Vocal timbre preference in children

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Music, a nonverbal form of communication, is prevalent in life from infancy through old age. Nordoff and Robbins (1977) state that within every human being there is an innate responsiveness to music, and that within every personality structure, there is a musical self called the music child. Carl Orff (1980), the founder of Orff Schulwerk, also introduced the concept of elemental music for children, defined as "the universal tendency of human beings to make music spontaneously, using the natural rhythms of movement and speech" (p. 12). He further adds that "the call, the rhyme, the word, the song were decisive factors, movement, singing and playing become a unity" (p. 12). Listening to music and creative exploration of music making facilitates one's aesthetic experience, which is crucial to a sense of personal worth and self-actualization from early childhood (Maslow, 1970). The need for an aesthetic expression and experience is essential to the development of humanness (Radocy & Boyle, 1997). In such a process, individual musical preference contributes strongly in facilitating a positive response in the listener. The existing literature indicates that from the infantile stage, most children respond positively to female voices. The purpose of this study was to review and examine the existing literature on children's preference for different voices and established significance of female voice in children. The study further examines whether there is any significant relationship between the gender of the children and the preferred voices in songs across different age groups.

Music as transitional tune

According to Kohut and Levarie (1990), a human's first direct auditory experience with external sound begins in infancy and moves through different developmental stages. The authors state that among the possibly auditory experiences, music in a certain sound form, either instrumental or vocal, may be an overwhelming stimulus in the very early stages; however, it gradually develops into meaningful sound communication as infants come to recognize the sound source and meaning. McDonald (1990) states that musical sounds acquire additional meaning for the infant when certain tunes are sung with the maternal voice. The maternal voice plays a significant role in the attachment process for the infant (Fifer, 1981).

McDonald (1990) calls the special lullabies or cradle songs sung by the mother,

"transitional tunes," which derived from the concept of transitional object as discussed in Klein's Object Relations theory (Grosskurth, 1986). The transitional object comes from the environment and is chosen or created by the infant to assist the infant's experience of separation from the mother, often used as a defense against anxiety. In other words, the lullaby functions as a transitional tune that can provide great comfort and peace when sung by others in the absence of the primary caregiver, often the mother. Further, a transitional tune can connect the parent and child, serving as a bond between the infant and the mother, especially during the separation.

In the early infant stage, the infant is fully attached to the mother who is usually the primary caregiver: From a psychoanalytic point of view, this is the first psychosexual stage, called the "oral stage," in which the infant seeks gratification by sucking on the mother's breast (Smirnoff, 1971, p. 59). Gradually, as infants grow, they become attached to other objects after the age of four months, such as their thumb, a teddy bear, the corner of a blanket, a bundle of wool, or some familiar object (Eissler, Freud, & Kriss, 1975; Grosskurth, 1986). Such behavior of seeking a transitional object is called the "transitional phenomenon" (McDonald, 1990, p.85).

Lullabies are one of the most universal forms of music, and found in all cultures. They reflect universal need to calm infants with music (Gregory, 1992). Cultures around the world provide opportunities for children's growth and development through lullabies, for these songs are an integral part of each musical heritage and identity (Howle, 1989). Research suggests that this is more than just a musical moment before sleep. During this time, both parent and child are reaping tangible and intangible benefits that include the formation of listening skills, parent-child bonding, and language facility. McDonald (1992) states that the meaning of lyrics and harmonic resolutions in the melodic line of the music convey a safe reunion with the mother after a brief separation.

Maternal voice in infantile development

Research has shown that even a fetus is capable of responding to the sound of the maternal voice by the final trimester of gestation (Hepper & Shahidullah, 1993). Smootherman and Robinson (1988) stated that during the perinatal stage, the maternal voice may be one of the most frequently heard sounds in the amniotic environment and that it represents a stronger signal than any other external voice. After the baby is born, the infant reacts selectively to various attitudes in the mothering one, the primary caregiver, and there is distinct preference for the maternal voice over others (DeCaspter & Fifer, 1981). Lock (1994) also suggested that the infant's ability to distinguish the maternal voice from others may be due to prenatal exposure to the maternal voice.

Dubois, Serbin, Kenyon, and Derbyshire (1994) examined the infant's knowledge of gender by providing both visual and auditory modes of gender. The study indicated that infants showed a preference for the face that matched the voice by displaying longer visual fixation on the appropriate picture. This study also indicated that the infant's knowledge about gender develops during the second half of the first year, and that it is likely to be acquired before any knowledge about sex stereotyped activities and traits

associated with each gender. Another significant finding was that the infants could accurately associate the female voice with a female picture more often than those of the male. This further implies that regardless of the infant's gender, the infant is more attuned to female visual and auditory stimuli.

Significance of maternal voice in attachment process and musical development

Theorists explain the child-mother attachment in four phases, each characterized by different levels of cognitive ability in the child. Bowly and Ainsworth called the first stage "initial preattachment phase," which begins at birth and continues until about the eighth or twelfth week. During this stage, infants show no evidence of discriminating one person from another (Ainsworth, 1979). The second phase, "attachment making," begins as the infants reach about eighth week of age until the child is seven or eight months old. During this phase, signaling and orienting, along with proximity seeking behaviors such as visually coordinated reaching, become focused on one or a few individuals, typically the mother. The infant learns to visually adapt to the mother, spending a great deal of time looking at the mother's face during feeding (Bower, 1979). Auditorily, the infant is exposed to maternal auditory stimuli, which involves prosodic elements of speech, such as intonation, intensity, inflection, temporal patterning, and other vocal attributes (Condon & Sander, 1974).

The third phase, from six or seven months to about the third year, is characterized by a strong attachment to the primary caretaker. The infant incorporates various active strategies in order to seek contact and maintain proximity with the caregiver. The mother, for example, is used as a home base, from which the infants explore their surroundings. During these forays, the children spend much of their time establishing visual and auditory contact with the mother. The final attachment state is characterized by partnership, which starts from the third year. During this stage the child becomes more skilled at adjusting behaviors to the mother, and becomes sensitive to the mother's expectations.

Similarly, Piaget explained children's cognitive development in four stages. Although Piaget did not specifically address musical development in his writings, music researchers have documented musical growth for each stage of child development along with mental, social and motor ability (Davis, Gfeller & Thaut, 1999). The first stage is called "sensory-motor" stage, from birth to 2 years old, where the infant has not yet developed its ego to interpret the surroundings or the environment. During this stage, the child learns about the environment through his senses and motor activity, therefore, the infant receives both sensory and motor stimulation as the parent rocks the baby and sings a lullaby. Even though hearing is not fully developed at birth, young infants can discriminate one sound from another and seek out the source of the sound (McDonald & Simmons, 1989; Standley & Madsen, 1990). During their first six month, the infants will seek out the musical inflection of the caregiver's voice and over the 18 months, the

child develops listening skills including recognition of musical dynamics, differences in timbre in vocal or instrumental music.

Second stage, "pre-operational" stage, runs approximately from 2 to 7 year old. This development is characterized by rapid language development and conceptual growth (Davis, Gfeller, & Thaut, 1999). They are more involved in various musical activity with motor development and increasing coordination. Therefore, they are no longer reliant solely upon sensory or motor experiences for understanding the environment, but are able to make connections between direct experiences and symbolic representation. Music activities that promote language, social cooperation, and physical activity are well suited to the developmental needs of the children at this level.

Third stage, "concrete operation" encompasses approximately ages 7 to 11. This stage is characterized by problem solving skills (Davis, Gfeller, & Thaut, 1999). This ability to think logically helps them to learn musical notation and concept of rhythm and harmony. At this stage, children are involved with community and social experiences outside the home, such as church choirs, band, and other group involvement, are significant in developing both individual and social identity. Music during this stage certainly offers opportunities to foster social interaction and cooperation in groups.

The last stage is called "formal operation" stage, which starts around age 11 to adulthood (Davie, Gfeller, Thaut, 1999). During this stage, the children develop ability to think abstractly. The children can systematically and solve mental problems as long as the experience was related to their own environment. As they reach adolescence, they are involved in different musical experiences, either actively by participating in music groups and taking music lessons, or passively by listening to music at leisure time.

Vocal timbre preference in older children

Most research on children's reaction to adult voices involved children from 6 month to one year old. Trends of vocal timbre preference may change from the early infant stage with developmental growth in children. However, a few studies indicate that the maternal voice still plays an important role in children's emotional and psychological well-being (Fagin, 1960; McClowry, 1988; Schaffner, 1992). White, Wear, and Stephen (1983) compared hospitalized children who had a tape recording of their mother reading a bedtime story with those who did not receive a story. The study indicated that the no-story group took longer to fall asleep. Additional research on hospitalized children indicates that having the parent present during hospitalization decreased psychological upset (Brain & Maclay, 1968; Coutture, 1976). The researchers used recorded maternal voice to help the children's hospitalization to reduce anxiety during the unpleasant separation. Studies involving older children mainly dealt with maternal voices, but did not deal with vocal preference as did studies involving infants.

Piaget views the child as a biological organism that adapts to its environment by actively organizing and interpreting experiences (Wicks-Nelson & Israel, 1997). Along with such intellectual development, children develop musical skills at different rates, but during normal development, they follow certain sequences. These cognitive developmental

stages may relate to children's ability to interpret musical information and respond to the vocal timbre of song.

The purpose of this study was to examine the children's vocal timbre preference between male and female singers. Since much research confirms the infant's preference for the maternal voice, it was not within the scope of this study to include infant responses to vocal timbre. The two presupposed result hypotheses were first, there would be preference for the female voice across all three group. Second, there will be a change in the children's vocal timbre preference indicating a) gender identification, in which the children will identify with their gender, and b) gender differentiation, in which males will indicate a preference for female voice and females will indicate a preference for male voice.

Method

Subjects

The subjects were selected from children ages six to twelve years old to correspond Piaget's last three stages of development: "preoperational stage" ages six and seven, "concrete operational stage," ages between eight and nine, and "formal operational stage," ages between eleven and twelve. Sixty public elementary school students were assigned to three groups based on their age: Ten boys and ten girls from the first grade (age 6 to 7) were in the first group. Ten boys and ten girls from third grade (age 8 to 9) were in the second group. Lastly, ten boys and ten girls from sixth grade (age 11-12) were in the third group. The informed consent forms were delivered to the parents via the children. Parents kept one copy for their record and returned the other signed copy to the researcher through their music teacher.

Design

A survey on three most popular songs was administered prior to the study. The survey completed by 35 university students indicated that "Twinkle, Twinkle, Little Star," "Mary Had a Little Lamb," and "Are You Sleeping," were the three most common children songs. These three songs were sung on a "la" syllable and recorded by one female and one male singer respectively. Each subject listened to each song twice, once sung by the female and once by the male, and indicated their preference by pointing to one of the two pictures indicating male or female. Since the scope of the study included examining the preference for male or female vocal timbre, data were collected by recording each subject's overall voice preference across the three songs, which were analyzed using Pearson Chi-Square and a log-linear model (LLM) to examine: 1) overall preference between male and female vocal timbre, 2) vocal timbre preference among age groups, 3) vocal timbre preference by subjects' gender, and 4) the interactions among the singer's voice (male and female), subject's gender (male and female), and subject age group.

The presentation order of vocal timbre was counterbalanced for each song (Appendix 1). The method of data collection consisted of recording the subject's overall

preference for vocal timbre across the three songs, which was the decision rule for determining preference. Across the three recorded preferences of vocal timbre, the most frequent one was recorded as the overall preference. Following this, data were collected and analyzed by tallying the number of subject's vocal timbre preferences (Appendix 2).

Results

The study first examined the children's overall preference between the male and the female voices. Results indicated that the subjects' preference for the female voice in the song was significantly stronger for the male voice; $\mathbf{X}^2(_1) = 9.6$, $p = .002$. The study further examined the subjects' vocal timbre preference between female and male voice within each age groups. The result indicated a significant difference across the three groups; ($\mathbf{X}^2(_2) = 5.07$, $p = .045$). The percentage of vocal timbre preference for female voice changed with higher age group. In the first age group, 15% of children indicated the preference for male voice and 85% indicated preference for female voice. In the second age group, 25% of the children indicated preference for male voice and 75% for female voice; and in the third age group, 50% of the children indicated preference for male voice and 50% for female voice (Table 1).

Table 1
Overall preference between the male and female voices in each age group.

		Vocal Timbre		
		Male	Female	Total
Group 1	Count	3	17	20
	%	15%	85%	100%
2	Count	5	15	20
	%	25%	75%	100%
3	Count	10	10	20
	%	50%	50%	100%
Total	Count	18	42	60
	%	30%	70%	100%

Third, the study examined voice preference based on subject's gender between boys and girls, regardless of their age (Table 2). The statistical analysis revealed a significant difference between the subject's gender and their voice preference, $\mathbf{X}^2(_2) = 6.19$, $p =$

.047. The study also examined vocal timbre preference between male and female students within each age group.

Table 2
Preference of male and female voice between boys and girls.

			Vocal Timbre		
			Male	Female	Total
Sex	Boys	Count	13	17	30
		%	43.3%	56.7%	100%
	Girls	Count	5	25	30
		%	16.7%	83.3%	100%
Total		Count	18	42	60
		%	30%	70%	100%

A linear trend became clear when the gender of each student was examined in relation to their indicated preference for vocal timbre. Depending on the gender of the subject, one may predict the voice preference of the singer; according to a goodness-of-fit statistics, the likelihood ratio was 0.8385. In the first group, both boys and girls had strong preference for female; boys, however, as they aged, showed increasing preference for the male voice.

Lastly, the study examined whether there were any interactions among singer's voice (male or female), subject's gender (male or female), and subject age groups. Hierarchical Log Linear Analysis indicated no statistically significant interaction among the subject's gender, singer's voice, and age groups for vocal timbre preference. Because the preference changes with different age groups, the interaction pattern was not consistent within respective age differences.

Discussion

Overall, the results indicate a strong preference for the female voice among the female students, especially in the first group, ages 6 and 7. Gradually, there were changes in the vocal timbre preference for voices for the older age groups. In the third age group, the female students stayed with same gender voice preference and male students indicated shifted their preference toward male voice in the songs.

There can be two interpretations for such change in vocal timbre preference. Although existing research literature supports preference for female voice in infants due to the significance of the maternal voice, changes may occur in the attachment process between the child and the mother, usually the primary caregiver, as the child matures. As

mentioned earlier, in the first stage of Piaget's child developmental model, the sensory-motor stage, the child is able to discriminate musical dynamics and differences in timbre. During this stage, music plays to be a significant auditory and emotional transitional object. The transitional tunes such as lullabies and cradle songs are familiar tunes, shown by parent and child in a comforting atmosphere. A child is able to express a preference by identifying the source of the sound and stimulus. Therefore, in early childhood, the child's maternal attachment may be reflected by expressing a preference for female vocal timbre. As children grow, they develop close relationships with others; one example may be the increased interaction with the father as a secondary caregiver (Lichtenberg, 1983).

Another interpretation may be the socio-cultural learning of gender identification, which may influence the relationship between boys and the mother as boys start to identify with their father or peers with the same gender. Freudians interpret such changes in the child-mother bonding as an identification process. According to Freud (1986), identification is defined as "the assimilation of one ego to another one, as a result of which the first ego behaves like the second in certain respects, imitates it and in a sense takes it up into itself" (p. 489). He further elaborated that such a process of identification is a very important form of attachment to someone else through transition.

To better explain children's development of identification, Lichtenberg (1983) introduced the concept of "emerging of self," stating that as children develop assertiveness and claim independence from the protective mother, they gradually gain genital awareness (p.122). It is not known at what point in development the genitals become integrated in the preexisting gender categorization; however, it is shown that the increased genital awareness and sensation gives a distinct image of body-self (Lichtenberg, 1983). Moreover, as children mature, they experience more gender-defining social and cultural expectations which contribute to their identity formation (O'Neil, 1997). The present study indicates that with different stages of development, there are distinct changes among boys and girls regarding the gender of singer in the song.

Further, these results may imply that children's preference for musical selections or a music therapist of a particular gender may have an impact on the process and outcome of subsequent therapy. Research on client preferences for therapist gender indicates that most female clients preferred a female therapist and most male clients expressed no preference for therapist gender (Mau & Jepsen, 1988, Pikus & Heavey, 1996, Walker & Stake, 1978). In this research, most clients based their preference for a male or female therapist either on a belief that a therapist of the same gender would have a better understanding of their problems or on their generally feeling more comfortable talking with people of a particular gender (Pikus & Heavey, 1996).

Developing this body of knowledge is particularly important for working with the children in different developmental stages. Results of this study may serve to increase music therapist's and educator's understanding and insight into the nature of children's preferences for musical resources and interpersonal interaction with the therapist. The present study supports the significance of female voice which implies that this preference represents not only one's musical taste, but also an emotional and psychological bond with the significant person represented by the voice.

Appendix 1

Presentation Order of Vocal Timbre

Subject No.	Song 1	Song 2	Song 3
1, 11, 21 31, 41, 51	Male - Female	Male - Female	Male - Female
2, 12, 22 32, 42, 52	Male - Female	Female - Male	Male - Female
3, 13, 23 33, 43, 53	Female -Male	Male - Female	Female - Male
4, 14, 24 34, 44, 54	Female - Male	Female - Male	Male - Female
5, 15, 25 35, 45, 55	Male - Female	Male - Female	Female - Male
6, 16, 26 36, 46, 56	Male - Female	Female - Male	Male - Female
7, 17, 27 37, 47, 57	Female -Male	Female - Male	Male - Female
8, 18, 28 38, 48, 58	Female - Male	Male - Female	Female - Male
9, 19, 29 39, 49, 59	Female - Male	Male - Female	Female - Male
10, 20, 30 40, 50, 60	Female - Male	Female - Male	Female - Male

Appendix 2

Number of Indicated Vocal Timbre Preference

Groups		Singer	
		Female	Male
I	10 Boys	8	2
	10 Girls	9	1
II	10 Boys	6	4
	10 Girls	9	1
III	10 Boys	3	7
	10 Girls	7	3

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