

Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

SciVerse ScienceDirect

Procedia - Social and Behavioral Sciences 69 (2012) 780 – 789

---



---

**Procedia**  
 Social and Behavioral Sciences
 

---



---

International Conference on Education and Educational Psychology (ICEEPSY 2012)

## Towards Understanding the Positive Effect of Playing Violent Video Games on Children's Development

Adel M. Agina<sup>\*a</sup>, Robert D. Tennyson<sup>b</sup><sup>a</sup>University of Tripoli, Faculty of Medical Technology, Tripoli, P.O.Box: 78619 (Tripoli/Gorje), Libya<sup>b</sup>University of Minnesota, Department of Educational Psychology, 56 E River Road, USA

---

### Abstract

**Problem Statement:** In the literature, playing the violent games still considers as double-edged sword (Agina & Kommers, 2008). On one edge, the focus was on the aspect of using video games in teaching, social settings, and improving human-computer interfaces (e.g., Malone 1981; ...). On the other edge, the focus was on the negative outcomes and later effects (e.g., Griffiths & Hunt 1998; ...). However, the literature clearly lacks investigating the positive effect of playing violent games on children's development processes when children act and react alone and without human's external regulation.

**Purpose of Study:** Given the fact that the world is clearly unable to stop the production of the violent games as avoiding children to play violent games is almost impossible, the present study aimed towards understanding the positive effect of playing violent games on children's development to clarify what the future research should highly take into account. Stated differently, the present study was an attempt towards clarifying the importance of embedding violent arousal as a process of learning.

**Research Methods:** Hundred children (50 boys, 50 girls) who, almost, daily played violent games were specifically selected. Each child was given one hour to play with "CAR-RACING" and "THE-PUNISHER". After the session, a Friendly-Chat-Questionnaire, through nonhuman's external regulator, was achieved with each child where all children's utterances were recorded and tabulated. An extra meeting with children was achieved after the entire session.

**Findings:** Children's self-regulation and thinking-aloud verbalization were affected by the game hero's gender; both were fluctuated even among the same gender where boys showed higher level of violent arousal. Children also showed high level of self-regulation when engaging them as design-partners that confirmed Agina and Kommers (2008).

**Conclusions:** Despite the negative effect of playing violent games, violent arousal has positive effect on children's development especially self-regulation and thinking aloud to express their mind's content. Thus, the most significant question for the future research on children's development is that: How can the violent arousal be safely transferred into children's learning settings to enable children to be "Violent-Arousal-Learners" through "Violent-Arousal-Learning"?

**Keywords:** Violent Games; Violent Arousal Learners/Learning; Self-Regulation; Thinking Aloud; Children's Development

© 2012 The Authors. Published by Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

Selection and peer-review under responsibility of Dr. Zafer Bekirogullari of Cognitive – Counselling, Research & Conference Services C-crcs.

Introduction

---

## 2. Introduction

Undoubtedly, one of the most important needs for children is playing that helps children, especially with pleasure, to explore and learn many different and various things such as rules, social and coping skills. Since 1970 computer and video games were entered to the children's world in which children were satisfied their emotional needs actively whereas the main subject and content of these games is *adventure* (Gunter, 2002). Technically, the visual and auditory coding is necessary for the full success of these games (Real, 1993) and the main subject of those games is *violence* (Friedman, 1995). Some researchers (e.g., Greenfield, 1994; Sneed & Runco, 1992; Gunter, 2002) believed that children especially boys interested to play challenging and progressive games and they preferred computer and video games than watching TV and communicating with peers. However, the children's parents have negative attitude toward these games because they worried about their behavior and academic achievement and skills. Much research (e.g., Anderson, Gentile & Buckley, 2007) have shown that playing video games can be problematic for some youth such as children who spent more time playing video games achieved lower grades over the course of the school year as compared with their peers who played less frequently. These children also showed more aggressive impulses and were more likely to infer hostile intent when none existed. This, in turn, was related to heightened levels of aggressive behavior. Other

---

\* Corresponding author. Tel.: +218924887110; Fax: +218214809200

E-mail address: adelagina@yahoo.com; a.m.agina@utwente.nl; ([www.adelagina.net](http://www.adelagina.net)) /Second Author: rdtennyson@gmail.com

research (e.g., Gentile, 2009)) has found that adolescents who were “addicted” to video games showed a variety of psychosocial and health problems. Given these effects, it is not surprising that parents and teachers are most concerned with violent games interfering with schoolwork, social skills, and exercises where many parents felt that computer games activated negative emotions such as aggression, loss of environmental attention, and social withdrawal (e.g., Kutner, L., A., Olson, C., K., Warner, D., E. & Hertzog, 2008). One of the main concerns that had constantly risen against video and computer games is that most of games claimed to feature aggressive elements. The issue is ever more important because new games like PUNISHER, DOOM, RESIDENT EVIL and SILENT HILL are realistic violence and bloody games. Many other researchers (e.g., Chambers & Ascione, 1987; Griffiths, 1999) claimed that most of the computer games are violent in nature and have no effect on teenagers but young children can be affected by games especially on their behaviour. Up to date, playing the violent games still considers as double-edged sword (Agina & Kommers, 2008). On one edge, the focus was on the aspect of using the video games in teaching, social settings, and improving human-computer interfaces (e.g., Malone 1981; Pausch et al. 1994; Ju & Wagner 1997; Amory et al. 1999; Day et al. 2001; Durkin & Barber 2002; De Aguilera & Méndiz, 2003; Johnson & Wiles 2003; Lee et al. 2004; Fisch, 2005; Metaxas et al. 2005; Al Mahmud et al. 2007; Grønbaek et al. 2007). On the other edge, the focus was on the negative outcomes and later effects (e.g. Griffiths & Hunt 1998; Anderson and Bushman 2001; Sherry 2001), and other different aspects (e.g. Higuchi et al. 2005; Vandewater et al. 2004; Smith et al. 2003; Dietz 1998; Norris 2004; Gottschalk 1995). Briefly, the problem of the violent game is that the gamers are always playing against the rules in which a number of several studies tried to conceptualize the behavioral properties of games (e.g., Järvinen 2003; Juul 2003; Klabbers 2003). Other studies have examined another aspects such as the demographic, personality factors, motor functions and methodological tools (e.g. Griffiths et al., 2003; Griffiths & Dancaster 1995; McClure & Mears 1984; Castel et al. 2005; Donchin 1995; Washburn 2003). Nowadays, millions of people are engaging in multi-user gaming environments like MMOGs (Ducheneaut et al., 2005; Griffiths, Davies, & Chappell, 2003; Griffiths et al., 2004; Woodcock, 2006; Yee, 2006); we can not stop them to play as we can not prevent the production of those games.

### 1.1 What is Children’s Behavioral Regulation?

Specifically in Aginian’s studies (i.e., Agina, 2008; Agina & Kommers, 2008, Agina, Kommers & Steehouder: 2011a; 2011b; 2011c; 2011d; and 2012; Agina, 2012; Agina, Tennyson, et al., *in press*), the Children’s Behavioral Regulation (CBR) refers to “the level of the children’s speech use, the differentiation and difference between private speech, social speech, and thinking aloud, and the degree of the children’s self-regulation learning and satisfaction during learning tasks when children act alone and without any human-human interaction or social intervention during learning tasks”.

### 1.2 The Effect of Violent Video Games on Children’s Development

According to Anderson and Bushman (2002), the violent video games influence aggression through short-term and long-term effects. In the short-term, violent video games function as a situation variable that can increase aggressive cognition, affect, and arousal, in turn leading to increased aggressive behavior. In the long-term, violent video games can influence aggressive behavior by promoting aggressive beliefs and attitudes, and creating aggressive schema, aggressive behavioral scripts and aggressive expectations; which, in turn, may bias an individual's personality toward aggression. In other words, each violent video game episode may reinforce the notion that aggression is an effective and appropriate way to deal with conflict and anger (Bushman & Anderson, 2002). The most commonly used measure of aggressive behavior in the violent video game in the literature is the modified Taylor Competitive Reaction Time Test (TCRTT), in which the participant is told that he is competing with another participant (confederate) to see who can push a button faster upon the appearance of a cue. After each trial, the loser receives an aversive punishment (e.g., a loud noise blast) and the winner chooses the intensity of the punishment. The level of punishment intensity that the participant sets for his opponent and the duration of the punishment are indicative of aggressive behavior. Wins and losses are determined before the task begins, and the participant both receives and delivers punishments (for more details, see Adachi & Willoughby, 2011).

## 3. The Present Study (The Research Problem and Main Question)

Remarkably, the negative outcomes of gaming, on one hand, is commonly reported (e.g. Piper et al., 2006; Dillon et al., 2006; Sehaba & Estrailier, 2006; Bernhaupt et al., 2007; Svoen, 2007; Ravaja et al., 2007). Therefore, there are several theoretical models that do not only describe and explain but also predict the aggressive behaviour (e.g., Berkowitz’s cognitive-neoassociation theory; Zillman’s excitation transfer theory; Huesmann’s script theory). On the other hand, there is no yet such a model that focuses on the positive

contribution and effect of the violent arousal to children's development. This subject is not only motivated *but* also challenged because there is an obvious contradiction between what the researchers believe about the violent arousal and the ultimate goal of self-regulation. Precisely, the problem of the current study lies behind the fact that most of the gaming researchers believe that playing in cooperation with another player is greatly effecting arousal, where the effect, per se, can be drastically impacted when the player knows that the other object on the screen is *physically* controlled by a human. This means that involving human, as an external regulator, for controlling/regulating arousal by a real human is inevitable. Clearly, this makes a significant 'collision/conffliction' with the ultimate goal of self-regulation, which is eliminating the human's external regulation (for more details, see Aginian's studies). Stated differently, the literature clearly lacks investigating the positive effect of playing violent games on children's development especially when children act and react *alone* and without human's external regulation. Thus, the present study tried to explore if there is an effect of the violent vs. nonviolent arousal on Children's Behavioral Regulation (CBR) through the following research question: *What is the effect of the violent vs. nonviolent arousal on children's behavioral regulation?*

#### 4. Material and Method

##### 4.1 Participants

With closely cooperation with the children's parents and teachers, participants were specifically selected from ten different preschools in Tripoli (10 children from each preschool, five boys and five girls produced the total of 50 boys and 50 girls, which were 100 participants with *Mage* = 5.7 years). All children spoke Libyan as their native language, which is a hybrid of Arabic and Italian. Participants already started learn English in very simple way (e.g., some songs, greetings, names of animals, fruits and vegetable, and so on with some other extra terminologies that have almost daily use in the classroom such as 'Simple/Advanced Calculator', 'Ready', 'Do It', and many others). To ensure the participants' mental and physical health, the school medical records were revised for all the participants to mainly ensure there is no sign for Attention Deficit Hyperactivity Disorder (ADHD) or similar challenges such as the Autism Spectrum Disorders (ASD) or problems with hearing or vision like color blindness. The parents' confirmation of their children's almost-daily use of the violent games was ensured during signing the consent to engage their children in the experiment.

##### 4.2 Materials

Two different sets of stimulus material were used. The first set involves two of the most preferable violent and bloody games among participants, namely: "THE PUNISHER" and "CAR-RACING". The second set involves two of 'peaceful tools' namely: Microsoft-Paint and "CHILD-CALCULATOR", which associated with a Friendly-Chat-Questionnaire (FCQ) where the computer acts as an external regulator to control the FCQ (Figure 1). The participants were so familiar with the violent games and were fluctuated in their familiarity with the peaceful-tools. In specific, some children were so familiar with the peaceful-tools, others have good level of experience, and others have a little experience, while others were novice (i.e., never experience them before).



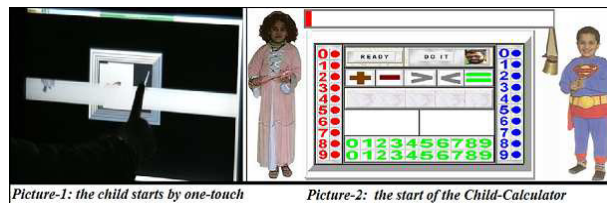
Fig.1 the stimulus materials

##### 4.3 The Experimental Design

There were four different sessions. Each session was recorded and all the utterances were tabulated.

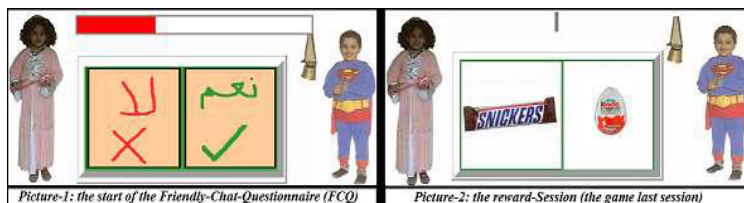
- **Session-1 (Violent arousal through violent games):** at the first hour (from 09:00 to 10:00), the participant was given a chance to play alone with the proposed violent games ("THE PUNISHER" or "CAR-RACING") with full freedom to switch between them.
- **Session-2 (Nonviolent arousal through a thinking learning tool):** at the second session (from 10:30 to 11:30), participant was asked to act alone (i.e., without his teacher as an external regulator). If the child agreed, he attended a five-minute welcome session in the meeting room with the teacher and experimenter

but did not receive training on how to use the Child-Calculator® given the fact that some children already experienced it while others are novice (this learning tool is reserved for Aginian's studies: *Not for commercial or public use*). Instead, children were made aware that the game requires a smart player to complete the task and that the teacher and experimenter were only waited outside the door to watch their performance in order to reward them. Children were also made aware that neither their teacher nor the experimenter would know the answers. If the child agreed, he was given a complete hour to play with the peaceful-toll "Child-Calculator®", which allows the child to play along 40 minutes and used the last 20 minutes to run the FCQ. In specific, because no previous training was offered (as an effort to avoid any human-human interaction, social intervention, or any external human regulation before the experiment), the game began with the instruction "Touch the correct sign with your finger to start the game" spoken first by the animated Princess and repeated by the animated Superman on a continual loop for five minutes or until the child reacted. If the child did not react within five minutes, he ended the session denoted that the child does not like to continue or he does not understand what he should do; otherwise the game started instantly (Fig. 2, Picture-1). The system then introduced the tool Child-Calculator® (Fig. 2, Picture-2) where the Princess was verbally and clearly warned the child that she and Superman would like to play math-tasks with him (the child) because he is very smart as his teacher recommended (as an effort to motivate the child to engage instantly). The Child-Calculator® (version-1) is a simple calculator with one levels of difficulties where children could act with five math operations (+, -, <, >, =). Superman was verbally warned the child that he (the child) has full freedom to play until the red-line (i.e., the time-line allotment), reaches him (Superman) because he (Superman) will finish the session by ringing the bell. The child had had to listen to the proposed task by the virtual teacher, construct the equation, and then answered it.



Picture-1: the child starts by one-touch      Picture-2: the start of the Child-Calculator  
Fig.2 the child acts alone without human's external regulation

At the end of the session (i.e. after 40 minutes), Superman was, first, opened the conversation by informing the child that he (Superman) and the Princess would like to chat with him (the child) about the game because he (the child) showed high level of intelligence and could help to improve the game (regardless of his actual achievement as a motivation for the child to respond exactly as the teachers did in the classroom). Superman asked the child to touch him or the Princess to choose who is going to chat with him (the child). During this chatting, the Princess/Superman asked the child 10 questions (five questions for the violent arousal and another five questions for the nonviolent arousal). The child had had to answer each question within two minutes. After each question, the Princess/Superman asked the child to touch the correct/incorrect sign if he would/wouldn't like to continue chatting until the last question (Fig. 3, Picture-1). At the end of the FCQ, the Princess/Superman moved to the last session (Fig. 3, Picture-2) where the child could choose his favorite piece of chocolate (Snickers and Kinder-Surprise were the most preferable chocolate among the participants as their teachers recommended).



Picture-1: the start of the Friendly-Chat-Questionnaire (FCQ)      Picture-2: the reward-Session (the game last session)  
Fig.3 the Friendly-Chat-Questionnaire (FCQ) and the game last session

Finally, the Princess and Superman thanked the participant and informed him that he did a very nice job with high performance (regardless his actual performance) and told him to go to the experimenter who waiting outside the door with a teacher to receive what he requested.

- **Session-3 (Nonviolent arousal through a drawing tool):** at the third hour (from 12:00 to 13:00), each participant was asked whether he would like to act with his teacher or alone. If the child agreed, he was given another hour to play with the peaceful-tool Microsoft-Paint to draw what they want.

- **Session-4 (Face-to-Fact Meeting):** during delivering the rewarded piece of chocolate the child already requested, the experimenter was utilized this session to ask the child “what was the best session he liked?”

#### 4.4 Measuring Children’s Verbalization

Because children did not receive any encouragement cues to talk during the progression, the present study considered all the children’s verbalization as thinking aloud utterances given the fact that thinking aloud should happen spontaneously; i.e., without previous instructions to do so (Aginian’s studies).

#### 4.5 Exploring the Indication(s) of Children’s Self-Regulation

To explore whether the children’s self-regulation has effected by the violent vs. nonviolent arousal, the present study relied on the children’s spontaneous reaction through the children’s answers of the FCQ. In specific, if the children liked the nonviolent environment more than or equal to the violent environment, the present study considered those children as having a sign of self-regulation and able to transfer that violent arousal into their learning settings *by themselves* given the fact that those child realized, clearly, the difference between the two environments. Otherwise, the present study considered those children as still needing an extra regulation to be able to transfer the violent arousal into their learning setting.

#### 4.6 Experimental Conditions

To explore whether there is a clear indication of violent arousal on children’s development, the participants were divided into two different group/orders (i.e., the two different conditions of the experiment). In the first order, the first 50 participants started with session-1 (the Violent arousal through violent games), followed by the session-2 (nonviolent arousal through a thinking tool) and session-3 (nonviolent arousal through a drawing tool), and ended with session-4 (i.e., the Face-to-Face-Meeting). In the second order, the second 50 participants started with session-3, followed by session-2 and session-1, and ended by session-4. For the sake of the simplicity, the present study defines the first order as VTD-Group and the second order as DTV-Group (Fig. 4).

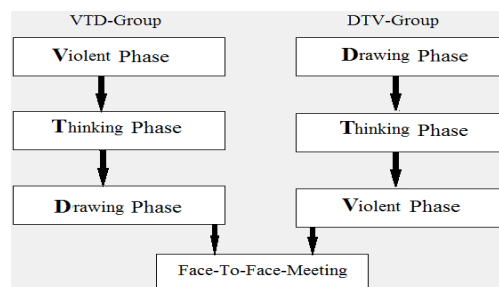


Fig.4 the experimental conditions (Violent vs. Nonviolent Arousal)

#### 4.7 Data Gathering

All data of the three sessions were gathered through revised the video records and tabulated whenever it was needed. During the third session, the system automatically counted how many equations each child constructed and answered correctly/incorrectly.

### 5. Procedure

At each preschool, the experiment started at 09:00 AM to avoid differences due to fatigue. Two children were select per day where each child was acted alone in a separate room (i.e., each school required five days to finish the experiment with ten children). Each room has a child-sized chair, an external touch-screen—used to avoid any possible coordination problems for the children—connected to a laptop computer with two hidden portable video cameras. The first camera captured the entire environment, and the second offered a clear view of the task on the screen and the child’s face. An extra small microphone was connected to the second camera for better audio recording. Children, however, were kept unaware of the cameras and the microphone to avoid a problem of splitting attention that could lead to undesirable cognitive processes.



6. Result

6.1 4.1 The effect of the violent vs. nonviolent arousal on children of the VTD-Group

The research question addressed was concerned the influence of the violent vs. nonviolent arousal on children’s behavioral regulation. Table (1) shows the influence of violent arousal vs. nonviolent arousal on children’s of the VTD -Group while Table (2) shows the significant effect of the violent vs. nonviolent arousal on children’s of the VTD-Group.

Table 1. The influence of violent arousal on children’s speech production (VTD-Group)

Game’s Name (Violent vs. Nonviolent Arousal)	Number of Game Usage		No of Speech Utterances		Children Refuse to Play	
	Boys (n=50)	Girls (n=50)	Boys (n=50)	Girls (n=50)	Boys (n=50)	Girls (n=50)
THE PUNISHER <sup>1</sup>	167 (27%)	93 (19%)	35 (10%)	51 (13%)	0	0
CAR-RACING <sup>1</sup>	203 (32%)	109 (22%)	67 (20%)	17 (.04%)	0	0
CHILD-CALCULATOR <sup>2</sup>	197 (31%)	203 (42%)	101 (29%)	227 (59%)	0	0
MICROSOFT PAIT <sup>3</sup>	62 (10%)	81 (17%)	141 (41%)	93 (24%)	0	0
<b>Total</b>	<b>629</b>	<b>486</b>	<b>344</b>	<b>388</b>	<b>0</b>	<b>0</b>

(<sup>1</sup>)Represents the number the children switch on/off the game.

(<sup>2</sup>)Represents the number of the tasks the children achieved.

(<sup>3</sup>)Represents the number of the pictures the children made.

Table 2. The significant effect of the violent vs. nonviolent arousal on the VTD-Group

Testing the significant between the violent vs. nonviolent of		$\chi^2$	df	N	p	Result
1	The game usage (boys and girls)	34.219	3	1115	< 0.001	Significant
2	The speech utterances (boys and girls)	88.663	3	732	< 0.001	Significant
3	The game usage and speech utterances (only boys)	145.429	3	973	< 0.001	Significant
4	The game usage and speech utterances (only girls)	71.502	3	874	< 0.001	Significant

6.2 The effect of the nonviolent vs. violent arousal on children of the GTV-Group

The research question addressed was concerned the influence of the violent vs. nonviolent arousal on children’s behavioral regulation. Table (3) shows the influence of violent arousal vs. nonviolent arousal on children’s of the DTV -Group while Table (4) shows the significant effect of the violent vs. nonviolent arousal on children’s of the DTV-Group.

Table 3. The influence of nonviolent arousal on children’s speech production (DTV-Group)

Game’s Name (Nonviolent vs. Violent Arousal)	Number of Game Usage		No of Speech Utterances		Children Refuse to Play	
	Boys (n=50)	Girls (n=50)	Boys (n=50)	Girls (n=50)	Boys (n=50)	Girls (n=50)
CHILD-CALCULATOR <sup>2</sup>	447 (55%)	391 (51%)	234 (32%)	313 (40%)	0	0
MICROSOFT PAIT <sup>3</sup>	91 (11%)	97 (13%)	277 (37%)	208 (26%)	0	0
THE PUNISHER <sup>1</sup>	87 (10%)	59 (.08%)	137 (19%)	177 (22%)	0	7
CAR-RACING <sup>1</sup>	193 (24%)	216 (28%)	88 (12%)	97 (12%)	9 (100%)	0 (100%)
<b>Total</b>	<b>818</b>	<b>763</b>	<b>736</b>	<b>795</b>	<b>9</b>	<b>7</b>

(<sup>1</sup>)Represents the number the children switch on/off the game.

(<sup>2</sup>)Represents the number of the tasks the children achieved.

(<sup>3</sup>)Represents the number of the pictures the children made.

Table (4). The significant effect of the nonviolent vs. violent arousal on the DTV-Group

Testing the significant between the nonviolent vs. violent of		$\chi^2$	df	N	P	Result
1	The game usage (boys and girls)	8.694	3	1581	< 0.034	Significant
2	The speech utterances (boys and girls)	24.522	3	1531	< 0.001	Significant
3	The game usage and speech utterances (only boys)	207.278	3	1554	< 0.001	Significant
4	The game usage and speech utterances (only girls)	152.689	3	1558	< 0.001	Significant

### 6.3 Exploring the Indication(s) of Children’s Self-Regulation

The FCQ shows that the both violent and nonviolent arousals have a significant effect on children where children in both conditions show almost the same reaction with slightly difference because of the novice children regarding the use of the nonviolent arousal learning tools (Table 5).

Table 5. The Friendly-Chat Questionnaire (FCQ), by group

The friendly chat questionnaire	VTD-Group (n = 50)	DTV-Group (n = 50)
<b>Questions about the violent arousal</b>		
(1) You feel anxiety if you do not play THE-PUNISHER or CAR- RACING everyday.	50 (100%)	50 (100%)
(2) You like all ‘action’ games.	50 (100%)	50 (100%)
(3) You will not stop playing these games.	50 (100%)	50 (100%)
(4) You pay attention when your parents ask you to stop play these games.	9 (18%)	7(14%)
(5) If you got a problem in your school, do you apply what you have learnt from THE-PUNISHER?	39(78%)	41(82%)
<b>Questions about the nonviolent arousal</b>		
(6) The CHILD-CALCULATOR and MS-PAINT are easy to use.	45(90%)	43(86%)
(7) You like the CHILD-CALCULATOR and MS-PAINT.	50 (100%)	50 (100%)
(8) You will play the CHILD-CALCULATOR and MS-PAINT once again.	50 (100%)	50 (100%)
(9) You will recommend the CHILD-CALCULATOR and MS-PAINT to your friends	50 (100%)	50 (100%)
(10) You want one of your parents or your teacher to be with you to finish the tasks.	5(10%)	7(14%)

Despite, children in both groups felt anxiety if they did not play the violent games, all children in both groups (100%) liked the nonviolent learning tools, they will play the nonviolent learning tools once again (100%), and , therefore, they will recommend the nonviolent learning tools (100%). More than that, most of the children in both groups (55% and 43% respectively) did not need their external regulator during the progression to finish the nonviolent tasks, which is the most significant indication of the effect of the violent vs. nonviolent arousal on self-regulation. Despite those reactions, children in the VTD-Group (19 children: 38%) preferred the nonviolent session more the children in DTV-Group (17 children: 34) during the Face-To-Face Meeting as shown in Table (6), which is an indication that children regulated themselves to understand the benefit of the nonviolent learning tools.

The question during the meeting: What was the best session (the violent or nonviolent)?	Violent Arousal Session	Nonviolent Arousal Session
VTD-Group	31 (62%)	19 (38%)
DTV-Group	33(66%)	17(34%)

### 7. Discussion

The present study started with the fact that the current research (Agina, 2012), simply, divided the children’s entertainment into two main divisions, positive and negative. The positive entertainment represents the educational and learning tools where young children gain extra benefit without hindering their behavioral regulation. In contrast, the negative entertainment represents the *violent arousal* where children’s behavioral regulation may negatively affect the society. However, the existing literature on violent arousal is clearly focusing on aggression, as the worst children’s behavioral action, and violence, as the worst psychological reaction. This result, however, has stated without investigating how that aggression and violence can be positively transferred into children’s learning settings. In other words, if children are able to convey that negative behavioral regulation into society, the research, then, should pay attention to: how can that negative behavioral regulation (i.e., the violent arousal) be positively conveying into children’s learning settings in order to enable children to become “self-arousal learners” given the fact that children do not only feel, but also ‘taste’ the *arousal* when playing against the rules (Agina & Kommers, 2008). From a practical point of view, the present study tried to convey the violent arousal when young children start playing with violent games into their learning setting to achieve some learning tasks. Therefore, the present study tried also to convey the children’s nonviolent arousal from their learning settings into violent environment where children start play with violent games. In both cases, the present study tried to explore whether there is an effect of the violent vs. nonviolent arousal on children’s development when children act alone (i.e., without an external regulator) in both environments. However, the present study does not precisely count the extent the children regulate themselves during the violent and nonviolent arousal in both groups. Instead, it only shows whether there is an indication of the effect of the violent vs. nonviolent arousal on children’s self-regulation (this limitation is very challenged and motivated for the future work).

The present study confirmed the conclusion of the previous study by Agina and Kommers (2008). Despite the negative effect of playing violent games, violent arousal has positive effect on children's development especially self-regulation and thinking aloud. Thus, the most significant question for the future research on children's development is that: How can violent arousal be safely transferred into children's learning settings to enable children to be "Violent-Arousal-Learners" through "Violent-Arousal-Learning (VAL)"? In other words, the future work should focus on the following questions: what is VAL and how can VAL be applied?

## 8. References

- Adachi, P. & Willoughby, T. (2011). The effect of violent video games on aggression: Is it more than just the violence? *Aggression and Violent Behavior*, 16 (2011), 55–62
- Agina, A. M. (2008). Towards understanding self-organization: How self-regulation contributes to self-organization?. *International Journal of Continuing Engineering Education and Life-Long Learning*, 18(3), 366–379.
- Agina, A. M. & Kommers, P. A. M. (2008). *The Positive Effect of Playing Violent Games on Children's Self-regulation Learning*. IADIS Multi Conference on Computer Science and Information Systems (pp. 141-145). Amsterdam: University of Twente Press. ISBN: 978-972-8924-64-5.
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011a). The effect of the external regulator's absence on children's speech use, manifested self-regulation, and task performance during learning tasks. *Computers in Human Behavior*, 27(3), 1118-1128 (2011) 3
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011b). The effect of nonhuman's versus human's external regulation on children's speech use, manifested self-regulation, and satisfaction during learning tasks. *Computers in Human Behavior*, 27(3), 1129-1142.
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011c). The effect of the nonhuman external regulator's answer-until-correct (AUC) versus knowledge-of-result (KR) task feedback on children's behavioral regulation during learning tasks. *Computers in Human Behavior*, 27(5), 1710-1723.
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011d). The effect of nonhuman's external regulation on detecting the natural development process of young children's self-regulation during learning tasks. *Computers in Human Behavior*, 27(5), 1724-1739.
- Agina, A. M. (2012). "Who vs. Whom AND Where Should We Go Through?": A Reflection Towards Clarifying the Effect of Media and Entertainment on Children's Development for Future Research. *Computers in Human Behavior*, 27(4), 366-379.
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2012). The effect of nonhuman's external regulation on children's responses to detect children with developmental problems (DP) associated with the natural development of self-regulation during learning tasks. *Computers in Human Behavior*, 28, (2012) 527–539.
- Agina, A. M., Tennyson, R. D., Kommers, P. A., & Steehouder, M. F. (in press). *Understanding children's private speech and self-regulation learning in Web 2.0: Updates of Vygotsky through Piaget and future recommendations*. In P. Ordóñez de Pablos, H.O. Nigro, R.D. Tennyson, S.E. González Cisaro, & W. Karwowski (Eds.), *Advancing information management through semantic Web concepts and ontologies*. Hershey, PA: IGI Global.
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011a). The effect of the external regulator's absence on children's speech use, manifested self-regulation, and task performance during learning tasks. *Computers in Human Behavior* (2010), doi:10.1016/j.chb.2010.10.007
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011b). The effect of nonhuman's versus human's external regulation on children's speech use, manifested self-regulation, and satisfaction during learning tasks. *Computers in Human Behavior* (2011), doi:10.1016/j.chb.2010.12.014
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011c). The Effect of the Nonhuman External Regulator's Answer-Until-Correct (AUC) versus Knowledge-of-Result (KR) Task Feedback on Children's Behavioral Regulation during Learning Tasks. *Computers in Human Behavior* (2011), doi:10.1016/j.chb.2010.12.014
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011d). The Effect of Nonhuman's External Regulation on Detecting the Natural Development Process of Young Children's Self-regulation during Learning Tasks. *Computers in Human Behavior* (2011), doi:10.1016/j.chb.2010.12.014
- Agina, A. M., Kommers, P. A. & Steehouder, F. (2011e in press). The effect of nonhuman's external regulation on children's responses to detect children with developmental problems (DP) associated with the natural development of self-regulation during learning tasks. *Computers in Human Behavior* (2011), doi:10.1016/j.chb.2011.10.02
- Agina, A. M., Tennyson, R. D., Kommers, P. A., & Steehouder, M. F. (2011f-in press). *Understanding children's private speech and self-regulation learning in Web 2.0: Updates of Vygotsky through Piaget*



- and future recommendations. In P. Ordóñez de Pablos, H.O. Nigro, R.D. Tennyson, S.E. González Cisaró, & W. Karwowski (Eds.), *Advancing information management through semantic Web concepts and ontologies*. Hershey, PA: IGI Global.
- Al Mahmud, A., Mubin, O., Renny Octavia, J., Shahid, S., Yeo, L., Markopoulos, P. & Martens, J. (2007). aMAZEd: Designing an Affective Social Game for Children. *IDC '07, June 6-8, 2007 Aalborg, Denmark*. Copyright 2007 ACM. 978-1-59593-747-6/07/0006IADIS International Conference Gaming 2008.
- Amory, A., Naicker, K., Vincent, J. & Adams, C. (1999). The use of computer games as an educational tool: Identification of appropriate game types and game elements. *British J. Educational Technol.* 30, 4, 311-321.
- Anderson CA, Gentile DA, Buckley KA. *Violent video game effects on children and adolescents: Theory, research, and public policy*. New York, NY: Oxford University Press, 2007.
- Anderson, C. A. & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychol. Sci.* 12, 5, 353-359.
- Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology*, 53, 27–51.
- Bernhaupt, R., Schwaiger, D., Riegler, S. and Enthaler, D. (2007). Evaluating Children's Gaming Experiences. *ACE'07, June 13–15, 2007, Salzburg, Austria*.
- Blanchard, A. (2004). Virtual behavior settings: An application of behavior setting theories to virtual communities. *Journal of Computer-Mediated Communication* 9, (2) January 2004.
- Castel, A. D., Pratt, J., & Drummond, E. (2005). The effects of action video game experience on the time course of inhibition of return and the efficiency of visual search. *Acta Psychol.* 1, 2, 217-230.
- Chambers, J. H., & Ascione, F. R. (1987). The effects of pro-social and aggressive videogames on children's donating and helping. *Journal of Genetic Psychology*, 148, 499–505.
- Day, E. A., Arthur, W., & Gettman, D. (2001). Knowledge structures and the acquisition of a complex skill. *J. Appl. Psychol.* 86, 5, 1022-1033.
- De Aguilera, M. & Méndiz, A. (2003). Video Games and Education. (Education in the Face of a .Parallel School.) *ACM. Computers in Phase*, Vol. 1, No. 1, October 2003, Article 01.
- Dietz, T. L. (1998). An examination of violence and gender role portrayals in video games: Implications for gender socialization and aggressive behavior. *Sex Roles* 38, 5-6, 425-442.
- Dillon, R., Wong, G and Ang, R. (2006). Virtual Orchestra: An Immersive Computer Game for Fun and Education. *ACM publications 2006*.
- Donchin, E. (1995). Video games as research tools - Tthe Space Fortress game. *Behaviour Res. Methods Instruments Comput.* 27, 2, 217-223.
- Ducheneaut, N., Yee, N., Nickell, E., & Moore, R. (2005). "Alone Together?" *Exploring the social dynamics of massively multi-player online games*. *CHI 2006*. Retrieved July 14, 2006, from <http://www.chi2006.org/>
- Durkin, K. & Barber, B. (2002). Not so doomed: Computer game play and positive adolescent development. *J. Appl. Developmental Psychol.* 23, 4, 373-392.
- Fisch, S., M. (2005). Making Educational Computer Games "Educational". *IDC 2005, June 8-10, 2005, Boulder, Colorado, USA*
- Friedman, T. (1995). Making sense of software :Computer games and interactive textuality ,in S. G. Jones (ed), *Cybersociety:computer –mediated communication and community* (Thousand Oaks, CA:Sage).
- Gentile DA. (2009). Pathological video game use among youth 8 to 18: A national study. *Psychol Sci*, 20,594–602.
- Gottschalk, S. (1995). Videology - Video-games as postmodern sites, sights of ideological reproduction. *SymbolicInteraction* 1, 1, 1-18.
- Greenfield, P.M.(1994).Action video games and informal education: effects on strategies for dividing visual attention ;*Journal of Applied Developmental Psychology*.15(1):105-123.
- Griffiths, M. & Hunt, N. (1998). Dependence on computer games by adolescents. *Psychol. Reports* 82, 2, 475-480.
- Griffiths, M., Davies, M., & Chappell, D. (2003). Breaking the stereotype: The case of online gaming. *CyberPsychology & Behavior*, 6, 81–91.
- Griffiths, M., Davies, M., & Chappell, D. (2004). Demographic factors and playing variables in online computer games. *CyberPsychology & Behavior*, 7, 479–487.
- Grønbeek, K., Iversen, O., S., Kortbek, K., J. & Aagaard, L. (2007). iGameFloor—A Platform for Co-Located Collaborative Games. *ACE'07, June 13–15, 2007, Salzburg, Austria*. Copyright 2007 ACM 978-1-59593-640-0/07/0006
- Gunter, B. (2002).*The effects of video games on children: the myth unmasked* .CA: Sage.

- Higuchi, S., Motohashi, Y., LIU, Y. & Maeda, A. (2005). Effects of playing a computer game using a bright display on presleep physiological variables, sleep latency, slow wave sleep, and REM sleep. *J. Sleep Res.* 14, 3, 267-273.
- Järvinen, A. (2003). Making and breaking games: A typology of rules. In *Proceedings of Level Up: Digital Games Research Conference*. M. Copier and J. Raessens, eds. (Utrecht University, Nov. 2003). 92-99.
- Johnson, D. & Wiles, J. (2003). Effective affective user interface design in games. *Ergonomics* 46, 13-14, 1332-1345.
- Jones, G. (2002). Killing Monsters: why children need fantasy, super heroes, and make-believe violence. The Kids Are Alright. Retrieved April 06, 2008, from <http://www.popmatters.com/books/reviews/k/killing-monsters.shtml>
- Ju, E. & Wagner, C. (1997). Personal computer adventure games: Their structure, principles, and applicability for training. *Database Advances Inf. Syst.* 28, 2, 78-91.
- Juul, J. (2003). The game, the player, the world: Looking for the heart of gameness. In *Proceedings of Level Up: Digital Games Research Conference*. M. Copier and J. Raessens, eds. (University of Utrecht, Nov. 2003). 30-45.
- Klabbers, J. H. G. (2003). The gaming landscape: A taxonomy for classifying games and simulations. In *Proceedings of Level Up: Digital Games Research Conference*. M. Copier and J. Raessens, eds. (University of Utrecht, Nov. 2003). 54-67.
- Kutner, L., A., Olson, C., K., Warner, D., E. & Hertzog, S., M. (2008). Parents' and sons' perspective on video game play. *J Adolesc Res*, 23:76–96.
- Lee, J., Luchini, K., Michael, B., Norris, C., & Soloway, E. (2004). More than Just Fun and Games: Assessing the Value of Educational Video Games in the Classroom. *CHI 2004, Late Breaking Results Paper, April 24–29, 2004*, Vienna, Austria.
- Malone, T. W. (1981). Toward a theory of intrinsically motivating instruction. *Cognitive Sci.* 4, 333-369. ISBN: 978-972-8924-64-5 © 2008 IADIS
- McClure, R. F. & Mears, G. (1984). Video game players: Personality characteristics and demographic variables. *Psychol. Reports* 55, 271-276.
- Metaxas, G., Metin, B., Schneider, J., Shapiro, G., Zhou, W. & Markopoulos, P. (2005). SCORPIODROME: An Exploration in Mixed Reality Social Gaming for Children. *ACE 2005*, Valencia, Spain.
- Norris, K. O. 2004. Gender stereotypes, aggression, and computer games: An online survey of women. *Cyberpsychol. Behav.* 7, 6, 714-727.
- Pausch, R., Gold, R., Skelly, T., & Thiel, D. (1994). What HCI designers can learn from video game developers. In *Proceedings of the CHI'94 Conference* (April 24-28).
- Piper, A. M., O'Brien, E., Morris, M. R. & Winograd, T. (2006). SIDES: A cooperative Tabletop Computer Game for Social Skills Development. *CSCW'06*, November 4–8, 2006, Banff, Alberta, Canada.
- Real, M.R. (1996). *Exploring media culture :A guide*, Thousand Oaks, CA: Sage.
- Sehaba, K. and Estrailier, P. (2006). Game execution control by analysis of player's behaviour. *ACE 06*, June 14-16, 2006, Hollywood, California, USA.
- Sherry, J. L. (2001). The effects of violent video games on aggression - A meta-analysis. *Human Communication Research*, 27, 3, 309-331.
- Shonkoff, J., & Phillips, D. eds. (2000). From neurons to neighborhoods: The science of early childhood development. A report of the National Research Council. *Washington, DC: National Academies Press*.
- Smith, S. L., Lachlan, K., AND Tamborini, R. 2003. Popular video games: Quantifying the presentation of violence and its context. *J. Broadcast. Electron. Media* 47, 1, 58-76.
- Sneed, C. and Runco, M.A. (1996). The beliefs adults and children hold about television and video games; *Journal of Psychology*, 126 (3) 273-284.
- Stright, A. D., Neitzel, C., Sears, K.G. and Hoke-Sinex, L. (2001). Instruction Begins in the Home: Relations Between Parental Instruction and Children's Self-Regulation in the Classroom. *Journal of Educational Psychology*. 2001. Vol. 93. No. 3, 456-466.
- Svoen, B. (2007) Consumers, Participants, and Creators: Young People's Diverse Use of Television and New Media. *ACM Computers in Phase*, Vol. 5, No. 2. Publication date: August 2007
- Vandewater, E. A., Shim, M. S., & Caplovitz, A. G. (2004). Linking obesity and activity level with children's television and video game use. *J. Adolescence* 27, 1, 71-85.
- Washburn, D. A. (2003). The games psychologists play (and the data they provide). *Behav. Res. Meth. Instruments Comput.* 35, 2, 185-193.
- Woodcock, B. (2006). *What the market research tells us – Where MMOs are going and how are we going to get there*. Austin Game Conference, Austin, TX.
- Yee, N. (2006). The demographic motivations and derived experiences of users of massively multi-user online graphical environments. *Presence: Teleoperators and Virtual Environments* 15, 309–329. Retrieved May 9, 2005, from <http://www.nickyee.com/pubs>