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Title: The Effect of Violent and Melodrama Movies on Risky Decision Making and Behavioral Inhibition in Adolescents

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Highlights
The results showed that violent movies caused a significant increase in risky decision-making in adolescents. Furthermore, this type of movie caused a significant reduction in behavioral inhibition in adolescents. The study showed that watching melodrama movies did not significantly increase adolescents' risky decision-making of adolescents. Another finding of the study suggests that watching melodrama videos did not increase the defect in adolescent inhibition significantly.

**Plain Language Summary**
This present study aimed to investigate the effect of violent movies on risky decision-making and behavioral inhibition. Inhibition means the ability to exert control over inappropriate behaviors. The results demonstrate that the more time adolescents spend watching violent movies, the more they are prone to fall into the trap of making wrong decisions such as drug abuse or driving without a driving license. Moreover, exposure to heavy doses of violent movies reduces behavioral inhibition in adolescents. Watching these kinds of movies can have adverse effects on the cortex, a part of the brain responsible for decision-making and inhibitory behaviors. It also contributes to the increased incidence of risky decision-making and reduction of suppressing misbehaviors. Movie production companies strive to produce films to attract more viewers, such as thriller movies. Since the frontal lobe is not fully developed in children and adolescents, they can make well-reasoned and rational decisions. They are eager to commit an act of violence and risky behaviors, so they are so interested in watching violent movies. Thus, the present study warns parents against selecting movies and recommends that they accompany their children while watching violent movies.

**Abstract**
**Introduction**: Brain Functional Performance is a collection of excellent mental processing that provides a framework for achieving goals based on targeted behaviors. Disorders in executive functions make it difficult for a person to perform everyday tasks. One of the phenomena that have been highlighted in various media is the violent phenomenon that adolescents welcome with the production of violent movies. Therefore, this study aimed to investigate the effect of violent movies on risky decision making and behavioral inhibition of adolescents and compare it with melodrama.

**Method**: This study was conducted with a quasi-experimental pre-test-post-test with a control group among 60 adolescents in Tehran (30 girls and 30 boys) using the available sampling method. For this purpose, neurological tests of Iowa Gambling and Go-No Go were used.

**Findings**: The results showed that violent movies caused a significant increase in risky decision making (P<0.05). In addition, these types of movies caused a significant decrease in behavioral inhibition among adolescents (P<0.05).

**Conclusion**: Movies that have a rude story and content that glorifies violence harm adolescents' decision making and deterrence, leading them to make risky decisions and inadequate inhibition.

**Keywords**: Violent, Melodrama, Movie, Risky decision Making, Adolescents

1. Introduction
Violence is one of the greatest traumas in the world today, usually used by individual or collective actors against themselves (suicide or self-harm) or against others (murder or sadism). Violence has a social nature, mostly in interpersonal and intergroup interactions (Darjee, 2019). It has a negative relationship with appropriate human interaction and social development, and its increase leads to disruption of human and social relationships and reduces public welfare and community safety (Van Bavel, Ansink, & Van Besouw, 2017). Today, with the advent of mass media and especially television, violence is directly broadcast by human actors and transmitted to others, but the media also contributes to the transmission of violence and the emergence of violent behaviors. One type of media violence is TV violence. The study of TV violence has two concepts: One is Real Violence in news programs and the programs that have an informational, educational, warning, and alerting role, and the other is Fantasy Violence, which is shown in TV series and movies. The most harmful effect of TV violence is in the age group of children and adolescents. According to Albert Bandura, this age group cannot understand that violent content should not be imitated (Khurana et al., 2019). The use of violence and violent acts in TV programs is increasing. The extreme portrayal of violence in mass media and especially TV has led to the transfer of violence from adolescents to adulthood, and without the necessary cognitive, subjective, and social skills, they are unable to distinguish between reality and fantasy and are (will be) exposed to various types of violent behaviors (Hu, Johnson, Teo, & Wu, 2020).

Various studies and researches show that adolescents acceptingly TV allow violence, and acts of violent behavior are evident in their behavior (Liu, Huang, & Zhou, 2020; Peters et al., 2021). Continuous viewing of violent scenes by children and adolescents will reinforce aggressive behavior in this age group, especially since violent behavior in a TV show is not followed by punishment. Those adolescents who have affective, behavioral, learning, and impulsivity problems are easily affected by TV violence (Zhuang et al., 2021).

Adolescents in the United States watch an average of 40 hours per week TV and movies. (Li, Du, & Gao, 2020) found in a comprehensive study in the United States that 99% of boys and 94% of girls play various video games. Similar results, and they found that 70% of adolescent boys aged 9 to 18 prefer violent games and movies. (Rostad, Basile, & Clayton, 2021) showed a positive and significant correlation between the hours spent watching television and videos and the violent behavior of those students who devoted significantly more hours to television on weekdays and weekends.

Some studies have shown that viewing TV depictions of violence increases criminal behaviors (Hopf, Huber, & Weiß, 2008) or aggressive behaviors (Chang & Bushman, 2019) in adolescents. There is consistent evidence that violent images in television, film, video, and computer games have significant short-term effects on arousal, thoughts, and emotions and increase the likelihood of
aggressive or fearful behavior in younger children, particularly boys (Coyne et al., 2017). A study of more than 2000 students from second through eighth grade in Ohio in 1998 showed that any increase in hours allocated to daily viewing TV increased the likelihood of symptoms of psychological distress, including anger, depression, and excessive psychological stress (Anderson et al., 2017).

Violence programs TV can have a negative impact on adolescents including aggressive behavior, the tendency to negative thinking, the outbreak of anxiety and panic in adolescents, which negatively affects the rest of their lives; however, there are not all the effects that violence programs can have (Weegels, 2018). One of the major indicators that should be considered in these studies is the impact on the cognitive functions of the individuals. Several studies conducted in the last half century have shown that children and adolescents who have been exposed to violent programs have lower cognitive functions than children and adolescents who have not been exposed to such programs (Hummer, Kronenberger, Wang, Anderson, & Mathews, 2014; Sumner et al., 2015). Executive function is one of the cognitive functions that is weakened by extreme exposure to violence in television programs. One of these executive functions is attention. Adolescents exposed to violent TV programming have reduced attention, weakness in working memory, and increased arousal (Lillard, Li, & Boguszewski, 2015).

The results of the study conducted by (Kronenberger et al., 2005) on adolescents with a diagnosis of psychiatric disorders and without a diagnosis of psychiatric disorders show that exposure to TV violence is associated with poor executive functioning. This association is stronger in adolescents with disruptive behavior disorder and ADHD. Thus, the results indicate that impulsivity, distraction, and attention reduction are more pronounced in individuals with psychiatric disorders.

Media violence exposure (MVE) is associated with aggressive outcomes in adolescents. Using survey data from 1,990 adolescents (mean age = 15.6 ± 1.10 years) and a content analysis of top U.S. movies and popular shows ( TV ), we examined the effect of MVE on both risk (i.e., family conflict, impulsivity, sensation-seeking) and protective (i.e., parental monitoring, parental involvement, parental mediation) factors. Analyzes of relative weights showed that MVE was one of the strongest predictors of aggression after impulsivity and family conflict. The cumulative risk score showed a linear and quadratic relationship with the likelihood of aggression, with MVE and family conflict having an interactive relationship in predicting aggression. Parental monitoring remained a significant protective factor even when all risk factors were accounted for. Targeted preventive interventions that reduce family conflict, promote parental monitoring, and reduce exposure to violent media may effectively reduce aggressive tendencies and associated negative outcomes (Khurana et al., 2019).
Decision making and inhibition are the essential components of cognitive function and executive function, which have a crucial role in the selection of gains and losses of the individual and in the identification of the desirable from the undesirable decisions. Despite the positive results of the above studies, there is a dearth of research on these two important cognitive functions, especially domestic studies. On the other hand, the lack of research and study on violent TV or motion pictures and their effects on cognitive functions provides an appropriate opportunity for research in this area. For this reason, the existing deficits prompt this research to examine the effects of violent media programs on adolescents' risk decision making and behavioral inhibition.

2. Materials and Methods
The proposed hypothesis of this study is tested in a quasi-experimental research with pre-test - post-test arrangement and control group. In order to measure the two functions of risky decision making and behavioral inhibition in adolescents aged 11 to 18 years, the Iowa Gambling Task and the Go/No-Go task were administered at the beginning and before the screening of the movie. The violent film and the melodrama film were played for the test group and the control group, respectively. Iowa Gambling Task and the Go/No-Go task were performed again for the two groups after watching the movie.

The independent variable of this study is watching a violent movie and watching a melodrama movie played for 28 minutes and 25 minutes, respectively, for the participants. The dependent variables include the extent of risky decision making and the extent of the participant's deficit in behavioral inhibition as measured by the Iowa Gambling Task and the Go/No-Go task.

2.1. Participants
The statistical population of this study was adolescents aged between 11 and 18 years in Tehran in 2019. Both girls and boys were studied in this statistical population. Subjects were selected for the study through an available sample. Significant criteria for inclusion in the project were the absence of a psychiatric disorder in the participants and the absence of separation or divorce of their parents. Some essential criteria were also considered for the study. If the participants or their parents were no longer interested in continuing to collaborate in the study, or it was determined during the study that the participant had a psychiatric disorder, or their parents divorced, we will terminate the collaboration while respecting the participant. The statistical sample size was 60 adolescents, including 60 girls and 60 boys.

2.2. Data Gathering and Questionnaires
Iowa Gambling Task: Iowa Gambling Task is identical with "Bechara Gambling Task". It was called "Iowa Gambling Task" because Bechara, Damasio, and Tranel were professors at the
University of Iowa when it was invented. The task is used extensively to measure decision making in risky and ambiguous situations in various clinical populations. Iowa Gambling Task is used as a framework for assessing many disorders in human decision making. In the ABCD version of this test used in this study, four groups of 60 cards were placed in front of the subjects. They have a total of 60 choices and were asked to take one card from one of the four categories for each choice. After each choice, they are told the odds of winning or losing. Subjects should try to get the highest net profit on their selection. The cards are divided into winning (C, D) and losing (A, B) categories. Although the profitability of the winning cards is low, they are profitable because of the lower losses compared to the wins. The loss cards suggest more profits for the subject than the gain cards; however, they are lossy overall due to the losses compared to the gains. The win rate (for the winning cards) and the loss rate (for the losing cards) increase over time.

Although the average win rate of A and B cards is the same, the number of cards in group A that have a chance of losing is higher, but lower in each case. Conversely, for Group B cards, the number of cards with a chance of losing is lower, even though the rate of loss for each card is higher. The same is true for the cards in groups D and C. At the end of the test, the subject's net score is calculated as (A+B) - (C+D) (Mueller, Nguyen, Ray, & Borkovec, 2010). This task has a main score named the net score. The less the net score of a subject indicates his/her impairment in decision making. The validity and reliability of this test have been reported over 80% (Fernie & Tunney, 2006). The validity and reliability of this test in its Persian version is 80% (Ekhtiari, Victor, & Paulus, 2017).

**Go No Go Task:** This task was originally developed by Hoffman in 1984; it is often used to assess response inhibition. Response inhibition involves executive control over prepared motor responses by altering the situational demand. In the Go-No-Go task, in one situation (Go or Motion), the subject is instructed to make a consistent response as quickly as possible when a stimulus appears. In another situation (No Go or Motion Inhibition), another stimulus is provided after the first stimulus, and the subject is instructed to refuse to respond when the second stimulus appears. Two situations of GO /NO GO are randomly assigned to a task. A subject's response inhibition ability in the second situation indicates his inhibitory control. A lack of correct inhibition or a commission error means that a person executes movement responses while being presented with nontarget stimuli. This test, which is administered and measured by computer, gives three different scores: the percentage of commission error, the percentage of incorrect inhibition, and reaction time. The high score in commission error, incorrect inhibition and reaction time indicates the weakness and inability of the person in reaction inhibition and the higher the score of the person in these components, the more deficits he has in inhibitory control (Samimi, Ramesh, & Kord Tamini, 2016). In this test, the subject should show a simple movement response (pressing a button) as
quickly as possible when the target stimulus (blue square) appears and show no response when the non-target stimulus (Yellow Square) appears. The validity of the GO /NO GO task was reported to be 87% (Hosseini, Zarghami, Moudi, & Mohammadpour, 2012), and its reliability was 80% (Tabibi, Borzabadi, Stavrinos, & Mashhadi, 2015).

**Movies:** In this study, two movies were used for the participants, "Saw" and "Gone with the Wind" were the selected movies for this study. "Saw" is an action movie with violent content and "Gone with the Wind" is a melodrama with emotional content.

**Sphygmomanometer (Blood pressure monitor):** Digital EchoMax, a Sphygmomanometer model HBP – 2000 (made in Korea) was used to measure the blood pressure and heart rate).

**Visual Analogue Scale:** This scale is a simple, ruler-like scale on which are written the numerals zero to one hundred (ten to ten). Zero indicates the lowest level of violence on this scale, and one hundred indicates the highest level of violence in violent films. This score was also used to evaluate the melodrama films and assess the emotional and affective level of the films from the participants’ point of view. Zero indicates the lowest level of affection, and 100 indicates the highest level of affection in melodrama films.

2.3. Data Analysis

Statistical Package for the Social Sciences 24 was performed to analyze the data as mean, standard deviation, Paired t-test, Wilcoxon signed-rank test, for assessing the effect of violent and melodrama movies on the heart rate. A visual check demonstrated that the data were normally distributed.

3. Results

The mean age of subjects was 14.57 with a standard deviation of 24.2, and the age range was 11 to 18 years. The specification of the subjects by gender, age, and education is shown in Table 1.
Table 1. Distribution of Respondents by Gender, Age and Education (n=60)

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Girl</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Boy</td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-14</td>
<td>26</td>
<td>43.4</td>
</tr>
<tr>
<td>15-18</td>
<td>34</td>
<td>56.6</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary School</td>
<td>12</td>
<td>18.3</td>
</tr>
<tr>
<td>Middle School</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>High School</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>Diploma</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

For normal variables, Paired Samples, parametric t-test and for non-normal variables, Wilcoxon Test was used to test the hypothesis. The dependent variable in this analysis was risky decision making, and behavioral inhibition was determined based on net gain in Iowa Gambling Task and omission error, commission error, and behavioral inhibition in GO / NO GO task.

The result of Iowa Gambling Task in two violent and melodrama movies in pre-test and post-test phase using paired t-tests is shown in Table 2.

Table 2. The Score of Iowa Gambling Task in Violent and Melodrama Movies (n = 60)

<table>
<thead>
<tr>
<th>Movie Type</th>
<th>Variable</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Violent</td>
<td>Total Score</td>
<td>- 1.55</td>
<td>28.79</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Total Score</td>
<td>2.53</td>
<td>3.74</td>
</tr>
</tbody>
</table>

The first row of Table 2 shows that the mean score of the participants of the overall rating component is reduced in the post-test phase of the violent film compared to the pre-test phase of this type of film. The second row of Table 2 also shows that the mean score of the participants for the total score component is reduced in the post-test phase of the melodrama film compared to the pre-test phase of this film type. The paired t-test was used to test the significance of this difference.
Table 3. Paired t-test in Score of Iowa Gambling Task in Violent and Melodrama Movies (n = 60)

<table>
<thead>
<tr>
<th>Movie Type</th>
<th>Variable</th>
<th>Mean differences</th>
<th>t-value</th>
<th>Degrees of freedom</th>
<th>significant value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent</td>
<td>Total Score</td>
<td>-4.51</td>
<td>-2.32</td>
<td>59</td>
<td>0.024</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Total Score</td>
<td>1.40</td>
<td>0.40</td>
<td>59</td>
<td>0.68</td>
</tr>
</tbody>
</table>

As the results of the first row of Table 3 show, there is a significant difference between the mean of the components of the Iowa Gambling Task in the pre-test and post-test phases for violent movies. This difference is that the mean of the total score component decreased significantly in the pre-test and post-test phases (0.024). Thus, watching a violent movie leads to a decrease in participants’ total score in the post-test phase compared to the pre-test, and adolescents' risky decision making increased accordingly. The result of the second row of Table 3 shows that there is no significant difference (Sig = 0.68) between the mean score of the subjects in the total score component in the pre-test and post-test phase in the Iowa Gambling Task. This difference means that the mean total score for watching melodrama movie in pre-test and post-test phase has no significant reduction. Thus, watching melodrama movies did not lead to an increase in risky decision making among adolescents.

The results of the Go/ NO GO task for two violent and melodrama movies in the pretest and posttest phases using the Wilcoxon test are shown in Table 4.

Table 4. Wilcoxon Test in a score of the components of Go/No-Go Task in violent and melodrama movies (n = 60)

<table>
<thead>
<tr>
<th>Movie Type</th>
<th>Variable</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Z-Value</th>
<th>significant value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent</td>
<td>Commission Error</td>
<td>19.97</td>
<td>639</td>
<td>22.63</td>
<td>181</td>
</tr>
<tr>
<td>Violent</td>
<td>Omission Error</td>
<td>5</td>
<td>30</td>
<td>6.25</td>
<td>25</td>
</tr>
<tr>
<td>Violent</td>
<td>Behavioral Inhibition</td>
<td>22.71</td>
<td>159</td>
<td>19.41</td>
<td>621</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Commission Error</td>
<td>19.44</td>
<td>525</td>
<td>15.67</td>
<td>141</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Omission Error</td>
<td>5.56</td>
<td>50</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Behavioral Inhibition</td>
<td>13.44</td>
<td>121</td>
<td>20.79</td>
<td>582</td>
</tr>
</tbody>
</table>

As the results of the first row of Table 3 show, there is a significant difference between the mean of the components of the Iowa Gambling Task in the pre-test and post-test phases for violent movies. This difference is that the mean of the total score component decreased significantly in the pre-test and post-test phases (0.024). Thus, watching a violent movie leads to a decrease in participants’ total score in the post-test phase compared to the pre-test, and adolescents' risky decision making increased accordingly. The result of the second row of Table 3 shows that there is no significant difference (Sig = 0.68) between the mean score of the subjects in the total score component in the pre-test and post-test phase in the Iowa Gambling Task. This difference means that the mean total score for watching melodrama movie in pre-test and post-test phase has no significant reduction. Thus, watching melodrama movies did not lead to an increase in risky decision making among adolescents.

The results of the Go/ NO GO task for two violent and melodrama movies in the pretest and posttest phases using the Wilcoxon test are shown in Table 4.
As we can see in the row about the violent movie in Table 4, the z-score for commission error, omission error, and behavioral inhibition is calculated as -3.155, -0.258, and -3.272, respectively. For commission error, omission error and behavioral inhibition components, the calculated significance level is less than alpha (\(\alpha=0.05\)). There is a significant statistical difference between the post-test and pre-test scores in the three GO /NO GO task components of the violent movie. In other words, watching a violent movie increases the committing and refraining error and decreases the behavioral inhibition. So, the result (Table 4) shows that watching violent movie increases adolescents' deficit in behavioral inhibition.

The result of the row on melodrama movies in Table 4 showed that the z-score for committing error, omission error and behavioral inhibition is calculated as -3.054, -2.496 and -3.522 respectively. Considering that the values of calculated significance level in all tests are less than alpha (\(\alpha=0.05\)), there is a significant statistical difference between post-test and pre-test scores in three components of GO /NO GO task. In other words, watching a melodrama movie leads to a significant decrease in commission and omission errors and a significant increase in behavioral inhibition in the post-test phase. Thus, the result (Table 4) shows that watching melodrama movies does not lead to a deficit in adolescents' behavioral inhibition.

From the comparison of the results of violent and melodrama movies in Table 4, it can be concluded that watching violent movie leads to deficit in inhibition control and logical response of adolescents and decreases their behavioral inhibition; however, watching melodrama movies does not lead to deficit in behavioral inhibition.

The result of Wilcoxon Test to measure the effect of violent and melodrama movies on systolic and diastolic blood pressure is shown in Table 5.

<table>
<thead>
<tr>
<th>Movie Type</th>
<th>Variable</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Z-value</th>
<th>significant value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Violent</td>
<td>Diastolic</td>
<td>16.08</td>
<td>16.79</td>
<td>-1.086</td>
<td>0.027</td>
</tr>
</tbody>
</table>

Table 5. Wilcoxon Test to Measure the Effect of Violent and Melodrama Movies on Systolic and Diastolic Blood Pressure (n = 60)
As we can see in the row about the violent movie in Table 5, the z-value for systolic and diastolic blood pressure is calculated as -1.086 and -2.249, respectively. Since the calculated significance level for both systolic and diastolic blood pressure is less than alpha (α = 0.05), there is a significant statistical difference between the post-test and pre-test values of both types of blood pressure. In other words, watching violent movies affects adolescents’ blood pressure and increases systolic and diastolic blood pressure.

The row on melodrama movies in Table 5 also showed that the z-value for systolic and diastolic blood pressure was calculated to be -0.801 and -2.082 respectively. Since the calculated significance level for both systolic and diastolic blood pressure is less than alpha (α = 0.05), there is a significant statistical difference between the post-test and pre-test values of both types of blood pressure. In other words, watching melodrama movies increases systolic and diastolic blood pressure.

The result of the paired t-test measuring the effect of violent and melodrama movies on heart rate is shown in Table 6.

<table>
<thead>
<tr>
<th>Movie Type</th>
<th>Variable</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>significant value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Rank Set</td>
<td>mean</td>
</tr>
<tr>
<td>Violent</td>
<td>Heart Rate</td>
<td>86.40</td>
<td>13.67</td>
<td>86.83</td>
</tr>
<tr>
<td>Melodrama</td>
<td>Heart Rate</td>
<td>85.05</td>
<td>13.19</td>
<td>85.95</td>
</tr>
</tbody>
</table>
The first row of Table 6 shows that the t-value is 0.356 for heart rate while watching violent movies. Since the calculated significance level (0.023) is less than alpha (α=0.05), there is a significant statistical difference between the post-test and pre-test values of average heart rate. For this reason, the results of (Table 6) suggest that watching violent movies increases the heart rate of adolescents. However, the results of the second row of Table 6 show that the t-value is -0.828 for heart rate while watching melodrama. Since the calculated significance level (0.023) is greater than alpha (α=0.05), there is no significant statistical difference between the post-test and pre-test values of average heart rate, so watching melodrama movies does not cause any significant change in heart rate. Watching melodrama movies does not affect heart rate.

4. Discussion and Conclusion

The results of this study showed that watching violent movies increased adolescents' risky decision making. Watching violent movie content also leads to deficits in behavioral inhibition and decreases adolescents' behavioral inhibition. Furthermore, results showed that watching violent movies increased participants' systolic and diastolic blood pressure and heart rate. However, watching melodrama movies does not significantly increase risky decision making; it significantly increases adolescents' behavioral inhibition. Watching melodrama movies also significantly increases systolic and diastolic blood pressure; however, no change is observed in heart rate.

According to the findings of (Fikkers, Piotrowski, & Valkenburg, 2017; Seabrook, Ward, & Giaccardi, 2019) watching TV violence had a significant effect on increasing the propensity to violence in children. According to Alia Klein, Wang, Preston-Campbell, Moeller, Parvaz & Zhu (2014), viewing violence in the media was found to affect the functions of the orbitofrontal cortex, including decision making. This means that exposure to media violence decreases the activity of the orbitofrontal cortex, and as a result, decision making is weakened. Therefore, it can be said that since the growth trajectory of adolescents is not yet complete emotionally and affectively, exposure to violence and especially media violence, which is usually accompanied by intriguing storytelling, could impair cognitive functions and hinder and weaken the development of their organizational performance. This may impair their decision making and jeopardize their alternatives.

On the other hand, after the announcement of the participants to repeat the violent scene and continue to observe and learn from it, we can say that what the adolescents have learned will increase their susceptibility to violent scenes. Adolescents will encode the information they receive and translate it into visible activities. In the case of receiving rewards and reinforcement, they will have a firmer and stronger motivation to engage in the violent behavior. As a result of repeated violent and aggressive behavior, their decision making would not be logical and rational and would lead to risky decisions.
The other finding of the current study showed that watching melodrama movies did not significantly increase adolescents' decision making. The research of (Forgas & East, 2008) did not confirm the above result. The result of their study showed that watching melodrama movies has a positive influence on risky decision making. The subjects of this study watched both comedy and melodrama movies for ten minutes. The results showed that the comedy movie leads to faster and more rational decision making, while the melodrama movie leads to delayed and riskier decision making. The difference between the above results and the results of this study may be due to the difference in the cultural context of the subjects. Based on social learning theory, both internal and external rewards and reinforcement motivate a person to act. As adolescents welcome violent media products, other media works are produced that do not contain violent content and encourage and reward emotional and kind behaviors. Another reason is that today's youth are less willing to watch melodramas and emotional works. Another reason is the decrease in the production rate of melodramas on TV and even home movies.

Another finding of the present study was that watching violence in movies leads to deficits in behavioral inhibition of the participants. The research findings of (Alia-Klein et al., 2014) confirmed this. Based on this result, watching media violence will affect the inhibition of people and cause a deficit of it. This also suggests that watching media violence will increase the delay in responding to the subject. Since we have explained that violence affects the executive function of the brain, we can conclude from this result that learning violence, whether in the natural environment, such as home or school, or in the simulated environment, such as in media content, could cause a deficit of inhibition in people, especially adolescents, and suppress the stopping or delaying of unwanted and unnecessary activities. Aggressive behavior is the inability of adolescents to respond appropriately to environmental stimuli. According to the Berkowitz stimulus effect theory, violent thoughts, analyzes, and even behaviors in people are stimulated by watching aggressive behaviors on TV, especially in movies. This converts people's logical and winning thinking, behavior, and analysis into inappropriate thinking and behavior (Zulfiqar, 2020). This is especially true for adolescents with weaker diagnostic ability who cannot analyze whether it is correct to respond to environmental stimuli by imitating violent TV shows.

Another finding of the present study suggests that watching melodrama movies does not significantly increase adolescents' deficits in behavioral inhibition. Reading dramas, including the works of Shakespeare, resulted in positive brain performance. They found that when subjects were exposed to reading works of melodrama, their emotions were more positive and the cognitive function of their brains improved. Among the cognitive functions of the brain that were assessed in this study, one can mention memory and problem solving.
This study also showed that watching violent movies significantly increased blood pressure (systolic and diastolic). Also (Denson et al., 2020) suggested that watching a movie with violent content increases the systolic and diastolic blood pressure of the subjects. Playing violent computer games increases systolic and diastolic blood pressure in adolescents compared to non-violent computer games. To explain this finding, it can be said that watching violence has a direct effect on arousal and thus increases arousal in people (Verheijen, Burk, Stoltz, van den Berg, & Cillessen, 2021). According to (Koepp et al., 1998), watching violence in movies would release dopamine and increase arousal and stress. Based on Tannenbaum's stimulation theory, exposure to media violence will increase aggressive behavior because it will increase fear and anxiety and thus stimulation or arousal of the viewer.

Another finding of this study suggests that watching melodrama movies increases blood pressure (systolic and diastolic) in adolescents. Since there is no research yet on the effect of watching a melodrama movie on vital signs, we will refer to another study that indirectly indicates the effect or lack of effect of watching a melodrama movie on vital signs. (Sanchez-Ruiz, El-Jor, Abi Karma, Bassil, & Zeeni, 2019) presented in their study that watching melodrama movies does not increase stress and anxiety (which are associated with increased physiological arousal). (Siervo, Sabatini, Fewtrell, & Wells, 2013) concluded that playing non-violent computer games has no significant effect on systolic and diastolic blood pressure and does not increase either level. Another finding of the present study was that watching violent movies increases heart rate in adolescents. Playing violent computer games significantly affects heart rate and increases heart rate.

The final result of the present study suggested that watching melodrama movies did not increase the heart rate of adolescents. (Hummer et al., 2014) indicated that watching melodrama movies did not increase stress and anxiety (which are associated with increased physiological arousal). Playing non-violent computer games has no significant effect on heart rate. In explaining the findings in terms of physiological symptoms, it can be concluded that what stimulates people's emotions would alter the vital signs of individuals. Thus, watching violent or emotional stories that lead to daydreaming and fantasies in adolescents could cause some changes due to the increase or decrease in vital signs. Therefore, it can be said that watching violent or melodrama movies could equally affect the arousal of adolescents and increase their stress levels (Dill & Dill, 1998; Greitemeyer, 2018).

According to these findings, it can be assumed that movies with violent content and a story that exerts violence on people and especially on adolescents negatively affect their decision making and inhibition, pushing them to make risky decisions and a deficit of inhibition. The production of movies or media works in general, in which the phenomenon of violence is presented as the main theme and the violence is confirmed by the selection of famous, well-known, good-looking and
well-dressed actors, leads children and adolescents to learn violent behavior and also to practice violent behavior in their real lives. According to the results of this research, watching violence accompanied by violent behavior and violent language affects the decision making and inhibition of adolescents, and if children and adolescents watch such works repeatedly and persistently, we will see that the viewer is unable to make a rational decision and inhibit his irrational behavior, both in adolescence and adulthood, the risky decisions and the inability to inhibit inappropriate behavior will increase in them.

The effects of risky decisions and lack of inhibition are reflected in personal life and have unpleasant consequences in social life. These rash decisions and inability to choose the right path may affect the person in, for example, choosing a field of study, a boyfriend, a job, a spouse, and confront him with the negative consequences of wrong choices, or they may lead to more serious social harms such as theft, addiction, murder, and suicide.

**Ethical Considerations**

Since showing violent films to adolescents was considered in conducting this study, participants were asked to give their consent in a form titled "Consent Form." In return, the researcher agrees to keep the participants' personal information confidential and use it only for the purpose of this study. Before conducting the research process, the form "Consent Form" was also filled by the parents of the subjects. The subjects who watched the violent movie were also given Anger Control Training after watching the movie and taking the tests. This training includes taking deep breaths, pausing, visualizing a relaxing image or repeating a relaxing word or phrase, or drinking a glass of water. All research processes involving people were guided by the ethical values of the National Research Committee, the 1964 Helsinki Declaration, subsequent amendments, or appropriate ethical standards. All participants signed an informed consent form when returning the survey, and the scales were completed anonymously. The authors declare that they have no competing interests.

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**Author Contributions**

All authors contributed to designing, running, and writing all parts of the research.
Conflict of Interests
The authors declared that the present study was fulfilled with no relevant financial relationships, which could be considered as a potential conflict of interest.

Data Availability Statement
The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.
References


