An approach to Children's singing between Forty to Fifty Months Old

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ABSTRACT

In early childhood, the first vocal attempts follow the general contours of the target melody. Those attempts gradually improve, turning into a more accurate performance both in melodic shape and tonal stability. The aim of this study was to test some categories disigned to typify children's vocal development during childhood. These categories involve vocal emission and tonal stability. A group of forty three children were selected between forty and fifty months old in a kindergarten school of La Plata, Argentina. The task consisted of singing two chosen songs: one beginning in an ascendant pentachord and the other in a descendent one. We used a karaoke sound track in a comfortable tonality for the age (D Major). Answers were recorded and the responses were assessed by a team of judges. Melodic and tonal categories were designed to analyze the anwers. The songs were taught by a teacher. The test was supplied twice: each child was recorded singing both songs on two different days. The majority of the children sang with an emission pitch close to the speech mode without a tonal centre. The results show statistical signification and positive correlation between vocal emission and tonal categories in both songs.

BACKGROUND

Given the importance of singing for expressive development and the role it plays in the social life of the child, studying the evolution of these abilities constitutes a topic of particular interest. Moreover "singing offers the most direct route to providing a music making experience for all children" (Welch, 2008)

During child's development, singing and speech are intertwined, learning to speak begins with a proto-language, the characteristics of which are clearly melodic (Trevarthen., 2004), and the first stages of singing are strongly determined by words (Welch, 2004, 1998; Davidson,1984). Thus, a criterion to distinguish singing at early childhood is to observe "the steadiness of the metrical pattern (the beat) and the use of discrete, sustained pitch levels for vowels" (Dowling, 1994, p.185).

A typical behaviour at three years old is to introduce fragments of known songs into spontaneous vocalizations, the so called *pot-pourri* songs (Moog cited by Hargreaves 1996).

Several studies have contributed to establish and describe different stages in children's singing development. These stages are based on observable characteristics at different ages related the development and the maturity of the vocal apparatus. For instance, Davidson (1994, op-cit.) observed that: "the typical 3-year-old relies on the words of the song and (she) can produce distinct pitches, but these have no interval stability or tonal coherence. By the age of 4 years, children still relies on the text of the song, and whilst the reproduction of its melodic contour is improving in accuracy, it still does not possess overall coherence... By the age of 5 years or so, individual contours and intervals are reproduced accurately ..."(P.162)

According to Welch (1998,op-cit.) there is sequence in the development of singing which is observable in children at early childhood and also in other individuals with little vocal experience. During the first stage the melodic profile follows just the macro-contour of the melody. In a second stage the melodic intervals are accurate, but the tonality usually fluctuates. And finally during the last stage intervals and tonality are quite accurate in the frame of simple songs from their own culture. According to Davidson this later skill involves: "(…)accurate singing of pitches with respect to the underlying tonality, the ability not only to reproduce the surface aspects of rhythm, but also to be able to relate these to the underlying rhythmic pulse, and the mastery of song forms, which include repetition, variation, and development"(Davidson, op-cit. p.162).

Several studies related to vocal development in early childhood identify and characterize singing behavior in the following ways:

- Welch, (1998) called the first vocal attempts of children as "chant-like". He characterizes them as centered in words more than in pitches, and so produced in a restricted vocal range.
- Mang, (2000) names the first vocal attempts of children as "*intermediate vocalization*s" between speaking and singing.
- Greenberg (1979)[1] shows that around three or four years old, children use a limited range of pitch from D4 to G4 , due to the lack of control of the physical mechanism neccesary to produce higher sounds.
- Rutkowski (1994) shows that children, who "sing" in the context of the spoken voice, usually do so from A3 to C4. In the following stage they oscillate between the speaking-singing voice and the range is extended to F4. After this phase they advance to the so called "incipient singer" stage with a vocal range usually extended from D4 to A4. Finally they reach the "singer stage" when they begin to use a higher register.
- In a study of (2001) Mónaco observed that during spontaneous singing, a sample of 48 children between three to four- year- olds shared a vocal range of three pitches from D4 to F4. In the sample the 75% of the children used a *tesitura* from C4 to A4.
- Finally, most of the experts agree that in the stages previous to the acquisition of an accurate singing, tonality is maintained only at the level of a musical phrase and not during the whole song. (Welch, 1998; Moog, cited by Hargreaves 1996; Davidson 1994).

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[1] Cited by Kim (2000)

With the aim of systematizing the analysis of children's vocal productions, Monaco (2008) proposed a series of categories related to two aspects: (1) the type of vocal emission; and (2) the relative tonal stability. The suggested categories were:

Cathegories related to the type of vocal emission:

- Contour spoken in a monotonic way (MC): the children recite the text of the song in complex pitch (spoken pitch) without the contour of the melody.
- Contour spoken with a tendency to move the pitches up and down (SC): the children recite the text with complex spoken pitch attempting the contour by an up and down movement.
- Contour spoken with at least four tuning pitches (PC): the children oscillate between speech and singing, sustaining the tonicity of few pitches.
- Contour with majority of tuning pitches (T)

In the last two categories (PC and T) the melodic contour matching could be recognised.

Categories related to tonal stability:

- Tonal centre absent TCA
- Tonal centre in at least two melodic segments of four (TC2), independently that these centers were or not the same
- Tonal centre during the whole phrases (TCPH) independent of whether these centres were the same or not.
- Tonal stability during the whole song (the same tonality) with only a few sounds out of tune (TCS)

In the frame of this work, melodic contour is defined as the shape of a melody considering only its up-down patterns and not the accuracy in the component intervals. (Malbrán, 2007)

The present work aims to study children's vocal productions at the stage between 40 and 50 months old in the light of the former categories. We stated the following research questions:
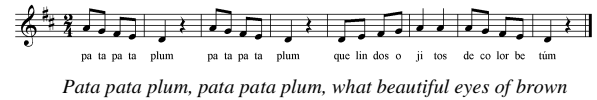- 1. Could the vocal productions in the sample be categorized as *singing* or as *proto-singing*?
- 2. Are the proposed categories suitable for characterizing children's vocal productions?
- 3. What is the proportion of each of the four categories of vocal emission in the sample?

METHODOLOGY

Subjects: The study was carried out with a sample of 54 children, aged 40 to 50 months old. The children were attending an urban kindergarten in La Plata City, Argentina

Stimuli: The stimuli were two songs *Pata pata plum* (song 1) and *La ranita* Cri (song 2) (see figures 1 and 2). Both songs have four segments with two different melodic designs: (A) ascending pentachord and (D) descending pentachord. The songs structures were D-D-A-D for song 1, and A-A-A-D for song 2. The selected tonality for both songs was D Major, and their range extended from D4 to A4.

Song 1

pa ta pa ta plum   pa ta pa ta plum   que lin dos o ji tos de co lor be tún

Pata pata plum, pata pata plum, what beautiful eyes of brown

Song 2

la ra ni ta cri   la ra ni ta cro   sa len de pa se o   a mi rar el sol

Little frog Cri, little frog Cro, go for a walk to look at the sun

The recording was made on the sound track of the musical accompaniment of each song.

Procedure: The music teacher of the class was asked to teach the songs using the recorded track of the musical accompaniment, thus children sung in a karaoke manner. This condition was required to prevent any change in the selected tonality. The test was taken when the teacher informed the researcher that according to her criterion children had learned the songs.

The children were invited to sing both songs individually in the presence of the tester, the teacher and a small group of companions. The performances were recorded digitally using a minidisk with an external microphone. The test was repeated twice, in order to take two samples of both songs from each child.

RESULTS

The final total sample number of subjects was N=43: the subjects who completed two performances of each song.

A panel of three experts were instructed to classify the performances of each child according to the categories established by Monaco (2008, op.cit). Therefore vocal emissions were classified in (1) MC; (2) SC; (3) PC; and (4)T; and tonal stability was classified as : (1) TCA; (2)TC2; (3) TCPH; and (4) TCS.

Agreement iner-raters were of 75%.

Figure 1 shows the distribution of the categories of vocal emission found in song 1 in its two interpretations. Figure 2 shows the distribution of the categories of vocal emission found in song 2, for its two performances.
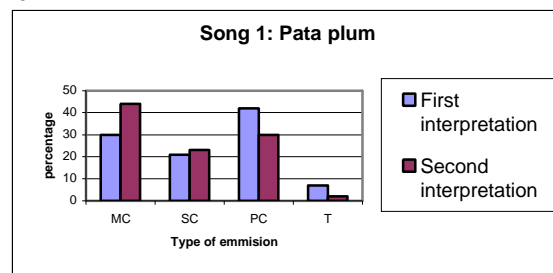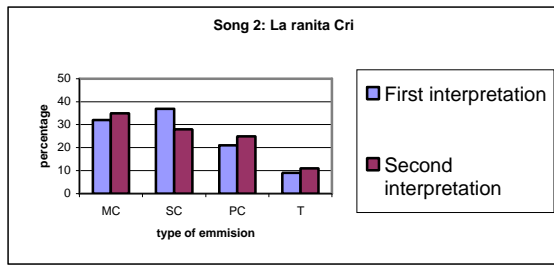
Figure 1

Figure 2

Song 2: La ranita Cri

■ First interpretation
■ Second interpretation

type of emmision

Summarizing the results for both songs in their two performances, it could be seen that 50% of the children sung with MC (spoken in a monotonic way) and SC (spoken with tendency to move pitches up and down) emissions.

In addition, song 2 showed better vocal emission than song 1.

For tonal categories it was found that the 70 % of the children sung without tonal centre (TCA).

The relation between vocal emission and tonal stability was analysed through a standard bi-variable correlation test (see table 1a-b). A positive significant correlation was observed.

Table 1-a Correlation between type of emission and tonal stability. Song 1

		Song 1 type of emission in two perf.	Song 1 tonal stability in two perf.
Song 1 Type of emission in two performances	Pearson Correlation	1,000	,776(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 1 Tonal stability in two performances	Pearson Correlation	,776(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

Table 1-b Correlation between type of emission and tonal stability. Song 2

		Song 2 - type of emission in two perf.	Song 2 - tonal stability in two perf.
Song 2 Type of emission in two performances	Pearson Correlation	1,000	,792(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 2 Tonal stability in two performances	Pearson Correlation	,792(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

As regards contour matching, more than 50% of the children could match the melodic contour of both songs. In song 1 a better contour matching was observed in the first performance than in the second. For song 2, both performances were similar.

Also observed in a few children N=5 was the production of the so called *pot-pourri* song category, meaning that they changed the melodic contour of the target song to another one belonging to a well known song of their cultural background. It is interesting that the 5 individuals were not the same in each song's performance, meaning this a random behaviour

The relationship between contour matching and vocal emission was studied through a bi-variable correlation test. A significant correlation between the two variables was found in both songs.(See table 2a-b).

Table 2-a Correlation between contour matching and vocal emission-Song1

		Song 1 - Type of emission of two per.	Song 1 - Contour matching in two per.
Song 1 Type of emission in two performances	Pearson Correlation	1,000	,849(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 1 Contour matching in two performances	Pearson Correlation	,849(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

Table 2-b Correlation between contour matching and vocal emission-Song2

		Song 2 - Type of emission in two perf.	Song 2 contour matching in two perf.
Song 2 Type of emission of two performances	Pearson Correlation	1,000	,777(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 2 contour matching of two performances	Pearson Correlation	,777(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

The correlation between contour matching and tonal stability was also studied and a positive correlation was also found in both songs.(See table 3a-b)

Table 3-a Correlation between contour matching and tonal stability-Song1

		Song 1 - Tonal stability in two perf.	Song 1 Contour matching in two perf.
Song 1 Tonal stability in two performances	Pearson Correlation	1,000	,485(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 1 Contour matching in two performances	Pearson Correlation	,485(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

Table 3-b Correlation between contour matching and tonal stability-Song2

		Song 2 Tonal stability in two perf.	Song 2 contour matching in two perf.
Song 2 Tonal stability in two performances	Pearson Correlation	1,000	,414(**)
	Sig. (2-tailed)	,	,000
	N	86	86
Song 2 Contour matching in two performances	Pearson Correlation	,414(**)	1,000
	Sig. (2-tailed)	,000	,
	N	86	86

** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

The results show that the predominant vocal emissions in the sample were monotonic (HC) and spoken with a tendency to a movement up and down of the contour (SC) and without a tonal centre.

It is considered that these responses belong to a form of "proto-singing". At the same time it was noticed that there was a definite preference for song 2 since the vocal emissions were better than in song1. This could be due to a preference for the text of the song as was observed in children attitudes towards the song. This song is a story about a frog which the children really liked, whereas song 1 is a "nonsense" song.

The songs are different: one starting on the dominant with a descendent pattern (song 1), the other one (song 2) starting on the tonic with an ascendant pattern. A question arises: which feature of the song promotes a better vocal emission at this age? The musical pattern, the initial tonal frame, the text or all of these together? It would be of interest for further research to asses these questions further

The categories designed were found to be adequate to describe the melodic responses in the sample, since they were able to include all the analysed responses.

The observed proportion of the spoken vocal productions (MC and SC) was 65%; PC category corresponds to 26% of the sample and T categoy corresponds to 7%. This would indicate that the children of the sample were in the initial stages of vocal development.

The absence of tonal centre in the majority of the performances confirms what has been said by previous studies, in the sense that, at this point of their development, children have difficulty in achieving and maintaining tonality.

Singing is an important component in communication and individual expression and its development depends on skills acquired through practice. Education should recognize this need and include singing from the very beginning of a child's formal education. Besides teachers working with early childhood should be trained to choose the suitable musical stimuli in order to promote singing development.

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