

## The Effects of Music Instruction on Emergent Literacy Capacities among Preschool Children: A Literature Review

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### Abstract

This article presents a literature review of pertinent research that has dealt with the relationships between music education and emergent literacy in preschoolers during the past 20 years. In total, 13 correlational and quasi-experimental studies were summarized and compared. These interdisciplinary studies have demonstrated that music education may effectively contribute to young children's awakening to reading and writing, whether or not learning difficulties are an issue.

### Introduction

Many researchers have observed that the learning of music contributes to preschool-age children's awakening to different subject matters, particularly to reading and writing (Cutietta, 1995, 1996; Ribière-Raverlat, 1997). Several studies have established significant correlations between the treatment of musical and linguistic information in early childhood. They indicate that young children who obtain superior results in melodic perception tasks<sup>1</sup> also obtain higher results in phonological awareness and prereading tests (Lamb & Gregory, 1993; Bolduc & Montésinos-Gelet, 2005). Quasi-experimental studies also show that children who participate in musical and first-language interdisciplinary programs develop phonological awareness, word recognition, and invented spelling abilities more efficiently than their classmates who do not participate in such programs (Bolduc, 2006; Register, 2001; Standley & Hughes, 1997). In fact, it seems that musical activities promote the development of auditory perception, phonological memory, and metacognitive knowledge—three components that are equally involved in the development of linguistic abilities (Bernstein, 1976; Fiske, 1993; Lowe, 1995, 1998; Ribière-Raverlat, 1997; Sloboda, 1985). In order to clarify the music-language relationship as understood in the early childhood pedagogy, this article presents a review of the main correlational and quasi-experimental studies published in the past 20 years<sup>2</sup> that have dealt with music education and the acquisition of written language in children 4 to 6 years of age.

### The Correlational Studies: A First Point of View

Five studies have been able to establish correlations between musical abilities and the acquisition of written language. Lamb and Gregory (1993) were among the first researchers<sup>3</sup> to examine the possible link between perceptive musical aptitudes and phonological awareness abilities with a group of 18 English-speaking preschoolers. Tizard, Blatchford, Burke, Farquhar, and Plewis's (1988) *Reading Test*, Daniels and Diack's (1960) *Standard Reading Test*, and an abridged version of Stuart-Hamilton's (1986) *Phonological Awareness Test* were used to evaluate children's linguistic skills. Also, a musical abilities test (melodic perception and musical timbre<sup>4</sup> recognition) developed by the researchers and a nonverbal ability control task (Raven, 1956) were used for evaluation purposes. After the tests were administered to the children on an individual basis, Lamb and Gregory (1993) observed that children who scored high in the melodic perception task also obtained significantly superior results in the Tizard et al. (1988), Daniels and Diack (1960), and Stuart-Hamilton (1986) tests. However, their scores were average when it came to timbre recognition and nonverbal ability control tasks (Raven, 1956). Although no causal relationship could be established between perceptive melodic abilities and phonological awareness abilities, and the authors acknowledged that different variables could have negatively or positively influenced their results, Lamb and Gregory (1993) concluded that children who obtained better results in melodic perception were able to decode and manipulate the various linguistic units (rhymes, syllables, and phonemes) with greater ease than children who performed less well in melodic perception.

Following the research results obtained by Lamb and Gregory (1993), Bolduc and Montésinos-Gelet (carried out in 2001, published in 2005) examined the correlation between phonological awareness, melodic perception, and rhythmic perception abilities<sup>5</sup> with 13 French Canadian kindergartners (average age: 5 years, 6 months). The researchers evaluated the perceptive musical abilities of the participants with an adapted French version of Gordon's (1979) *Primary Measures of Music Audiation Test* and their phonological awareness abilities with Armand and Montésinos-Gelet's (2001) *Phonological Awareness Test*. Results indicated a significant correlation between scores obtained in the perceptive melodic tasks (Gordon, 1979) and the syllables and rhymes identification tasks (Armand & Montésinos-Gelet, 2001). More precisely, Bolduc and Montésinos-Gelet (2005) noticed that melodic perceptive abilities were by far more correlated with syllabic and rhythmic identification tasks. In addition, Bolduc and Montésinos-Gelet's (2005) research revealed that there was no correlation between melodic and rhythmic perception, and between rhythmic perception abilities and phonological awareness abilities, for this group of 13 kindergartners. Sloboda (1985) and Ribière-Raverlat (1997) state that researchers agree that music education may contribute to the development of phonological memory. It is believed that musical activities help children focus on elements that are different but potentially useful for the emergence and development of linguistic skills.

Two studies led by Peynircioglu, Durgunoglu, and Oney-Kusefoglul (2002) support Lamb and Gregory's (1993) and Bolduc and Montésinos-Gelet's (2005) research outcomes. In their first study, they examined the correlation between musical aptitudes (perceptive melodic and rhythmic abilities), phonological awareness, and "pseudoword" recognition abilities. Among the 32 Turkish participants in the study, half the participants were found to possess below-average musical aptitudes, while the other half had above-average musical aptitudes. Each kindergartner was individually evaluated using Oney-Kusefoglul and Durgunoglu's (1997) *Phonological Awareness and Pseudoword Recognition Test* (rhymes, syllables, and phonemes) and the melodic and rhythmic perception tasks from Seashore's (1956) *Musical Aptitudes Test*. Statistically, results suggested that participants with superior musical aptitudes obtained better results in the phonological awareness and pseudoword recognition tasks than participants with below-average musical aptitudes. Even if these results are interesting, they must be interpreted with caution because no precise information was provided by the authors about the children's general cognitive abilities or their socioeconomic background. These variables should have been taken into account.

In their second study, Peynircioglu et al. (2002) examined whether musical aptitudes (perceptive melodic and rhythmic abilities) were correlated with phonological awareness and recognition of pseudowords abilities (rhymes, syllables, and phonemes), with a group of 40 preschool-age children from the United States. Half of the participants were identified as having below-average levels of musical aptitudes, while the other half of participants were rated as having above-average levels. Similar to the first study, the researchers noted that participants with a superior level of musical aptitudes (perceptive melodic and rhythmic capacities) as measured by Seashore's test (1956) obtained more significant results in phonological awareness and pseudoword recognition tasks than participants without a superior level of musical aptitude (Oney-Kusefoglul & Durgunoglu, 1997). Moreover, Peynircioglu et al. (2002) observed that participants from the United States were able to distinguish consonants at the beginning of words more easily than their Turkish counterparts. Again, it is not possible to assert that the superior level of musical aptitudes is the only factor that influences emergent literacy abilities because other variables may also have had an impact, as explained previously.

In 2002, Anvari, Trainor, Woodside, and Levy (2002) also explored whether musical abilities were correlated with phonological awareness and prereading abilities. In total, 100 English-speaking Canadian preschoolers, ages 4 to 5 years old, participated in this study. Six tests were administered to each participant. Researchers developed a phonological awareness test (rhymes, initial phonemes identification, and fusion tasks) and a musical aptitudes test (rhythmic, melodic, and harmonic perceptions,<sup>6</sup> as well as rhythmic production and chord analysis) for the purpose of the study. The prereading tests were taken from the well-known *Wide Range Achievement Test-3* (Wilkinson, 1995) and the *Peabody Picture Vocabulary Test-Revised* (Dunn & Dunn, 1981). Spatial-temporal (Wechsler, 1971) and mathematical (Sophian & Vong, 1995) control tasks were also used as assessment measures. Results from Anvari et al. (2002) revealed that phonological awareness and prereading scores were correlated with musical aptitudes. However, a detailed analysis that included all the participants suggested that the results from the melodic tasks (melodic, harmonic perceptions, and chord analysis) were more significantly correlated with phonological awareness than temporal tasks (rhythmic and production perceptions). The correlations between the control and the musical tasks were also statistically less significant. Like Sloboda (1985) and Fiske (1993), Anvari et al. (2002) accepted the hypothesis that general auditory perception mechanisms are simultaneously involved in the treatment of musical and linguistic information. In their opinion, music stimulates phonological memory and promotes linguistic knowledge transfer.

In summary, the correlational studies that we reviewed in this section enable us to establish links between musical aptitudes and emergent written language. On the other hand, these studies do not allow us to establish a causal relationship between different variables. It is difficult to determine whether musical aptitudes influence emergent literacy abilities or whether on the contrary, emergent literacy abilities influence musical aptitudes. Hence, the presentation of quasi-experimental studies that make use of

training programs is essential in order to discretely examine the causality between learning music and the acquisition of written language in kindergarten.

### The Quasi-experimental Studies: Examining the Link between Music Instruction and Emergent Literacy Abilities

Eight quasi-experimental studies provide insight into the effects of various music programs on the development of emergent literacy abilities in kindergarten.<sup>7</sup> A study by Colwell (1988) showed that a music-therapy program improved phonological awareness abilities for 23 participants from the United States, ages 4 to 6 (9 girls, 14 boys). During the first 4 weeks of the study, two groups of children (A and D) participated in an experimental program that included a daily 15-minute music lesson that focused on learning songs and on identifying and categorizing different phonological units through listening activities. In the course of this same period, two other groups of children (B and C) participated in a control program that provided phonological awareness training without musical instruction. The four groups switched programs in the last 4 weeks of the research period: groups B and C participated in an experimental program, while groups A and D participated in a control program. A phonological awareness test developed by the researcher was used to assess participants' performance in the fourth and eighth week of the study. Colwell's (1988) variance analyses revealed that although both the control program and the music-therapy program had a significant impact on phonological awareness, statistically the music-therapy program proved to be more efficient. In her conclusion, the author claimed that music facilitates the development of reading skills even before systematic teaching of reading begins in primary school. Nevertheless, results should be analyzed with caution because only one phonological awareness assessment test, developed by Colwell herself, was used in the framework of her research.

In 1994, Colwell also examined the effects of a music program on the development of global word recognition abilities in three kindergarten classes in the United States. In total, 27 preschoolers participated in this study. In addition to the regular program offered by the three teachers, supplemental musical training was provided by a music therapist. For 12 weeks, the music therapist met with each group for 20 minutes, twice a week. Group 1 participated in a program during which they sang stories (short songs representing a story), group 2 participated in a program during which stories were traditionally read and sung, and group 3 participated in a program during which stories were simply read. Every 2 weeks, participants' global word recognition abilities were assessed using six storybooks previously presented in class. The *Test of Early Reading Ability* (Reid, Hresko, & Hammill, 1991) also served as an assessment tool at the end of the 12-week program.

After analyzing the data, Colwell (1994) noted significant statistical differences between the three groups. Results in the Reid et al. (1991) test indicated that participants in groups 1 and 2 had a better understanding of the text, and they omitted and substituted fewer words than subjects in group 3. According to Colwell (1994), these results suggested that music stimulates intellectual abilities and contributes to the transfer of academic notions. However, despite this interesting conclusion, Colwell neglected a variable that could have had a considerable effect on the development of word recognition capacities in this sample: Colwell (1994) failed to assess teachers' in-class practices to promote emergent literacy practices. It is possible that some of the teachers may have privileged emergent literacy more than others, and consequently, they may have influenced their children's performances. As such, results must be interpreted with caution.

For his part, Fetzer (1994) was interested to see whether a music program focused on the learning of traditional songs could enable the development of word recognition abilities in 30 children registered in kindergarten in the United States. Fifteen participants in this study participated in a 30-minute weekly music program, whereas the other 15 participants were enrolled in a regular school program with no musical training. Based on the *Test of Early Reading Ability-2* (Reid et al., 1991) that was administered at the end of the 20-week training program, Fetzer's (1994) variance analyses suggested that participants who underwent the training obtained better results in the test than their counterparts in the control group. However, it appears that Fetzer (1994) did not take into consideration the Hawthorne effect since this limit was never mentioned in his thesis. It would have been crucial to examine the psychological effect of being self-conscious of one's participation in a study and special treatment during the research on the experimental group. In addition, Fetzer (1994) claimed that music promotes cognitive development in children. He also maintained that music should be considered a complementary approach that helps the development of metalinguistic abilities in young learners.

In 1997, Standley and Hughes studied the effect of an interdisciplinary music program on emergent written abilities in 24 preschoolers enrolled in a program for exceptional children in the United States. Children were divided in two subgroups ( $n = 12$ ). In the fall session, group 1 participated for 7½ weeks in an experimental music program centered on the development of prewriting abilities. Group 2, the control group, participated in a regular school program that also offered a music program. In the winter session, programs were switched around, and group 2 participated in the 7½-week experimental music program, while group 1 took part in the regular school program. Standley and Hughes' (1997) music program was offered for 15 weeks and consisted of two 30-minute music classes per week. In total, children were exposed to 30 classes.

The program's primary objective was having children *sing and play instruments*. Songs of a variety of styles and types were used. The experimental program brought children into contact with a variety of musical instruments, allowing them to play simple songs and/or melodies. The second objective was to make children self-conscious of the process of *creating music*. Improvisational activities were particularly favored in this context. The third objective was *responding to music*. Children identified the sources of a wide variety of sounds. The fourth objective was to awaken an *understanding of music*. Children build up their knowledge using their own and standard music vocabulary to discuss musical experiences. Prewriting activities focused on the development of abilities required to accomplish invented spelling tasks, word transcription, and graphomotricity. Prereading activities dealt with the development of abilities related to phonological awareness, word recognition, and youth literature.

Three well-known tests were chosen to assess the abilities of the participants: the *Print Awareness Test of Logos* (Freeman & Whitesell, 1985; Thomas, Rinehart, & Wampler, 1992), the *Print Concept Checklist* (Clay, 1985), and the *Developmental Writing and Language Skills Checklist* (Thomas et al., 1992). Each child was assessed individually at the beginning and at the end of the fall and winter sessions. Results indicated that group 1 obtained significantly better results in the prewriting assessment than their counterparts in group 2 in the first posttest at the end of the fall session. It is also interesting to note that results in the prewriting assessment were similar for both groups in the second posttest at the end of the winter session. Furthermore, researchers observed that participants in group 2 considerably improved their performances in the prereading assessment in the second posttest at the end of the winter session. In their discussion, Standley and Hughes (1997) claimed that their music program enhanced the emergent literacy abilities of their preschool-age participants. The authors also concluded that musical activities are pleasant for children and motivate them. They explained that "it was also apparent from the children's reaction that the music activities provided pleasure and excitement about academic participation, possibly generating long range motivation for reading and writing" (p. 83).

Register (2001) replicated Standley and Hughes' (1997) study. Fifty American preschool-age children identified with multiple learning disabilities participated in this research. Two classes joined to form the experimental group ( $n = 25$ ), and two others formed the control group ( $n = 25$ ). For 15 weeks, each group participated in a semi-weekly music program. The experimental group followed Standley and Hughes' (1997) music program, while the control group participated in a standard music-therapy program. Standley and Hughes' (1997) assessment instruments were used by Register (2001): the *Print Awareness Test of Logos* (Freeman & Whitesell, 1985; Thomas et al., 1992), the *Print Concept Checklist* (Clay, 1985), and the *Developmental Writing and Language Skills Checklist* (Thomas et al., 1992). The research indicated that both music programs contributed to the emergence of writing skills. However, Standley and Hughes' (1997) program seemed to be more effective: The experimental group obtained higher results in the prewriting and prereading evaluations compared to the control group. According to Register (2001) implementing a music program centered on the development of prereading and prewriting abilities could provide another venue to teach critical skills before the beginning of primary school.

Similar to these two studies, Bolduc (2006) also examined the effects of an experimental music program on the development of phonological awareness, word recognition, and invented spelling abilities in 104 francophone kindergarten children in Quebec who had no learning disabilities. The experimental group ( $n = 51$ ) and the control group ( $n = 53$ ) were both composed of three classes. Over a period of 15 weeks, each class participated in a weekly 60-minute music course. The experimental group took part in a music program from Standley and Hughes (1997) adapted to the francophone sociocultural context. The control group followed the official music education program of the Ministère de l'Éducation du Québec (2001).

Five assessment tests were administered in this study: the *Primary Measures of Music Audiation* by Gordon (1979); Armand and Montésinos-Gelet's (2001) *Phonological Awareness Test* (rhymes, syllables, and phonemes); the *Word Recognition Test* (prereading tasks) inspired by the Morin, Montésinos-Gelet, and Charron test (2004); Morin and Montésinos-Gelet's (2003) *Invented Spelling Test* (prewriting tasks); and some excerpts from Kaufman and Kaufman's *K-ABC* (1993) tasks on short-term memory of numbers and on spatial memory. Descriptive and statistical analysis showed that both programs developed perceptive melodic and rhythmic abilities similarly to Gordon's test (1979). On the other hand, the experimental music program appeared to be more effective when it came to the emergence of writing abilities: It facilitated the manipulation of certain phonological units, it improved complex syllable recognition, and it progressively introduced children to standard orthographic writing.

According to the author, the interdisciplinary activities in the experimental music program contributed to raising three components that play an essential part in the development of musical and linguistic abilities. The first component—*auditory perception*—refers to the set of cognitive operations used to receive and analyze sound stimuli. The second component—*phonological memory*—stimulates information withdrawal required for the recognition and distinction of similar linguistic and musical patterns. Finally, *metacognitive knowledge* facilitates self-awareness of one's intellectual functioning, and it supports the mental processes related to language and music. In summary, it seems that by focusing the child's attention on different elements related to literacy emergence and the development of metalinguistic abilities, it is possible to develop learning

strategies that facilitate the acquisition of written language.

Gromko (2005) was also interested in the effects of music education on the development of phonemic awareness. Her study included 103 kindergartners, ages 5 and 6 in the United States. During a 4-month period, four experimental classes ( $n = 43$ ) participated in a weekly 30-minute music program, inspired, among others, by Bruner's educational principles. Four control classes ( $n = 60$ ) received equivalent teaching time in an emergent literacy program. Participants' phonemic awareness abilities were assessed with various tasks from the *Dynamic Indicators of Basic Early Literacy Skills Test* (Good, Gruba, & Kaminski, 2002) in three different occasions: at the beginning, in the middle, and at the end of the research project. Results indicated that throughout the study there was a more significant improvement in phonemic awareness abilities in the experimental group compared to the control group. Gromko (2005) concluded that music promotes the development of auditory abilities that in turn have a direct influence on the ability to split words into phonemes. Despite the positive results obtained in her study, we consider, as does the author, that certain variables could nevertheless have influenced the results. Among these variables, Gromko (2005) notes that the Hawthorne effect could have played a role because children from the experimental classes were aware of the special treatment they were receiving.

In order to establish links between teaching music and language, Galicia, Contreras Gomez, and Peña Flores (2006) recently examined the effects of an experimental music program that integrates perceptive, visual, and motor activities related to the development of vocabulary abilities with 30 Mexican kindergarten children. For 10 weeks, a group of children ( $n = 10$ ) participated in the experimental music program (*PIMITL Program*), another group ( $n = 10$ ) participated in a regular music program offered by the school (*RCJ Music Activities*), and a third group ( $n = 10$ ) had no access to musical activities.<sup>8</sup> Two 40-minute music lessons were given per week to the first and second groups of children. An adapted Spanish version of the *Peabody Vocabulary Image Test* (Dunn, 1986) was administered to all the participants during the pretest and posttest assessment. Results obtained at the end of the study revealed that the children who participated in the experimental program experienced a more significant improvement in the Dunn (1986) test than the other two groups. In their conclusion, the authors suggested that PIMITL activities may have strengthened children's phonological awareness abilities. "Based on the evidence of the significant correlations of phonological awareness with melody and timbre discrimination and with receptive vocabulary (Anvari et al., 2002), it can be inferred that melody and timbre discrimination activities help to stimulate receptive vocabulary development" (Galicia et al., 2006).

## Conclusion

The research studies discussed in this article show the extent to which interdisciplinary programs in music and language can promote basic learning in both subjects, as early as preschool. Canadian and American reports indicate that some children enter primary school with existing reading and writing difficulties (Statistique Canada, 1996; U.S. National Institute for Literacy, n.d.). Thus, it is essential to propose different methods to introduce these young learners to written language before they begin their schooling. Because music education offers a holistic type of education that may facilitate the development of listening and analysis abilities, it can be used as an efficient complementary educational approach. As we pointed out in this article, many authors and researchers (Anvari et al., 2002; Bernstein, 1976; Bolduc, 2006; Colwell, 1994; Fetzer, 1994; Fiske, 1993; Lowe, 1995, 1998; Bolduc & Montésinos-Gelet, 2005; Ribière-Raverlat, 1997; Sloboda, 1985) claim that musical activities promote the development of three important components that are equally involved in the development of linguistic abilities: *auditory perception*, *phonological memory*, and *metacognitive knowledge*. Given this evidence, early childhood educators can give young children the opportunity to fully develop their potential in the domains of music and emergent literacy by supporting music education and interdisciplinary projects that enable them to acquire skills in many fields.

## Notes

1. Melodic perception is defined as the decoding mechanism by which the individual sequentially processes musical information by considering a series of pitches as an organized assemblage within a given musical system.

2. For this review, we used the following databases: *Arts and Humanities Index* (1988-2006), *CAIRSS for Music* (1973-2006), *Dissertation Abstracts International* (1950-2006), *ERIC* (1965-2006), *Francis* (1966-2006), *Music Education Online* (1970-2006), *Music Education Resource Base* (1980-2006), *Music Education Search System* (1980-2006), and *PsychLit/PsychINFO* (1952-2006). We also consulted numerous doctoral and master's theses, as well as reports from learned societies and review papers. Five terms were selected for the literature review: *Music*, *Music education (Music instruction)*, *Emergent literacy*, *Reading*, and *Writing*.

3. Five studies revealed the presence of significant correlations between musical aptitudes and emergent literacy skills. It is important to note that these studies were carried out with homogeneous populations. No distinction was made between children from middle-class families and those from working-class or low-income families. In addition, no direct link was established between the level of musical aptitudes and family situation or other contextual variables.

4. Musical timbre determines the color of sound. It is different for each type of sound source, and when listened to, it allows differentiating two sounds of same musical pitch and intensity: for instance, the same note played with the same intensity but with a flute or a clarinet.

5. Rhythmic perception mainly examines the treatment of temporary organization or the way the individual treats the pulse and the tempo.

6. Harmonic perception emerges from the *deliberate* use of simultaneous frequencies. It represents the *vertical* aspect of the music, while the musical height deals with the *horizontal* aspect (melody).

7. It must be noted that two of the studies cited in this section (Standley & Hughes, 1997; Register, 2001) were carried out with children enrolled in early intervention and special education programs, and they took into account children's economically disadvantaged backgrounds. As for the other studies mentioned in this section, they were conducted with homogeneous populations who did not have special needs. None of the researchers established links between the level of musical abilities, family background, and other contextual variables.

8. Galicia, Contreras Gomez, and Peña Flores (2006) explain that each session of the *PIMITL Program* had a topic that was developed through various musical activities. They emphasized repeating rhythmical patterns, remembering sound sequences, as well as discriminating and making graphic representations of timbres, rhythms, and melodic lines. Activities were chosen because they were considered more likely to promote language development. They were also designed to promote various kinds of associations with visual stimuli and motor actions. During *RCJ Music* sessions, the normal activities of the Rhythm, Songs, and Games subject were carried out. These activities were implemented by the teacher and music instructor assigned to that class.

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