INPLASY

The relationship between screen exposure and executive function among children: A meta-analysis

Liu, CH.

Corresponding author:
Changhai Liu

260784817@qq.com

Author Affiliation:
Chongqing Early Childhood Education Quality Monitoring and Evaluation Research Center, Chongqing Normal University.

ADMINISTRATIVE INFORMATION

Support - Chongqing Early Childhood Education Quality Monitoring and Evaluation Research Center.

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Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 October 2024 and was last updated on 2 October 2024.

INTRODUCTION

*R*eview question / Objective This meta-analysis synthesizes the results of past research on-screen exposure and executive functioning in children. Specifically, this study (a) determined the overall effect size of the association between screen exposure and executive functioning, and (b) tested whether this association varied by demographics (age, gender), exposure time, media type.

Condition being studied Screen exposure, also known as screen use or media use, refers to a range of activities in which individuals are exposed to screen-based electronic media , such as watching television, playing video games, surfing the Internet, and using cell phones (Zhu et al., 2021). In some studies, the timing , content, and context of exposure are important factors influencing the effects of screen exposure. However, the relationship between children's screen exposure and the development of executive functioning is controversial across studies.

METHODS

Participant or population The study population consisted of general children under the age of 12 years, excluding children with special needs.

Intervention This is a correlational meta-analysis, not a traditional intervention study. The intervention in this context refers to the exposure to screens, including both passive screen time (e.g., TV watching) and active screen time (e.g., interactive media such as educational apps).

Comparator Since this is a correlational meta-analysis, there is no traditional comparative intervention.

Study designs to be included (1) The study examined the relationship between Screen Exposure and Executive Functions; (2) The assessment tools and research methods were clearly reported; (3) The study provided detailed statistical information (e.g., sample size, mean values, standard deviations or t-values, p-values,

and correlations between two variables) regarding the calculable quantifications of effect size.

Eligibility criteria Data from a single sample cannot be duplicated across multiple studies. If the same research data are published more than once, only the article with the most comprehensive information is used.

Information sources Chinese literature was searched using CNKI, Wipo Journal Network, Wanfang database.
English literature searches were conducted using Taylor & Francis, Wiley, Web of Science, Springer Link, and Elsevier Science Direct.

Main outcome(s) The main outcome of this meta-analysis is the overall executive function of children. The effect size will be measured using Pearson's correlation coefficient (r) to quantify the strength of the relationship between screen exposure and children's executive function. Subgroup analyses will be conducted based on the type of electronic media, categorized into passive (e.g., watching TV) and active (e.g., interactive apps or games) screen exposure.

Quality assessment / Risk of bias analysis This study used funnel plots, insecurity coefficients, and Egger's linear regression coefficients to assess the risk of publication bias.

Strategy of data synthesis The data will be analyzed using a random-effects model to account for potential heterogeneity among the included studies. Pearson's correlation coefficient (r) will be used as the effect size to measure the relationship between screen exposure and executive function among children. Heterogeneity will be assessed using the Q statistic and I^2 index. Publication bias will be evaluated using funnel plots, insecurity coefficients and Egger's test. Sensitivity analysis will be performed by removing one study at a time to assess its influence on the overall effect size. All analyses will be conducted using Comprehensive Meta-Analysis (CMA) software.

Subgroup analysis Age, gender, exposure time, media type.

Sensitivity analysis Sensitivity analysis was performed by sequentially removing one study at a time to assess the influence of each study on the overall effect size. The one-study-removed effect sizes ranged from 0.038 to 0.048, with the final pooled effect size being 0.043. The results indicated that no single study had a disproportionate impact on the overall findings, suggesting the robustness of the results.

Country(ies) involved China.

Keywords Screen exposure; executive function; children; Meta-analysis.

Contributions of each author
Author 1 - Changhai Liu.
Email: 260784817@qq.com