



The Game “Inside Me”: Designing a Game for Evaluation and Feasibility Study of Effects of Video Games on Anger and How to Control it: A Causal-Comparative Study

Abbas Mousivand¹, Mahdi Pourjafar¹, Shahriyar Derhami¹, Yazdan Movahedi²

Original Article

Abstract

Introduction: In this study, a user interface was designed based on anger management to create a medium by access to which the user may control or decrease his/her anger against the individual causing the anger. The tools and audio-visual effects presented in the game were devised to release furious emotions of the user and in certain states, to examine the result of provocation of anger in the user. This study aims to investigate the impact of video game on anger management and control against a particular person.

Materials and Methods: This study involved the two experimental and control groups with the subjects selected from students of Tabriz Islamic Art University, Iran. 10 students were selected and assigned to the two groups (5 in each group). The experimental group received the game, but the control group did not receive it. The final data was analyzed using the univariate analysis of covariance (ANCOVA).

Results: Based on the data analysis, there was a significant difference in the mean scores in the pretest and posttest stages for the experimental and control group, ($P = 0.050$), so that the game led to some development in anger management towards a special person.

Conclusion: Overall, this study showed that “Inside Me” game can be used as an effective method to improve the ability of prevention of anger towards a certain person.

Keywords: Anger; Anger management; Computer games

Citation: Mousivand A, Pourjafar M, Derhami S, Movahedi Y. **The Game “Inside Me”: Designing a Game for Evaluation and Feasibility Study of Effects of Video Games on Anger and How to Control it: A Causal-Comparative Study.** J Res Rehabil Sci 2019; 15(1): 36-40.

Received: 30.01.2019

Accepted: 01.03.2019

Published: 04.04.2019

Introduction

Violent acts and aggressive behavior have long been common in human societies, the first example being the brutal and cruel murder of Abel by Cain. Feelings of anger and aggression stem from harming another and have no source other than negative emotions (1). Since such behaviors are harmful and costly to the family, the community, and even the individual himself, researchers are trying to explore and find solutions to these behaviors in various ways (2).

Coyne defines aggression in simple terms as: “a behavior that is intended to harm others” (3). There are various causes for the aggressive behavior that is

taking place in most societies as a bitter reality. Legal deficiencies, lack of attention from supportive institutions, fear and embarrassment in expression, harassment at the family home, and the homelessness of the victim are among the various causes of the violent behavior (4).

In addition to personal discomfort, impaired general health and interpersonal relationships, inability to manage anger leads to maladaptation and the harmful consequences of aggressive behavior (5). In the field of psychology, there are various methods to control this problem, and solutions have long been proposed in this area to control anger. Anger management skills can

1- MSc Student, Department of Computer Arts, School of Multimedia, Tabriz Islamic Art University, Tabriz, Iran

2- Assistant Professor, School of Multimedia, Tabriz Islamic Art University, Tabriz, Iran

Corresponding Author: Ali Mousivand, Email: a.mousivand@tabriziau.ac.ir

reduce many of the anomalies and negative events in society. Therefore, guiding and assisting this group of people in order to manage and control anger can have beneficial and constructive effects on the society (6).

Self-learning when confronted with this feeling is one of the most effective ways to control anger. Self-regulation by overcoming undesirable behaviors, as well as regulating the individual's thoughts and emotions can be an internal force for inhibiting such emotional reactions (7). Today, there are several treatments for psychological or educational disorders, one of which being play therapy (8).

Given the advances made in the computer gaming industry, this industry can be used in various cases in accompany with other sciences such as psychology, etc. Games can be very helpful in subconscious and implicit learning because of their fun and leisure aspects (9). There has been a growing interest in the use of computers in the field of cognitive problems to treat developmental disorders in recent decades, which has led to the development of computer-based cognitive training programs (10).

In order to investigate the effect of computer games on children, psychiatrists in Harvard University conducted an experiment at Boston Children's Hospital, USA. The experiment was conducted using a popular game called "Space Invaders". The game playing process was designed in such a way that the children were examined during the game with the heart rate monitors, and at the moment when their heart rate was higher than normal (at rest), the player lost the ability to shoot. Because these children responded negatively to the existing therapies and refused to attend therapy sessions, playing the game in the long term had effects on the frontal lobe of their brains, similar to the effects of the clinical anger management method (11).

In a study, the anger management games were applied to examine changes in the behavioral symptoms and anger in the hyperactive children. Due to the positive results, the use of these games was recommended as a new and effective aid method due to the ease of use by the children and their low cost (12). In another study, 45 children with attention deficit hyperactivity disorder (ADHD) were examined and it was found that two methods of neurofeedback training and play therapy could be used to reduce the symptoms of ADHD (13).

In examining the external behavioral problems of children and adolescents such as aggression problems, it was observed that the reduction of behavioral problems among children such as aggressive behavior and legal behavior in the intervention group that received cognitive-behavioral therapy was significant

compared to the control group (14).

Since no study has been carried out on the investigation and control of anger toward a particular person, the present study is performed with the aim to examine the effectiveness of computer games on managing and controlling anger toward a particular person, and the game "Inside Me" was designed. It is worth noting that this game includes features such as entering the image of individuals and placing that person as a game character, which is rarely possible in other games.

Materials and Methods

This was a causal-comparative preliminary study with a controlled clinical trial design. The statistical population of the study included students of Tabriz Islamic Art University, Iran in the academic year of 2019-2020. First, the students who wanted to participate in the study were identified by a call. The study inclusion criteria were defined as having a sense of anger toward a particular person. It should be noted that in this basic study, no exclusion criterion was considered. 10 subjects who met the inclusion criteria were equally divided into the two groups of intervention and control. At first, the participants were given information and after signing the consent form, they entered the test. The subjects were told that they could withdraw from the test after arranging with the authors at any stage they felt they could not continue the study. In the next step, a researcher-made questionnaire [derived from the aggression questionnaire proposed by Buss and Perry (15)] was presented to both groups to measure their anger toward a particular individual. Then the participants of the intervention group played the designed game (Inside Me). After two days, both groups were asked to answer the questionnaire again.

Anger control game: The user interface and the character of the game "Inside Me" have been designed in a three-dimensional form to be more tangible for the user as well as for more interaction of the user with the game. It is also possible to place the face of the person who has made the player angry, on the character of the game; In this way, the user enters an image of the face of the person who has made him angry to the game, and thus the image is placed on the head of the 3D model embedded in the game and then the player begins to play (Figure 1).

This character is actually the subject of the user's anger, and the tools, environment, and all the features allow the user to annoy the subject in whatever way he wants, and the user is provided with a variety of objects to throw at the character. During the game, the user can choose any of the elements in the game,

such as tomatoes, knives, potatoes, etc., to throw them at the subject. The game continues until the user collects the necessary points and completes the challenges until he ends the game.



Figure 1. Entering the person's face into the game

It should be noted that in order to create more interaction between the user and the game, the game character has animations and when the tool hits the character, the character animations run and after consecutive hits and gaining the required points, the character dies, but there is also a feature that the same character can enter the game again. Another point that has been considered by the developers to provide a better sense of the game is the voice acting on the character to show the amount of pain after being hit by the objects, which helps to make the game process more natural and tangible.

The normal data distribution was assessed using the Shapiro-Wilk test. The nominal data (gender and education level) of the two groups were compared using the Mann-Whitney U non-parametric test. The data were then analyzed using descriptive statistics [mean and standard deviation (SD)] and inferential statistics including paired t-test for the intragroup comparison and analysis of covariance (ANCOVA) test in SPSS software (version 21, IBM Corporation, Armonk, NY, USA). $P < 0.05$ was considered as the significance level. To analyze the test power, the G*Power software (G*Power 3.1.5 freeware, University of Düsseldorf, Düsseldorf, Germany) was utilized.

Results

The demographic characteristics of the subjects are presented in table 1.

Given the data in table 1, there was no significant

difference in the demographic characteristics of the two groups. The pre-test anger in the groups did not show a significant difference ($P = 0.050$), but these quantities were had a higher variance in the post-test phase and the differences between the two groups based on the independent t-test were significant ($P < 0.001$). In addition, the level of anger in the intervention group decreased significantly after participating in the game compared to the pre-test stage (Table 2).

Table 2. Average anger in the two participating groups

Group	Pre-test	Post-test	P value
	Mean \pm SD	Mean \pm SD	
Experimental	27.47 \pm 2.40	16.60 \pm 2.41	0.044
Control	25.91 \pm 3.20	28.40 \pm 3.21	0.310
P value	0.050	< 0.001	-

The results of the ANCOVA test are presented in table 3. On the basis of the data presented in this table, a significant correlation is observed between the variables and the test power is 0.47, indicating that the game can reduce the rate of aggression by 47%. The power analysis results also showed that the study power is suitable for comparing anger levels in the two groups ($\beta > 0.8$).

Discussion

In the present study, a preliminary assessment was performed on the game "Inside Me" designed with the aim of helping to control one's anger in order to investigate its effect on a group of students. The game seems to have been successful in helping people manage their anger. The use of play therapy in the process of successful control of anger from an early age is one of the therapeutic methods of anger management (16). In fact, the game algorithm controls the sense of anger which is along with its control or even excitation. When a player does not receive specific feedback in the game after his violent act, he is encouraged to do so, and in fact, this further provokes him (17).

Factors such as fatigue, discomfort, anxiety, or behavior of a person can cause anger and resentment (18). Once the cause and motivation of anger is found, a solution must be found to control and manage it. There are many ways to control anger and rage, and to solve it, a variety of prescriptions are offered to individuals with different personalities (19).

Table 1. Demographic characteristics of participants

Group	n	Age (year) (mean \pm SD)	Gender [n (%)]		Education [n (%)]	
			Male	Female	BSc	MSc
Experimental	5	23.0 \pm 2.4	4 (90)	1 (10)	3 (60)	2 (40)
Control	5	23.0 \pm 2.6	3 (60)	2 (40)	4 (90)	1 (10)

SD: Standard deviation

Table 3. Analysis of covariance (ANCOVA) test results of the two groups to determine the difference between the two groups in the variables

Distribution source	Sum of square	df	Mean of square	F	P value	Eta squared	Test power
Group	373.473	1	373.473	141.319	<0.001	0.953	0.47
Error	18.499	7	2.643				
Total	5475	10					

df: Degree of freedom

Playing darts and throwing objects to reduce anger and aggression is a proven way in such a way that even psychologists recommend such games to their patients (17).

The game "Inside Me" is a digital tool designed to control anger or measure its level. The difference between this game and other similar games is that the user can enter their favorite images into the game and thus match with the game's character. In order to create a sense of immersion in the game, environments from different places are also included in the game.

Limitations

The present preliminary study was conducted only to evaluate the level of success in designing the game "Inside Me" with the aim of controlling anger. The low number of participants in the test was one of the biggest limitations. Moreover, these subjects were all university students in the field of art and were not good examples of people at the community level.

Recommendations

It is recommended that researchers and clinical specialists active in the fields related to anger, use this game in the form of clinical trial studies with scientific and accurate design with compliance with the executive principles of this type of studies. Additionally, it is suggested to extract accurate information about the effect of this game on different groups of people and the problems caused by anger at different levels of society, in addition to measuring its cost and benefit in comparison with different types of treatments in this area. The use of electroencephalography (EEG) tools to improve data recording and analysis, design more advanced steps, and use more diverse personalities under the supervision of experts and based on the results of other studies could be valuable.

Conclusion

In general, based on the findings, it can be declared that the designed game has possible effects on anger control and management, which are more common with repetitive exercises. It should be noted that due to the limitations of the study, generalizations should

be made with caution.

Acknowledgments

The present study was one of the articles submitted to the secretariat of the Fifth International Conference on "Computer Games; Challenges and Opportunities" with a special focus on therapeutic games (February 2020, Isfahan, Iran), which was praised by the editorial board of the Journal of Research in Rehabilitation Sciences. The authors would like to appreciate the Cyberspace Research Institute, National Cyberspace Center for supporting the publication of this article. The present study was approved by Tabriz Islamic Arts University. The research council of the university and the officials of the Department of Computer Arts, School of Multimedia, Tabriz Islamic Arts University and all the participants who contributed to this study are appreciated.

Authors' Contribution

Ali Mousivand: Study design and ideation, data collection, providing study equipment and samples, analysis and interpretation of results, manuscript preparation, specialized manuscript evaluation in scientific concepts, confirmation of final manuscript for submission to the journal office, responsibility to maintain the integrity of the study process from the beginning to publishing, and responding to the comments of the referees; Mahdi Pourjafar: Study design and ideation, data collection, analysis and interpretation of results, manuscript preparation, specialized manuscript evaluation in scientific concepts, confirmation of the final manuscript for submission to the journal office, responsibility to maintain the integrity of the study process from the beginning to publishing, and responding to the comments of the referees; Shahriyar Derhami: Study design and ideation, supportive, executive, and scientific services of the study, manuscript preparation, specialized manuscript evaluation in scientific concepts, confirmation of the final manuscript for submission to the journal office, responsibility to maintain the integrity of the study process from the beginning to publishing, and responding to the comments of the referees; Yazdan

Movahedi: analysis and interpretation of results, specialized statistical services, manuscript preparation, specialized evaluation of the manuscript in scientific terms, confirmation of the final manuscript for submission to the journal office, responsibility to maintain the integrity of the study process from the beginning to publishing, and responding to the comments of the referees.

present study was published in the Journal of Research in Rehabilitation Sciences, with the financial support of the Cyberspace Research Institute of the National Cyberspace Center, sponsor of the Fifth International Conference on Computer Games with an approach to therapeutic games. This research institute did not contribute to the designing, compiling, and reporting this study.

Funding

The study funding was provided by the authors. The

Conflict of Interest

The authors declare no conflict of interest.

References

1. Thomas SP. Assessing and intervening with anger disorders. *Nurs Clin North Am* 1998; 33(1): 121-33.
2. Tafreshi M, Amiri Majd M, Jafari A. The effectiveness of anger management skills training on reduction family violence and recovery marital satisfaction. *Journal of Family Research* 2013; 9(35): 299. [In Persian].
3. Coyne SM. Effects of viewing relational aggression on television on aggressive behavior in adolescents: A three-year longitudinal study. *Dev Psychol* 2016; 52(2): 284-95.
4. Hosseinkhanzadeh AA. Effect of self-regulation ability training on decreasing aggressive behaviors of students with disruptive behavior. *Psychology of Exceptional Individual* 2018; 7(27): 31-52. [In Persian].
5. Arefi M. Aggressive communication and its relationship with emotional social adjustment in elementary school student in Shiraz [MSc Thesis]. Shiraz, Iran: Shiraz University; 1999. [In Persian].
6. Zarei M, Mohammadi M. Effect of anger management training based on cognitive-behavioral method on behavioral activator system and behavioral inhibitor system. *J Fundam Ment Health* 2017; 19(Special Issue): 142-6. [In Persian].
7. Rostami H, Fathi A, Kheyri A. The effectiveness of mindfulness training on reducing aggression and increasing the mental health of soldiers. *Iran J Health Educ Health Promot* 2019; 7(1): 109-17. [In Persian].
8. Brezinka V, Hovestadt L. Serious games can support psychotherapy of children and adolescents. In: Holzinger A, editor. *HCI and Usability for Medicine and Health Care (USAB 2007)*. Berlin, Heidelberg: Springer Berlin Heidelberg; 2007 p. 357-64.
9. Razazi Borujeni H. The role of human-computer interaction (HCI) in the design of computer games. *Proceedings of the 2nd International Conference on Information Technology, Communication and Telecommunicatio*s; 2016 Mar 1-2; Tehran, Iran. [In Persian].
10. Gaitan A, Garolera M, Cerulla N, Chico G, Rodriguez-Querol M, Canela-Soler J. Efficacy of an adjunctive computer-based cognitive training program in amnesic mild cognitive impairment and Alzheimer's disease: a single-blind, randomized clinical trial. *Int J Geriatr Psychiatry* 2013; 28(1): 91-9.
11. O'Donnell E. Gaming the Emotions. *Harvard Magazine*. January-February 2011 [Online]. [cited 2011]; Available from: URL: <https://harvardmagazine.com/2011/01/gaming-the-emotions>
12. Kazemi A, Nikyar H, Najafi M. Effectiveness of anger management games on behavioral and anger symptoms of children with hyperactivity/attention deficit disorder. *J Isfahan Med Sch* 2016; 34(381): 461-9. [In Persian].
13. Niknasab F, Sheikh M, Hemayattalab R. The effect of neurofeedback instruction and play therapy on symptoms of children with attention deficit -hyperactivity disorder. *J Sabzevar Univ Med Sci* 2018; 25(4): 562-72. [In Persian].
14. Ghodousi N, Sajedi F, Mirzaie H, Rezasoltani P. The effectiveness of cognitive-behavioral play therapy on externalizing behavior problems among street and working children. *Iran Rehabil J* 2017; 15(4): 359-66. [In Persian].
15. Buss AH, Perry M. The aggression questionnaire. *J Pers Soc Psychol* 1992; 63(3): 452-9.
16. Nangle DW, Hansen DJ, Erdley CA, Norton PJ. *Practitioner's guide to empirically based measures of social skills*. New York, NY: Springer; 2010.
17. Schaefer CE. *Foundations of play therapy*. 2nd ed. Hoboken, NJ: John Wiley and Sons Inc; 2011.
18. Clarke M, McEwan K, Ness J, Waters K, Basran J, Gilbert P. A descriptive study of feelings of arrested escape (Entrapment) and arrested anger in people presenting to an emergency department following an episode of self-harm. *Front Psychiatry* 2016; 7: 155.
19. Vannoy SD, Hoyt WT. Evaluation of an anger therapy intervention for incarcerated adult males. *J Offender Rehabil* 2004; 39(2): 39-57.