

The Effects of Enrollments in Pre-Kindergarten and Mother's Highest Level Of Education on Children's Visuo-Spatial Working Memory

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Abstract

Objective: To examine the effects of Pre-Kindergarten (Pre-K)/Daycare enrollment and mother's higher education level on children's working memory at 4 to 5 years of age.

Background: Low socioeconomic status (SES) has been linked to suboptimal child executive functioning. Research has shown that early childhood education improves performance in cognitive abilities, such as working memory. Working memory involves focus, attention and mental control, all of which are necessary for school preparedness.

Method: Children's enrollment in Pre-K/Daycare and mother's higher education level were documented. Children's memory scores were obtained from the Wechsler Preschool and Primary Scale of Intelligence test (WPPSI-IV).

Results: Children who attended Pre-K/Daycare had higher visuospatial working memory scores compared to children who did not ($M = 19.98$ vs. $M = 17.46$, $p = 0.048$), irrespective of their mother's higher education level.

Conclusion: Pre-K/Daycare attendance may have positive effects on visuo-spatial working memory development in 4-5 years olds. As working memory is a cognitive process crucial for school readiness, implementation of Universal Pre-K by New York City Department of Education may be a groundbreaking initiative to equalize educational preparedness.

Measures

Sample Population: The study consisted of 94 participants (44 girls) between the ages of 4 to 5 years participating in a longitudinal study of pregnancy (SIP Study, PI Yoko Nomura). Mothers of children were recruited from New York Presbyterian Queens and Mount Sinai Hospital in New York City during pregnancy and children have been followed through development.

Measures: Children's enrollment in Pre-K/Daycare was noted from the H.O.M.E Inventory questionnaire. Memory scores were derived from the Wechsler Preschool and Primary Scale of Intelligence (WPPSI-IV) test that measures cognitive and age-related development for children between 2 ½ years and 7 ½ years. Maternal education level, dichotomized as holding a college degree vs not, was collected from demographic information. 44 mothers obtained college degree.

Data Analysis: A factorial ANOVA was used to measure the effects of a child's enrollment in Pre-K/Daycare and their mother's highest level of education on the child's working memory score.

Results

Results: There was a significant main effect of Pre-K/Daycare attendance on working memory scores. Children who attended Pre-K/Daycare had higher memory scores than children who did not ($M = 19.98$ vs. $M = 17.46$, $p = 0.048$). There was no significant main effect of mother's level of higher education ($M = 19.05$ vs. $M = 18.38$, $p = 0.6$) or interaction between maternal education and Pre-K/Daycare attendance on children's working memory scores ($p = 0.4$).

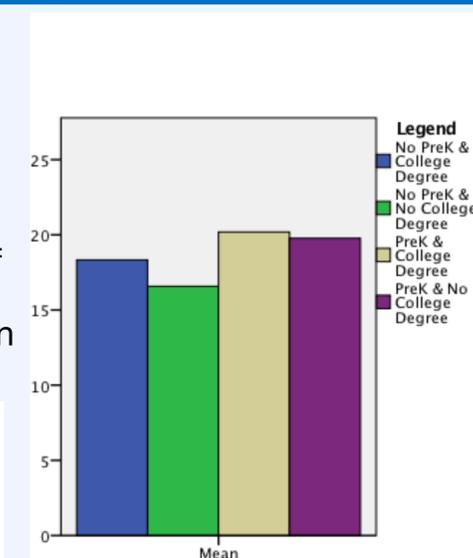


Figure 1. Means Working Memory Scores

Discussion

- The results suggest that Pre-K/Daycare attendance may have a positive effect on visuo-spatial working memory development in 4 and 5-year-olds, irrespective of their mother's level of education.
- Working memory is crucial for academic performance. Moreover, as visuo-spatial working memory is key to the development of mathematical cognition, the implementation of Universal Pre-K by New York City Department of Education can be a much needed academic foundation for many children.
- Further research is needed to examine how the home environment, length and quality of early childhood education can affect children's working memory, as well as follow-up study to assess later school performance.

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