Phonological Awareness and Musical Rhythm Subskills in Kindergartners

INTRODUCTION

Fluent reading is a critical skill in our society and is based on children’s acquisition of several essential subskills, including phonological awareness (“PA”). Musical activity has been used experimentally as a means of bolstering reading skills, including those of children with dyslexia, with preliminary indications that reading and music are related. Yet little is known about the exact relationships and the specific links between these two domains. This study included basic research into relationships between musical rhythm and phonological awareness subskills in five-year-olds. In a longitudinal design, the study also compared post-year changes in musical and phonological awareness subskills of kindergartners in two schools with different amounts of musical training.

RESEARCH QUESTIONS

1) What specific relationships exist between phonological awareness and rhythm pattern perception and production and tempo production subskills in five-year-old children?

2) Will the post-year phonological awareness subskill performance of kindergarten children who participate in more musical activity be different from the performance of children who participate in less musical activity during their kindergarten year?

PARTICIPANTS & MUSIC CURRICULA

This study included basic research into relationships between musical rhythm and phonological awareness subskills in five-year-olds. In a longitudinal design, the study also compared post-year phonological awareness subskills of kindergartners in two schools with different amounts of musical training.

PARTIAL CORRELATION RESULTS: FALL SCORES

Study groups combined into one sample, n = 30
Control for KBIT-Composite “Abbreviate IQ”

<table>
<thead>
<tr>
<th>RHYTHM</th>
<th>Tempo Copying</th>
<th>Tempo Rhythm</th>
<th>Tempo Rhythm Copying</th>
<th>Tempo Rhythm Discrimination</th>
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<tr>
<td>Group</td>
<td>Human Rater Score</td>
<td>Human Rater Score</td>
<td>Human Rater Score</td>
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<tr>
<td>EXPERIMENTAL GROUP</td>
<td>.37*</td>
<td>.22</td>
<td>.37*</td>
<td>.44*</td>
</tr>
<tr>
<td>CONTROL GROUP</td>
<td>.06</td>
<td>-.14</td>
<td>.44*</td>
<td>.38</td>
</tr>
</tbody>
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Composite of 4 PA Tests = Latent Composite

PHONOLOGICAL AWARENESS

Segmentation Of Sentences: .30 .13 .45 .50** .01
Segmentation Of Syllables:

MEASURES, SCORING & CONTROL VARIABLE

Phonological Awareness Tests (“PA” tests) (Robinson & Salter, 1997; Subtests: Rhyming Discrimination and Production, Segmentation of Sentences, Syllables, and Phonemes; Isolation of Initial, Final, and Medial Phonemes; Deletion of Sounds (Compounds and Syllables) and Phonemes. Scoring = standard scores.

Musical Rhythm Tests - Adapated from Overy et al., 2003, Musical Aptitude Tests (MAT):
- Rhythm Pattern Discrimination - A computer produced two rhythm stimuli with varied intervals (3-17 bongo drum taps per stimuli at overall presentation speed of 100 bps). Ss determined whether same or different. Both halves of paired stimuli had equal number of taps and varied in rhythm only. (Scoring = raw score of correct answers)
- Rhythm Pattern Production (Copying) - A computer produced rhythm stimuli with varied intervals between taps (3-7 taps at 100 bps). Ss copied stimuli by tapping on computer space bar. (Scoring*)
- Tempo Production (Copying) - Computer produced isochronous rhythm sequences (4-10 drum taps per second at 60, 80, 100, 136 bps). Ss copied stimuli by tapping on computer space bar. (Scoring*)
- Rhythm and tempo copying tests scored both by measuring and assessing difference in milliseconds between stimulus taps and response taps (“computer score”); and by two musicians independently judging audio files of Ss’ responses using Likert scale (average of two musicians’ scores = “human rater score”).

Correlational Analyses Control Variables:
- Kaufman Brief Intelligence Test (KBIT) (Kaufman & Kaufman, 1990) Composite Score of Vocabulary and Matrices tests.

PARTIAL CORRELATION RESULTS: SPRING SCORES

Results by group
Control for KBIT-Composite “Abbreviate IQ”

PHONOLOGICAL AWARENESS

PHONOLOGICAL AWARENESS

CONCLUSIONS & FUTURE DIRECTIONS

This study’s results suggest the following pathway by which musical training in young children could affect reading acquisition: (1) rhythm pattern production is linked to phonological segmentation ability; (2) exposure to rhythmic pattern production activities and rhythmic song lyrics through intensive musical instruction are connected to enhanced phonological awareness in the form of rhyming discrimination and phonological segmentation subskills; and (3) phonological awareness enhances reading acquisition. This study provided evidence for the underlying links between rhythm pattern abilities and phonological segmentation subskills, and for the link between musical training (A) and enhanced phonological awareness (B) as represented in Figure below. Decades of prior research support the link shown between phonological awareness (B) and reading acquisition (C) (Adams, 1990; National Reading Panel, 2000). Prior research with dyslexic primary-grade children (Overy, Annah, N.Y. Acad. Sci., 1999, 2003) suggested a similar model.

Further Research:
School 1 children’s improvement in phonological awareness subskills may be due to intensive practice with rhythmic song lyrics in the Kodály music curriculum. More research is needed to tease apart effects of exposure to music and lyrics in musical training.