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Background

School success depends on a child's ability to regulate emotions, behaviors and attention in the service of learning, and emergent evidence suggests that high quality early childhood music programming may promote the development of such self-regulatory capacities (Brown & Sax, 2013). The present study examines the impact of MacPhail's Learning with Music Program on the development of self-regulatory skills for young children at risk via economic hardship.

MacPhail's Learning with Music Program

In Learning with Music, MacPhail music teachers visit partner preschool classrooms 24 times across the school year and model music integration for early childhood educators by leading group music activities as well as adding songs, chants and musical stories. These serve to ease transitions, support task accomplishment, and help children to regulate or manage emotions and behavior.

Research Design

The present study used an experimental waitlist control design to examine the impact of Learning with Music on children's development of self-regulatory skills. The study spanned three years and included three preschools, matched on geographic location, participant demographics, base curriculum and quality ratings. In Year 1, one preschool received Learning with Music and the other two received programming as usual. In Year 2, an additional preschool received Learning with Music whereas one still received programming as usual. In Year 3, all schools received Learning with Music.



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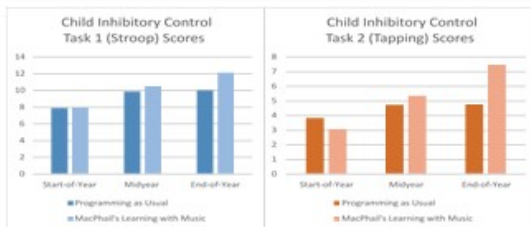


Figure 1. The bar graphs display scores on Stroop and Tapping tasks of inhibitory control at start, middle, and end of year time points for preschool children receiving programming as usual versus those receiving MacPhail's Learning with Music Program.

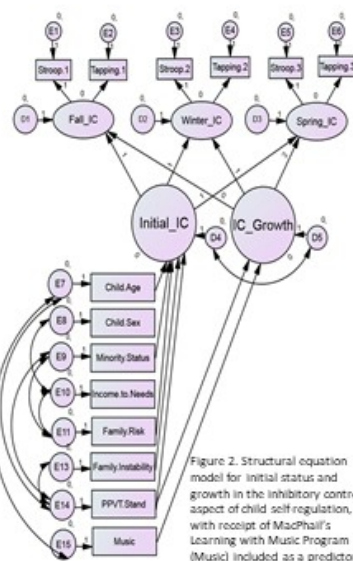


Figure 2. Structural equation model for initial status and growth in the inhibitory control aspect of child self-regulation, with receipt of MacPhail's Learning with Music Program (Music) included as a predictor of growth.

	Estimate	S.E.	C.R.	P
Initial_IC ← Child Age	.093	.081	2.853	.004
Initial_IC ← Minority Status	-1.982	.874	-2.267	.023
Initial_IC ← Family Risk	-.181	.269	-.672	.502
Initial_IC ← Family Instability	-.171	.174	-.984	.325
Initial_IC ← Verbal Ability	.180	.013	14.245	***
IC_Growth ← Music	.918	.154	5.940	***
IC_Growth ← Verbal Ability	-.072	.008	-9.257	***
Fall_IC ← IC_Growth	1.000			
Winter_IC ← IC_Growth	1.000			
Spring_IC ← IC_Growth	2.000			
Spring_IC ← Initial_IC	1.000			
Fall_IC ← Initial_IC	1.000			
Tapping 1 ← Fall_IC	.891	.043	19.258	***
Stroop 1 ← Fall_IC	1.000			
Stroop 2 ← Winter_IC	1.000			
Tapping 2 ← Winter_IC	1.135	.058	19.689	***
Stroop 3 ← Spring_IC	1.000			
Tapping 3 ← Spring_IC	1.583	.120	13.198	***

Table 1. Maximum Likelihood Estimates for SEM (N = 234)

Method

Ethical standards were followed in the conduct of this study, and all procedures were approved by the appropriate institutional boards. The study included 183 preschool child participants, 143 of whom received MacPhail's Learning with Music program and 40 of whom did not.

The first study component involved a **Demographic Interview** with parents or caregivers. This was conducted at the preschool by trained research assistants at the start of the preschool year.

The second study component involved standardized, individual child assessments completed by trained research assistants at the start, middle and end of the preschool year. Start-of-year child assessments included the **Peabody Picture Vocabulary Test (PPVT)** which was used to control for verbal ability. All child assessments included three measures of the inhibitory control aspect of self-regulation. In the **Day/Night Stroop** measure (Gerstadt et al. 1994), the experimenter presents a white card with a yellow sun pictured on it and a black card with a moon and stars on it. Children are instructed to say "night" for the sun card and "day" for the moon and stars card. There are 16 test trials, with each card presented from beneath the table in a fixed, pseudorandom order. In the **Peg Tapping** measure (Diamond & Taylor, 1996), children are instructed to tap twice with a wooden peg when the experimenter taps once, and once, when the experimenter taps twice. There are 16 counterbalanced trials. In the **Bear/Dragon Puppet** measure (Reid, Pein and Rothbart, 1984), children are instructed to do what the bear puppet asks them to do (e.g., touch your nose) but not to do what the dragon puppet asks. There are 10 test trials with bear and dragon commands in alternating order.

Results & Discussion

The first stage of analysis included descriptive statistics and tests of group differences for indicators of inhibitory control at each time of year (fall or start-of-year, winter or midyear, and spring or end-of-year) for children with and without receipt of MacPhail's Learning with Music Program (see Figure 1). Results demonstrated no statistically significant differences at start-of-year in the children who would receive MacPhail's Learning with Music Program and those who would not. For core analyses, we employed structural equation modeling (SEM) using IBM's AMOS statistical program to examine initial status and growth in child self-regulatory skills, with receipt of Learning with Music used as a key predictor of growth and demographic variables and child verbal ability included as controls (see Figure 2). Results of the SEM suggested that, once all relevant variables were accounted for, child age, minority status, and verbal ability statistically predicted initial inhibitory control (see Table 1).

Results further suggested that, once all relevant variables were accounted for, verbal ability and receipt of MacPhail Center for Music's Learning with Music Program statistically predicted growth in inhibitory control across a year of preschool attendance.