Abstract Title Page
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Title:

Language and Literacy Effects of Curriculum Interventions for Preschools Serving Economically Disadvantaged Children: A Meta Analysis

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Abstract Body

Limit 5 pages single spaced.

Background/context:

Research has shown that delays in language development often predict literacy problems for children in later grades. Low performance in early vocabulary acquisition has a detrimental impact on language and literacy competencies in later grades (Bracken, 2005; Cunningham,1997; Dickinson & Tabors, 2001; NICHD Early Child Care Research Network, 2005; Spira, Bracken, & Fischel, 2005), limited vocabulary skills plague poor children (Dickinson & Tabors, 2002), and the gap between poor and middle class children's vocabularies increases over time (Harris & Herrington, 2006; Lee & Burkam, 2002). Several initiatives have formed with the goal of combating these problems and reversing this downward trend. Consequently, the United States has seen a surge in interventions targeting language and literacy development for preschool children over the past few decades. These interventions, as exemplified by the Preschool Curriculum Evaluation Research Initiative (PCER) funded by the Institute of Education Sciences (IES) in 2002 and the NCER report (Preschool Curriculum Evaluation Research Consortium, 2008) have had mixed results from showing substantial positive effects to having limited and at times negative influence on child outcomes.

This paper presents the results of a meta-analysis whose aim was to broaden our understanding of various interventions focused on enhancing literacy development. Results will show the effectiveness of preschool curriculum targeting children from economically disadvantaged families. This synthesis also examines the ways in which the ethnic composition of preschool programs moderates the effect of the intervention. Additionally, it examines the moderating effects of preschool type (e.g. Head Start or other), parental involvement in literacy activities, and implementation of a mentoring program for teachers adopting the new curricula.

Purpose/objective/research question/focus of study:

The objective of this report is to review studies that report language and literacy outcomes associated with preschool curriculum-based interventions. Results from studies reporting on interventions targeting preschool children from low-income families were included regardless of the specific type of program. Although the majority of preschool interventions target classrooms affiliated with Head Start, studies with alternative programs were also considered. Results will help inform administrators and policy makers of the effectiveness of curriculum-based preschool interventions. The following research questions are highlighted:

1. Do curriculum interventions have significant effects on preschool children's vocabulary development?

2. Are the effects of curriculum interventions on vocabulary affected by program characteristics?

Inclusion Criteria - Setting/Types of Studies:

Studies were included in this synthesis if they met particular criteria. Intervention studies that employed random assignment with at least one treatment and one control group, and quality quasi-experimental studies were considered for inclusion. Control groups could take various forms and may include pre-existing curriculum or the same baseline curriculum as the treatment group without the additive/supplementary elements. Due to the nature of preschool programs and how children are assigned to teachers and classrooms, it was acceptable for researchers to assign at the classroom level. Studies had to have pre-test measures on vocabulary for all groups so that adjusted post-tests scores for treatment and control groups could be calculated. Additionally, only studies completed after 1990 were included, yet inclusion was not dependent on publication. Acceptable types of publications included journal articles, reports, conference presentations, and unpublished dissertations. A variety of publication types were represented in this analysis (see Table 1, Appendix B for details).

Population/Participants/Subjects:

All studies that met the review criteria included samples with specific characteristics. All sample participants included children between the ages of 3 and 5 attending a preschool program. Only preschools that targeted children from low-income families were included; consequently, all preschool programs served children from high-poverty communities with high risk of academic failure. Head Start classrooms and programs receiving Title I funding automatically met this criterion as did other programs where the majority of the enrolled children were from low-income backgrounds. Cultural, linguistic, and racial backgrounds of the children in these studies differed. Studies that include second language learners in their sample were included.

Intervention/Program/Practice:

This meta-analysis focuses on the implementation of both comprehensive curricula and supplementary curricula with enhanced materials and/or instructional methods used in conjunction with pre-existing programs of instruction. Additionally, studies focused on language and literacy development with measurements targeting the effects of the curriculum on vocabulary acquisition. Furthermore, providers of the curriculum could vary between classroom teachers or others like support staff, specialists, researchers, and parents. It was necessary for the delivery of this intervention, however, to occur in the school setting. Nevertheless, classroom teachers delivered the majority of interventions.

Research Design:

A random effects model was used for this synthesis in order to best characterize variance between studies (Lipsey & Wilson, 2001). Effect sizes were calculated by finding the standardized mean difference while employing the Hedges' *g* correction for sample size bias and inverse variance weights (Hedges & Olkin, 1985). Because random assignment was made at the classroom level and this synthesis reports effect sizes at the child-level, a standard error

adjustment was made to account for the influence of sample clustering (Hedges, 2007). Without this adjustment, standard errors would likely be inflated and the likelihood of statistical significance would be disproportionately greater.

Data Collection and Analysis:

The included studies reported on several dependent variables. This synthesis highlighted one major category of language and literacy competence: vocabulary. Studies eligible for inclusion reported vocabulary outcomes using either a receptive or expressive standardized, nationally-normed measure. If a study reported both receptive and expressive vocabulary outcomes, scores were taken from the receptive measurements (e.g. PPVT). It was not necessary for studies to directly report effect sizes for these outcomes; however, it was mandatory that effect sizes on these measures could be accurately calculated from the data reported.

Findings/Results:

To date, 17 studies originating from eight separate reports have been included in a synthesis; more studies will be added to the synthesis prior to the conference meeting. In addition, print awareness will be included as a literacy outcome in the final analysis. All studies included vocabulary outcomes; the majority of which reported pre and post scores of receptive vocabulary by administering the PPVT. In the cases when PPVT scores were not reported, data from expressive vocabulary assessments were used (e.g. EVT or EOWPVT). (See Table 1, Appendix B for details).

A test of homogeneity was performed. Main effects analysis produced a significant Q-statistic ($Q=64.23$, $DF=16$, $p<.01$), allowing us to reject the null hypothesis that assumes homogeneity. Since the differences between studies appear to be caused by something other than sampling error, random effects analysis as well as moderator analysis was justified.

Mean Effect Across Studies for Vocabulary Acquisition

The overall effect size of preschool curriculum interventions on vocabulary was 0.066 ($p>.05$). The 95% confidence interval also indicates that this is not statistically significant [0.147,0.278]. These calculations signify that, overall, there are no significant effects of these interventions on the vocabulary outcomes of preschool children. The forest plot below (see Figure 1 in Appendix B) shows that the majority of interventions had little to no effect on vocabulary. This forest plot indicates that 6 of the 17 included studies have statistically significant effect sizes. Of those six, two have a negative impact, while the other four show positive effects.

Because the Q-value ($Q=64.231$, $DF=16$, $p<.01$) was significant and allowed us to reject the null hypothesis that there is homogeneity among these studies, the mean effect size calculated above (Mean ES = .066, $p>.05$) is not representative of the overall effect and variability among preschool curricula. Likewise, the I-squared value (75.10) represents the portion of the total variance that is the between-study variance, which is not likely caused by chance. In this case roughly 75% of the total variance is represented by the between study variation; this is a

relatively large amount. These findings and the evidence that there exists a sizeable amount of variation between the 17 studies included in this synthesis give justification to explore moderator effects in effort to explain that variation. The ensuing moderator analysis helped to clarify which studies produced larger effects and which elements of those studies had the largest impact.

Analysis of Impacts for subgroups of Studies on Vocabulary Outcomes

In order to determine if sample and programmatic characteristics are systematically related to the effect sizes, an ANOVA within a random effects model was run on each moderator using a macro in SPSS (Wilson, 2005). This also signified whether the difference between categories within a group varied significantly.

An ANOVA was also used to test whether the type of publication reporting the study moderated the effect of the curriculum intervention. No influence based on publication type was present (Q-between=.33, DF=1, $p>.05$). Therefore, it appears that publication type does not influence effect sizes, nor is there evidence of any publication bias.

Moderator analysis did reveal some interesting significant results. The type of preschool program impacted the effect of the intervention. The Q-between value representing two types of programs (PkTyp), Head Start compared to programs not affiliated with Head Start, equaled 0.95 (DF=1, $p<.10$). (See Table 2, Appendix B for details). Interventions in Head Start programs had positive effects on children's vocabulary development. The mean effects sizes between programs with a predominantly (over 50%) white enrollment and those with enrollments that were predominantly African American, Hispanic, or Asian/Pacific Islander (PredEth) were significantly different (Q-between=9.76, DF=1, $p<.01$). The mean effect size for programs with a non-White racial majority was significantly higher (.33) than that of programs with a White majority (-.53).

Conclusions:

One of the goals of this meta-analysis was to indicate the extent to which preschool curricular interventions increase vocabulary outcomes for children. Results of this synthesis showed that overall such interventions, some of which specifically target language and literacy development, have no significant effects on children's vocabulary. The resulting effect size (ES=0.07) is quite small and non-significant. In practical terms, this effect size equates to a 1.05-point increase in the PPVT. Analysis of the FACES data (Zill, N., Resnick, G., & Kim, K., 2001) provided evidence that attending Head Start for a year raised children's PPVT scores 4.3 points, on average. This increase equates to an effect size of 0.29. The curriculum interventions, in this synthesis, averaged about a 25% gain above and beyond that. One can conclude that attendance in a preschool program like that of Head Start has a larger positive effect on vocabulary acquisition than does the particular curriculum implemented in such a program.

Moderator analysis, however, identified two primary differences between preschool programs. The type of preschool program impacted the effect of the intervention as results show Head Start programs had more positive effects on children's vocabulary development. The influence of a preschool program's ethnic and racial composition on the effectiveness of these interventions

was revealed. Results from an analysis of variance (ANOVA) indicated that interventions in programs predominantly serving children of color had positive effects on children's vocabulary development.

As is the case with all research, it is essential to use statistical analyses like the ones used in this synthesis to inform practice and policy. Certainly, the findings of this report are not enough to justify widespread policy regarding preschool interventions. However, evidence that curriculum-based interventions affect vocabulary gains differently with regard to the type of preschool program and the racial and ethnic background of the enrolled children suggests that a closer examination is warranted. Moreover, analysis of the effect of these interventions on additional outcomes (e.g. print awareness) is necessary, as several curricula included in this synthesis directly emphasize other elements of preschool children's literacy and language development in addition to vocabulary acquisition.

Appendixes

Appendix A. References

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Appendix B. Tables and Figures

Table 1: Sample characteristics of 17 included studies

Sample Characteristic	N	Sample Characteristic	N
Publication Type		Total N (range)	
Journal Article	11	<100	6
Report	3	100-199	6
Unpublished	2	200+	5
Dissertation	1		
Program Type		Curriculum Type	
HS	8	Language & Literacy	15
T1	2	Math	1
UPK	2	Multiple	1
Public	4		
Private	1		
Measure of Vocabulary		Program Predominant Ethnicity	
PPVT	9	White	4
EVT	6	African American	2
EOWPVT	2	Hispanic	4
		Asian/Pacific Islander	2
		No majority	5

Table 2: Relation of Moderators to Effect Size

Moderator	Group	MeanES	Q-between	p-value
Publication Type			.33	.57
	Journal Article (0)	.115		
	Other (1)	-.011		
Type of Preschool*			2.97	.08
	Head Start (0)	.179		
	Other (1)	-.001		
Pred Ethnicity***				
	White (0)	-.525	10.01	.002
	Other (1)	.329		
Parent Involvement			.05	.82
	No (0)	.077		
	Yes (1)	.017		
Mentoring			.23	.63
	No (0)	.009		
	Yes (1)	.113		

* p<.10, ** p<.05, *** p<.01
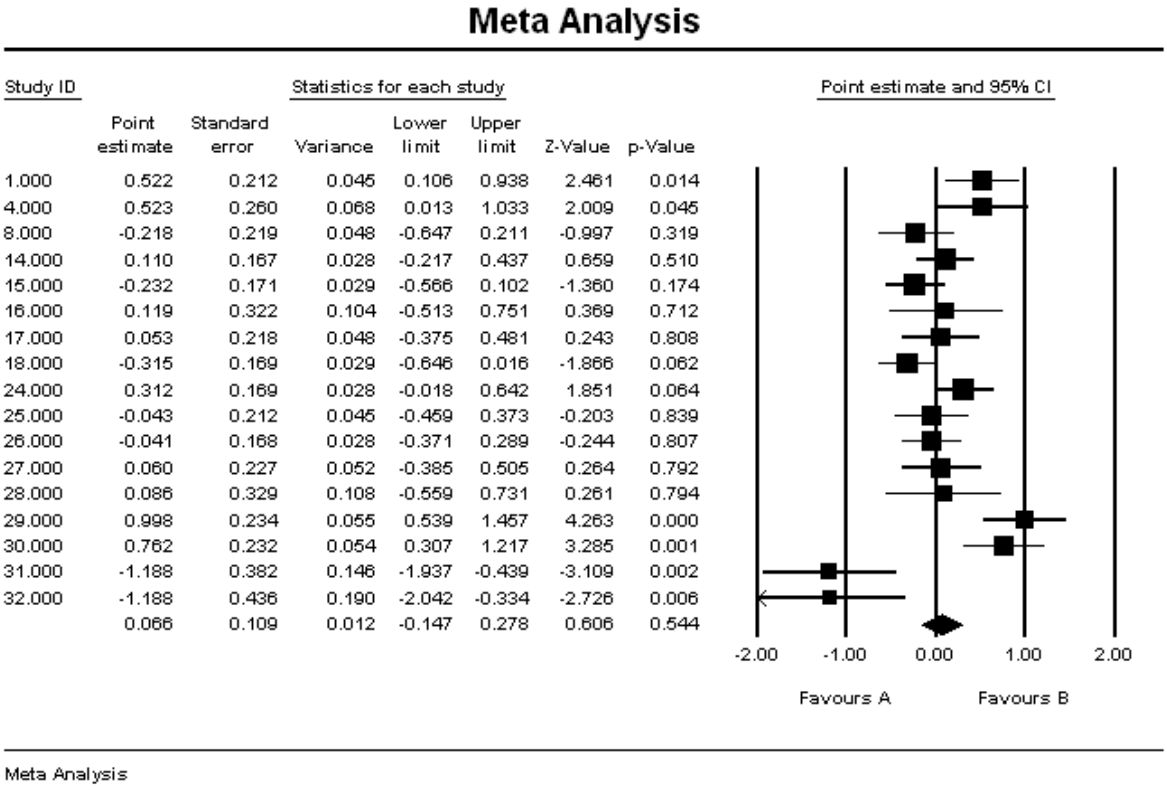
Figure 1. Random Main Effects Output