have experience in paying violent games is that the scenes to which they were exposed are “cool” and that they do not have aggressive and violent aspects. Youngsters’ who have no experience in playing violent games stated that the scenes are very aggressive and traumatizing. This can be explained by the fact that youngsters who are used to violence from the games they play have been exposed to the phenomenon of desensitisation and they perceive cognitively and not emotionally the violent sequences showed to them.

## 5. Conclusions and recommendations

The findings show that the environment of video games playing has a strong influence on the emotional and physiological desensitization to violence for youngsters (Fig. 2a and b).

Based on the two models: the general aggression model [12] and the model of the effects of exposure to media violence [3] in order to highlight the physiological reactions of exposing the youngsters to audio visual aggressive stimuli from the high rated video game "God of wars III", the research continues and highlights the fact that violent video game environment can lead to the desensitization of the young. They are getting used to violent and aggressive stimuli and, therefore, similar violent situations to which they are exposed do not give them strong emotions of fear because they perceive violence as their common environment to which they have been taught by playing violent games.

A great contribution to this study had the previous experimental studies involving aggressive and violent scenes from movies [14] and the GSR response to aggressive verbal stimuli [13], [15].

Furthermore, the findings show that participants with experience in playing violent videogames process the violent situations at a cognitive level, being unaffected emotionally (table 1; Fig.2 a). The limbic system is restrained by the cognitive mechanisms developed within the violent videogames environment and, therefore, the desensitized youngsters consciously react in a relaxed manner [16], [17]. Therefore, we can emphasize that experiencing violent videogames environment, shapes is changing features at the cognitive level of youngsters who react insensitively and consciously to violent stimuli, because they are not being able to empathize with the situations showing emotionally powerful stimuli such as: human decapitation, mutilation and blood, human tortured, pieces of flesh and blood.

In conclusion, on one side it is important for the young to avoid spending time playing violent videogames but, on the other side, those who don't experience violent videogames environment are not trained for a violent, hostile environment reacting emotionally and possibly suffering psychological trauma. The question arising from this study "How it is better: to accustom youngsters to violence from games, getting them ready for being used to violent and hostile environments or to offer them an environment without violence although asking them for emotional vulnerability to hostile and violent environments?" This question is a subject for a future research.

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