Effect of Cartoons on Children's Cognitive Regulation Index

Dipti Soni & Mridula Sharma

Abstract

This study explored the effects of cartoons on cognitive regulation index of executive functioning among children. The sample consisted of a total of 94 children (56 females and 38 males) 11 and 12 years of age living from Jaipur using purposive sampling technique. Cognitive regulation index was evaluated using BRIEF – 2 (Behavior Rating Inventory of Executive Function, Second edition) Self - Report Test. Participants were divided on the basis of number of hours they watch cartoons and their difference on cognitive regulation index was examined using t – test. Results showed that number of hours spent by children watching cartoons on television had a significant effect on all the scales of cognitive regulation index, except working memory ($p<0.05$). Children who watch cartoons for 2 hours or less are better on cognitive regulation index than those who watch it for more than 2 hours.

Keywords: Cartoon, Children, Cognitive Regulation, Executive Functioning, Number of Hour.

Introduction

Early and middle childhood is typically the period of a child's life when they starts interacting with the social world and establishes the basic codes of ethical conduct. While most of the lifelong learning comes from parents and society, a crucial role is played by the television, particularly cartoons. Cartoons effects the child's executive functioning in early childhood stages, but it is usually not on a severe level, thus parents are not able to point them out easily. As the child grows and moves into the middle childhood stage, the effects become more prominent and thus, are noticeable because behavior of the child changes gradually as they might not be able to resist impulses or be aware of the effect their behavior has on others.

Several studies have been conducted in the past to establish the fact that TV (cartoon) watching influence the executive functioning of the children at different ages. Samples from different places have been examined with factors like age, gender and education in cross – sectional studies. To demonstrate how some aspects of the executive function or executive functioning as whole is affected. A study suggested that different types of television programs have immediate impact on young children's executive function and excessive television watching affects executive functioning of school going children. The results showed that children who watch fast - paced cartoon have poor executive functioning (Lillard & Peterson, 2011) [8]. Another study investigated the effect of cartoon viewing

on immediate motor executive function of 4 - 6 year old children. 279 participants were given the Seguin Form board test to confirm they were all developmentally equal. Children watching fast - paced cartoons performed slower on motor executive function tasks than the children in other two groups ($P<0.001$) (Solomon et al., 2017) [9].

Despite the substantial evidence from the previous studies to suggest that cartoons significantly influence the executive functioning of both males and females, little is known about the effect of time duration of watching cartons on the functioning of the children. Thus, this study aims to assess how number of hours watching cartoons has an effect on the cognitive regulation of children aged 11 and 12. It is hypothesized that there will be significant difference between the two groups formed on the basis of number of hours. Participants who watch television for 2 hours or less are expected to perform better on the test than those who watch cartoon for more than 2 hours.

Definition of Terms

Cognitive Regulation Index (CRI) is the individual's ability to control and manage their cognitive processes and how they solve the problems faced by them effectively. It comprises three clinical scales: Task Completion scale, Working Memory scale and Plan/Organize scale.

The Task Completion Scale measures the individual's ability to finish or complete tasks on time and in an appropriate manner, underlining the difficulties faced during the production of work, their performance and their satisfaction with the output of task.

The Working Memory Scale is the capacity to remember information in mind for the purpose of encoding information for task completion, stick to an activity, generating plans, goals, and necessary steps to achieve the goals. It is important to carry out tasks with multiple steps, follow complex instructions, and completing mental operations like arithmetic.

The Plan/Organize Scale measures the individual's ability to manage and control present and future – oriented demands. The scale is composed of two components: Plan and Organize. The Plan component of the scale assesses the ability to foresee future events, to determine goals, and to develop appropriate consecutive steps ahead of time to carry through a task or activity while the Organize component measures the ability to keep information in an order and to recognize the main concepts or key ideas when communicating or learning information.

Methodology

Participants

This study enrolled a total of 94 healthy subjects 11 – 12 years of age (56 females and 38 males). Independent group design was used and the samples were selected through purposive sampling technique with regard to the inclusion and exclusion criteria:

Criteria of Inclusion:

- Male and Female
- Within the age group of 11 - 12 years
- Live in Jaipur city
- Study in 5^{th} – 7^{th} grade
- Belongs to Upper Middle Class
- Study in Private School

Criteria of Exclusion:

- Children who do not meet the Inclusion criteria.
- Children with any Psychiatric history or Learning difficulty
- Children with Conduct or Behavioral difficulties

Measurement Tool

Research tool used to measure self – awareness of the children was BRIEF 2 (Behavior Rating Inventory of Executive Function, Second edition) Self – Report Test Form. Evaluations were administered as per following:

- On the basis of number of hours cartoons watched, two groups were formed:
  - 2 hours or less
  - More than 2 hours

Behavior Rating Inventory of Executive Function, Second edition Self – Report Test Form

This test was first designed and introduced by Peter K. Isquith, Steven C. Guy, Lauren Kenworthy & Gerard A. Gioia in 2015 to evaluate the adolescent's views on the strengths and weaknesses of self – regulation. It is a standardized subjective assessment of older children's and adolescent's (aged 11 to 18 years) views of their own executive functions, or self – regulation, in their everyday environment. The test is composed of 55 items that fit into seven overlapping scales which are further grouped into three indexes — Behavior Regulation, Emotion Regulation and Cognitive Regulation — for measuring executive functioning.

Procedure

At the initial meeting for data collection, demographic details were established so that normative data could be appropriately corrected for the variables. All participants were informed of the test procedures and informed consent was obtained from all participants prior to the assessment. Then participants were given an instruction sheet explaining the experimental conditions and clarified guidelines for filling in the questionnaire which were read aloud too. After each participant completed the test form, they were debriefed and excused. The test lasted for 10 to 20 minutes. Data was then compiled together for scoring and analyzed through SPSS. Descriptive data including mean (M), standard deviation

(SD) and standard error of mean was calculated for the difference between number of hours. Evaluation was examined through t – test with $P<0.05$ being statistically significant.

Results

This study recruited a total of 94 participants 11 and 12 years of age. In terms of number of hours spent watching cartoons by the children, 54.25% of subjects spent 2 hours or less and 45.74% spent more than 2 hours on a daily basis. Table 1 contains descriptive of children who watch cartoons for 2 hours or less and those who watch for more than 2 hours which includes mean (M), standard deviation (SD) and standard error of mean.

Table 1. Descriptive of Children on Number of Hours on Cognitive Regulation Index (N = 94)

Scales	Number of Hours	N	Mean	Standard Deviation	Standard Error Mean
Task Completion	2 hours or less	51	11.5098	2.98913	0.41856
	more than 2 hours	43	12.9070	3.10770	0.47392
Working Memory	2 hours or less	51	13.7059	3.28812	0.46043
	more than 2 hours	43	14.3953	3.30324	0.50374
Plan/Organize	2 hours or less	51	17.2941	3.73788	0.52341
	more than 2 hours	43	19.2326	4.21357	0.64256
CRI	2 hours or less	51	42.5098	8.71177	1.21989
	more than 2 hours	43	46.5349	9.26681	1.41318

Results of evaluating the difference on cognitive regulation on the basis of number of hours spent watching cartoons among the participants using t - test are summarized in Table 2. According to the results, number of hours spent watching cartoons by the children were found to be statistically significant with the clinical scales of cognitive regulation except working memory. Participants watching cartoons for 2 hours or less performed better on the test, having a higher mean score as compared to those watching for more than 2 hours.

Table 2. Independent Samples Test depicting the Difference on Cognitive Regulation Index among Children who watch Cartoon for 2 hours or less and more than 2 hours (N = 94)

		Mean Differences	t - test for Equality of Means		
			T	df	Significance (2 - tailed)
Task Completion	Equal variances assumed	-1.39717	-2.217	92	0.029
	Equal variances not assumed	-1.39717	-2.210	88.067	0.030
Working Memory	Equal variances assumed	-0.68947	-1.011	92	0.315
	Equal variances not assumed	-0.68947	-1.010	89.197	0.315
Plan/Organize	Equal variances assumed	-1.93844	-2.363	92	0.020
	Equal variances not assumed	-1.93844	-2.339	84.848	0.022
CRI	Equal variances assumed	-4.02508	-2.168	92	0.033
	Equal variances not assumed	-4.02508	-2.156	87.229	0.034

Discussion

In this study, the influence of number of hours on different scales of the cognitive regulation index was investigated using the t – test.

Effect of number of hours on Cognitive Regulation Index (CRI)

Results of the study showed that Task completion, Plan/Organize and Cognitive Regulation Index as whole were affected by number of hours, indicating a significant relationship between the differences of the two groups' effect on cognitive scales except Working Memory. The 2 hours or less group has higher mean score than more than 2 hours group on all sub – scales of the index. The overall mean score of the index is higher for 2 hours or less group, which is 42.5 as compared to more than 2 hours group, which is 46.53.

The mean score of children watching TV for 2 hours or less was found to be 11.5 while it was 12.9 for more than 2 hours group on Task completion scale. The value of difference between the two groups was statistically significant i.e. 0.02. The mean score for Working Memory scale of 2 hours or less group was 13.7 and 14.39 for more than 2 hours group. The scale has a difference value of 0.31 which is statistically insignificant. Plan/Organize scale was found to be significantly affected by the difference in number of hours as the value was 0.02. The mean score of 2 hours or less group was 17.29 which is higher than the more than 2 hours group, which is 19.23.

The findings stated that Task Completion and Plan/Organize scales were affected by the difference between number of hours while Working Memory scale was not. Accordingly, overall value of the difference between these groups was found to be 0.03 which is statistically significant. Thus, the hypothesis is partially supported because the groups differs on Task Completion and Plan/Organize scale but does not differs on Working Memory scale.

According to the observation, children watching cartoon for 2 hours or less performed better on the test as compared to those watching it for more than 2 hours. It is suggested that 2 hours or less group is not "impulsive" and have a better "understanding of their own strengths and weaknesses" as compared to more than 2 hours group. They don't "have trouble getting used to new situations", "overreact" and "have trouble finishing tasks". The findings were in line with the earlier study done by Yang et al. who emphasized that television viewing time and child directed educational programs were positively associated with executive functions.

Conclusion

As mentioned earlier, the influence of cartoons on the cognitive regulation index of executive functioning of children is noticeable at an early age. It might hinder their ability of problem solving, to adjust to changes in people, plans, and environment or to perform basic tasks without being distracted. Results of the study showed that the effect of cartoons on cognitive regulation is associated with number of hours TV watched.

According to the evaluation, the effect of duration of cartoon watching was found to have a great impact on cognitive regulation. All clinical scales of cognitive regulation index except working memory were found to be significantly influenced by the number of hours cartoons are watched by children. It was found that children who watch cartoon for more than 2 hours are affected more than those who spend time watching cartoon for 2 hours or less. The children watching cartoons for more than 2 hours performed the worst on the test as compared to those who watch cartoons for 2 hours or less.

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