GROWING UP IN A BI-CULTURAL CONTEXT: ORGANISING LANUAGE AND MUSIC WHILE SINGING

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ABSTRACT

Song singing means organising simultaneously linguistic and musical elements into a coherent unit by reproduction (imitation) or (spontaneous or requested) invention. Children developing in a bi-cultural context familiarise with a larger variety of cultural conventions than mono-cultural children. For the latter, microgenetic analyses of strategies in making new songs at different developmental stages have been described, but none for bi-cultural children. Our case-study concerns a six-years-old boy with a Turkish family background, attending a German kindergarten. The song he learnt was also used in studies with mono-cultural children. Compared to them, the bi-cultural boy had considerable difficulties acquiring the lyrics and melody. He adopted the beginning of the melody (primacy-effect) and the end of the lyrics (recency-effect), whilst ignoring the middle part. He then tried to fill it in melodic and linguistic elements. He continued with a regular meter despite of producing inappropriate accents in the wording. Albeit the discrepancies between the song model perceived and the ones produced, he was highly motivated and not yet hampered or discouraged by internalised conventions. This case study illustrates a strategy at the pre-conventional stage, and contributes to the variability of the phenomena during a crucial time for developing a (bi-) cultural identity.

1. INTRODUCTION

European societies become more and more multicultural. For a developing person, the social and cultural world is variable, be that in a more mono- or more bi-cultural context. Yet, an increasing number of children grows up with two or more cultures due to migration or other constellations. At home, one or two languages are in use, and at kindergarten or at school, another language and culture dominates. These children are faced with solving problems related to different languages, music traditions, and other conventions. Collectively shared cultural forms such as language and music build up individual feelings of social belonging and of cultural identity. The process of building up a mono- or bi-cultural identity starts early in live with participating in social activities. Song singing is one of them, and it is powerful because singing is an elementary and primitive musical activity. Participation is possible with little requirements, depending first of all on individual demands. Song singing is a human cultural conduct that is densely structured, even in primitive forms. Singing can be defined as the prolongation of vowels. By that, the pitches become more prominent and are easy to modulate. Also, the timing of musical and/or linguistic elements can be organised: regular or irregular pulses, with regular or varied accents (meter), phrases and repetitive units. For a child, singing and music making means a kind of play. It is a long lasting process until the rules or cultural conventions are understood at the level of knowing how to act, and later at the level of abstract and conscious reflection about the actions and thoughts related to cultural conventions. Children all over the world like to play with vocal and instrumental sounds. For a child growing up in a bi-cultural context, music making conventions are more variable across contexts than for a mono-cultural child. This study aims at describing a bi-cultural child's process of learning a new song. The actual genesis of new structures in the vocal expression is reconstructed step by step. The microgenetic analysis of the structural transformation reveals the child's understanding of the actual task. Hence, the intention is not to study possible deficits related to the bi-cultural context, but rather investigating a bi-cultural child's strategies in creating something new. Furthermore, this case study will be compared to similar ones, and therefore adds to the variability of the phenomena, i.e. strategies in making new songs from the viewpoint of structural transformations. Instead of treating human conduct and the environment as static and reduced quantities, the accumulation of case studies allows preserving the complexity at the level of the individual conduct in time, and based on this, allows studying the patterns and dynamics of change in order to gain abstract knowledge [1].

2. METHOD

Here, we describe the general method used in previous case studies. The standard song in the present study was '*Fidel didel*'. It is one of a set of songs, each one related to a picture in a children's book. They were all newly composed in order to control equal novelty for all children. The model song '*Fidel didel*' used in this study is depicted as a solid line in the figures below, yet complete only in figures 4 and 7. The melody deliberately ends in the dorian mode. The general procedure is to present each new song to the child in

connection to a picture, and to adapt the interaction to the child's need while learning.

The microgenetic analysis of a child's song acquisition process encompasses first the analysis of the social interaction. The interaction is either recorded on tape or on video. Apart from the verbal interaction, the sequence of all events concerning the standard song are summarised and quantified with respect to a) presentations of the song model by the researcher, b) the reproductions by the child. Related to the position within this interaction sequence, each of the child's solo is marked with respect to the overall occurrence of the song and the previous and present solo. For instance, the figure's heading '*Ereignis (event) 21, solo 3*' means: This solo is the 21st event of this song in the interaction, and the child's third solo. Hence, the researcher previously presented the song model 18 times, and there exist two previous soli by the child. Maybe another child present in the interaction contributed to the total events of the song.

After the interaction analysis, each solo is stored in the computer and then analysed with acoustic tools. This method for the structural analysis is introduced elsewhere [2]. It is the first method that analyses the organisation of several simultaneous parameters as a configuration of a sung song on an acoustic basis. Two computer programs are used: the Pitch Analyser offers two different algorithms for extracting pitch [3], and the Notation Viewer gives a graphic representation of data based on the acoustic measures. They are freely available at: http://mmatools.sourceforge.net/. A detailed instruction of the method is provided. There exist other programs for analyzing pitch (e.g. [4]), yet not specialized on this kind of signal.

The Pitch Analyser is shown in figure 1. The rich data given by this acoustic analysis is then reduced to a limited set of categories and symbols in the context of a new notation system. The main symbols are summarised in Table 1. Table 2 gives an example of how the data on phrases, pitch qualities, ending and beginning pitch, time, and syllables is structured for the visualising program (Notation Viewer) in order to get the figures given below. For each sung solo, this method yields a graphic figure showing the child's organisation of the following parameters: syllables, their pitches and timing. The sequence of produced soli is the basis for analysing a person's strategy or recurrent pattern while transforming the vocal structures into new ones.

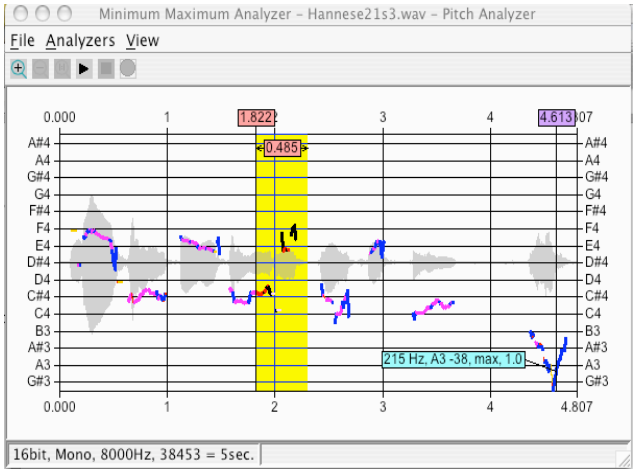

Figure 1: The Pitch Analyzer. Acoustic analyses on pitch (Hz and cents) and time are given. For instructions see: http://mmatools.sourceforge.net/

Code	Symbol	Description
1	•	Stable pitch
2	↗ ↘	Stable pitch, ending with upward or downward glissando
3	↗ ↘	Stable pitch, starting with upward or downward glissando
4	/ \	Unstable pitch, but clear upward or downward glissando
5	|	Unstable pitch with glissandi in any direction and/or unidentifiable, fuzzy pitches within context of singing (prolonged vowel)
6	W	Pitch of a spoken syllable
7	×	Estimation on the basis of disturbed signales
8	H	Syllable sung by the researcher
+10	○	Joint singing

Table 1: This is a set of categories, symbols, and codes to reduce and represent redundant data on pitch and additional features for depicting sung songs.

```
Hannese21s3.DAT
Hannes, Ereignis 21, Solo 3, 4.7 secs
1
9
 3 14.4 16.4  0.09 Lie-
 1 13.3 13.3  0.63 den
 3 16.8 19.1  1.12 fie-
 2 16.2 15.8  1.58 den
 3 15.2 15.8  1.98 das
 2 12.8 12.0  2.40 där
 4 15.6 16.3  2.85 Kas-
 3 12.0 12.7  3.27 ten
 4 10.7 08.5  4.35 mann
   4.76
end
```

Table 2: This data structure yields Figure 2 by applying the Notation Viewer. The symbols shown in Table 1 are encoded. Instructions are given on: http://mmatools.sourceforge.net/

3. CASE STUDY

3.1. Hannes

The six-years-old boy, here named Hannes, has a Turkish family background and attends a Swiss German Kindergarten. Hannes was selected during our visits at the kindergarten, because he represents a typical bi-cultural child. Both his parents were born in Turkey and had immigrated 15 years ago. Hannes grows up with a twin brother. At home, they speak Turkish and practise Turkish music. In an interview, the mother expressed openly her emotional difficulties in living with two different cultures. She wishes her children to adopt both cultures.

3.2. Procedure

Because singing is a social event, Hannes's twin-brother was included in the learning sessions. Both were shown the picture and presented the song model. Before each presentation, the starting pitch of the melody was taken from a recorder to ensure a constant pitch level. The interaction had a playful character. Compared to natural learning situations, the children were explicitly encouraged to learn this standard song. Other data was collected such as interview with mother and teacher, video recordings of his musical behaviour in the kindergarten.

3.3. Microgenetic analyses of the song acquisition process

Information on the social interaction is summarised here in the headings of each figure as explained above. We do not represent all of the analysed soli. The Figures 2 to 7 show a selection of typical and consecutive soli sung by Hannes. For each figure, the child's progress and problems are briefly addressed in the subtitle. The more quantitative analyses are given in the next section.

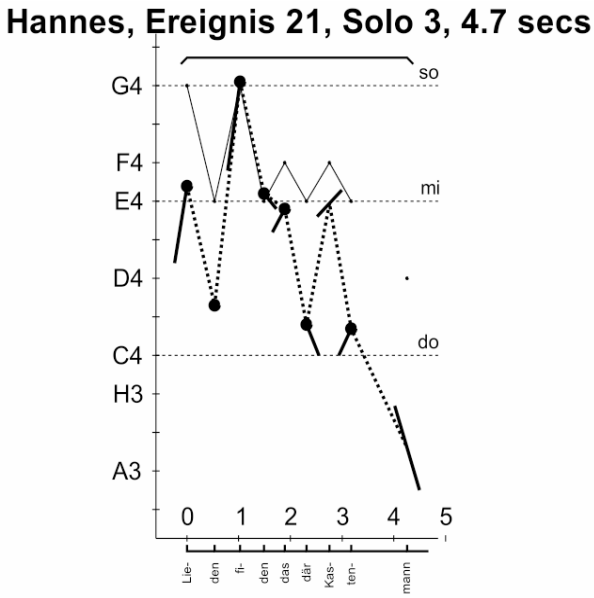

Figure 2: Third solo. He adapts to the beginning melody but changes the words, omits the second phrase, and ends with the descending pattern and the correct last word of the lyrics '(Leier-)*kas-ten-mann*'.

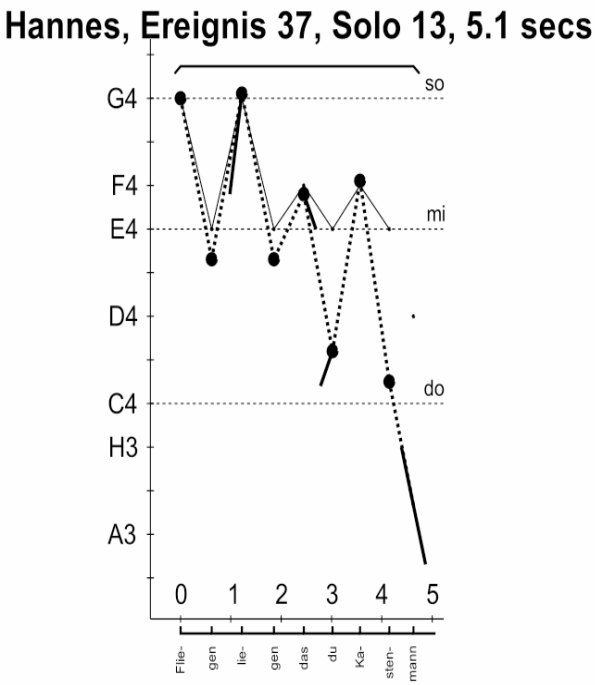

Figure 3: More prominently than in the previous solo, Hannes shows how he adopts the beginning part of the melody (first 5 notes), omits the middle part of the song, and ends again with the correct last three syllables of the

lyrics '(Leier-)*kas-ten-mann*'. The problems he has to solve are: Fitting the correct lyrics to the beginning melody, adopting lyrics and melody of the middle part, and adopting the melody to his ending with the correct lyrics.

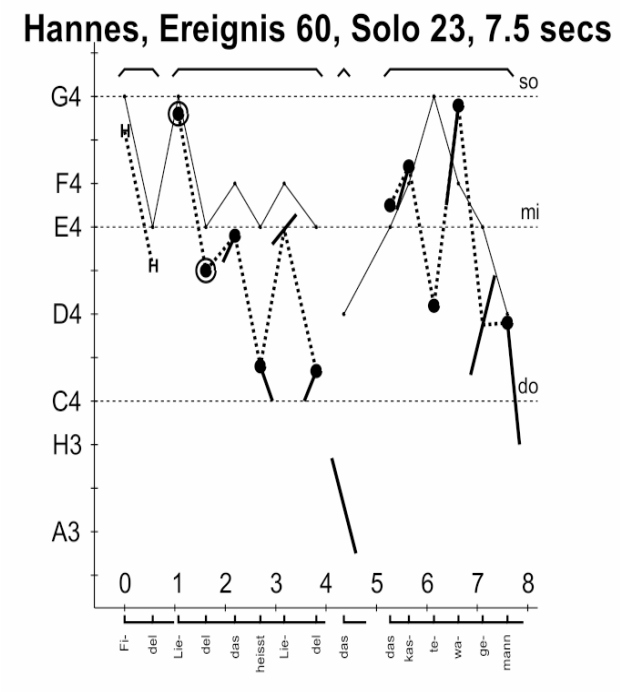

Figure 4: This song begins with the researcher's presentation of the first two notes and syllables. Hannes joins in singing (two notes), and creates a middle part of the song. The lyrics he invents resemble German phonems, but do not have a conventional meaning.

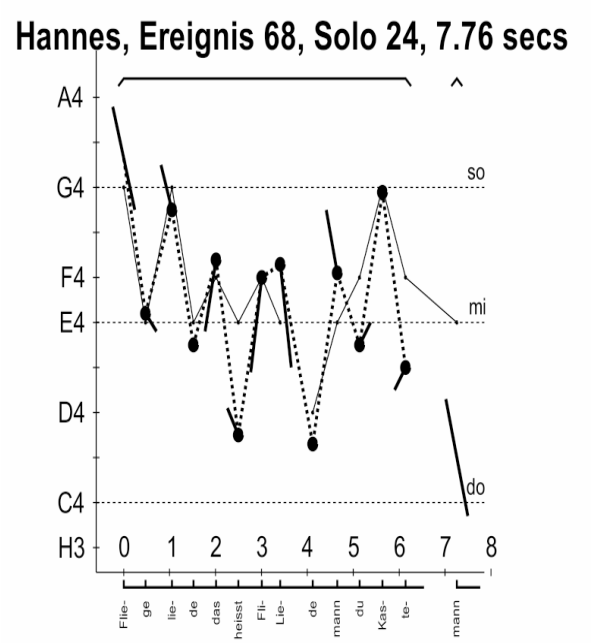

Figure 5: This solo shows again his adoption of the beginning melody. He continues the melody with an ascending-descending pattern, ending on a low note, and again with the correct word '(Leier-)*kas-ten-mann'*.

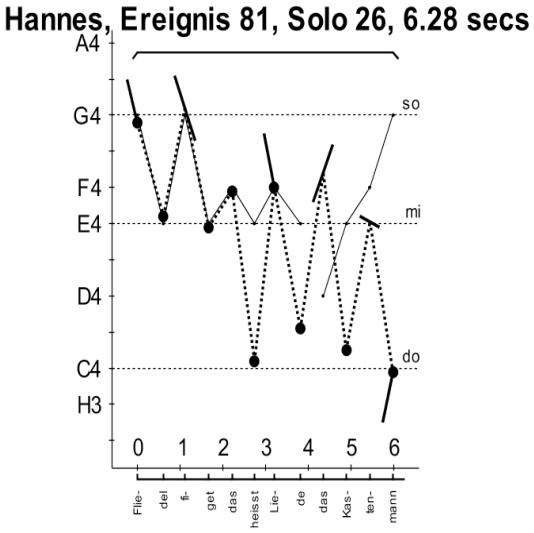

Figure 6: This solo version shows again his strategy of accepting the melody in the beginning, and of accepting the final word of the lyrics. As in Solo 23 and 24, Hannes intends to reproduce the model he perceived by adding more elements to the middle part. He sings again an ascending-descending pattern, ending on a low note. The words again resemble German phonems, but lack conventional meaning. In all his soli, Hannes produces a rather steady and regular beat with a beginning accent on the first note. Correspondingly, the lyric of the model song is trochaic. However, in this version, Hannes organizes his singing in a way that conflicts the melody's meter with the trochaic pattern of the lyrics: he makes regular accents on the melody at the expense of the conventional accents on the last word. In other words, he accentuates the wrong syllables because of the meter he took over with the melody. He gave priority to the temporal pattern of the melody and not of the prosody. We know from mono-lingual children that they possibly insert an additional syllable in order to avoid such a conflict and/or to prioritize the word meanings. Hannes also introduces new syllables (see Table 5), but primarily to make a longer song, or to end with low pitch as in solo 27. Yet, we can not say that he generally would give more priority to the melody and its meter.

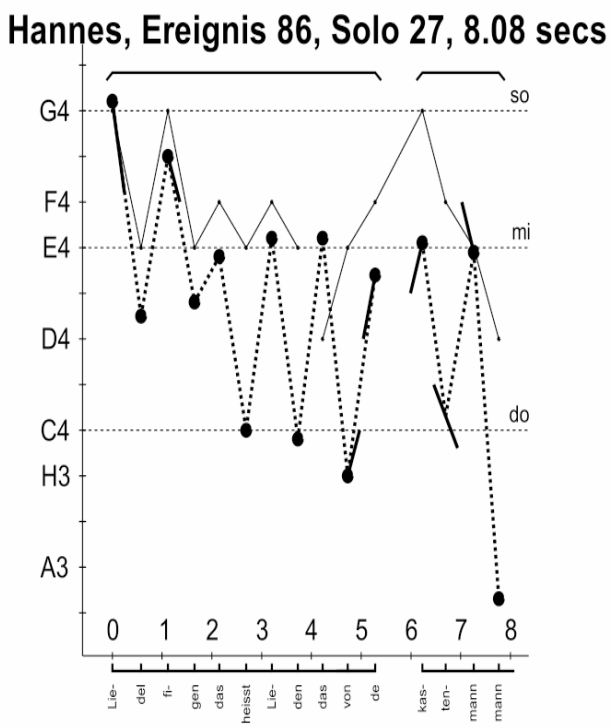

Figure 7: Of the twelve soli we analyzed, this one is the child's longest version. It shows again the main strategies Hannes pursued while learning a new song. He adopts the beginning melodic part, but not the corresponding lyrics. He accepts some parts of the lyrics, first of all again the last word '(Leier-)*kas-ten-mann'*. Step by step he uses more and more German-like words. But they show that he does not understand the meaning of the lyrics. In this version, he ends the song as usual on a low pitch. But, here is an exception, since he repeats the last syllable '*-mann'*. in order to achieve this ending pattern. It seems that he wanted to finish the melody on a low note, and this was only possible by adding a syllable. Notable is also the break before the ending: He might have solved the previous conflicting temporal melodic and linguistic pattern by singing the first syllabel of '(Leier-)*kas--ten-mann'* within his repetitive descending-ascending pattern on a high and accented note.

3.4. Further analyses of the child's strategies

Apart from reconstructing the child's intentions as shown in the organization of this singing, we also systematically analyzed quantitative aspects. However, it does not make sense to single out pitches or other features from the organization for the only sake of quantifying, but rather to look at the sequence of recurrent melodic, linguistic, and temporal patterns. An example another of such a systematic analysis is to be found in [4, 5]. Here, we summarize the main findings.
We analyzed acoustically twelve of the 33 soli sung by Hannes. The researcher presented the model song 34 times. The song fragments and joint singing counts 32, and the twin brother sung 10 times.

In all but the first of the twelve soli, Hannes used a beginning melody pattern - the first five notes - that resembles the models song. Except in solo 3, but in all other cases, he produced a middle part, and here, he created as a melodic pattern consisting of repetitive descending-ascending pitches, with an almost constant accent on the upper pitch. Slight deviations from this pattern are seen in solo 24 and solo 27. All his soli ended on a low pitch. He applied various strategies to complete his songs with a descending pitch.
In all his songs, he enlarged the pitch range in comparison to the song model. This contradicts theories on singing development, which assume that children reduce the melody contour in relation to their chronological age. Hannes produced 45.5% stable intervals of his totally sung 123 intervals, as shown in Table 3. The organization of the lyrics is analyzed in Table 4a 4b, and 5.

Solo	stable intervals	N
3	5 mi 3rds (mi =minor)	5
7	1 mi 3rd, 1 ma 3rds (ma = major)	2
10	1 mi 3rd, 3 ma 3rds, 1 5th, 1 tritone	6
13	5 ma 3rds	5
15	1 ma 3rd	1
23	5 mi 3rds, 1 ma 3rd	6
24	1 mi 3rd, 4 ma 3rds	5
25	2 mi 3rds, 1 ma 3rd	3
26	2 mi 3rds, 1 ma 3rd, 3 4th	6
27	1 mi 3rd, 1 ma 3rd	2
28	1 mi 2nd, 3 mi 3rds, 3 ma 3rds, 1 4th, 1 mi 6th	9
33	1 ma 2nd, 1 mi 3rd, 1 ma 3rd, 1 4th	4
	Total intervals =123, stable intervals: 45.5 %	56

Table 3: Quantitative analysis of the stable intervals sung by Hannes. In the twelve soli he sung a total of 123 intervals, of which 56 or 45.5% were stable according to the western tonal system.

	Fi	del	di	del	heisst	das	Lie	del
1	Lie	den	fi	den	das			
2	Lie	den	flie	gen	das			
3	Flie	gen	lie	den	das			
4	Flie	gen	lie	gen	das			
5	Lie	den	flie	gen	das			
6	Lie	del	das	heisst	Lie	del	das	
7	Flie	de	fi	ge	das	heisst	Flie	Lie
8	Flie	ge	lie	de				
9	Flie	del	fi	get	das	heisst	Lie	de
10	Lie	del	fi	gen	das	heisst	Lie	den
11	Flie	ge	lie	de	das	heisst	Lie	de
12	Fli	de	fie	ge	das	heisst		

Table 4a: The organization of the lyrics compared to the model (top line). Part a: first phrase.

von	dem	Lei	er	kas	ten	Mann.
			där	Kas	ten	mann.
			der	Kas	ten	mann.
			der	Kas	ten	mann
			du	Kas	ten	mann.
			du	Kas	ten	Ä
	das	Kas	ten	wa	ge	mann.
de		mann	du	Kas	te	mann.
			das	Kas	ten	mann.
			das	Kas	ten	mann.
das	von	de	Kas	ten	mann	mann
von	dem			Kas	ten	mann.
				Kas	ten	mann.

Table 4b: The organization of the lyrics compared to the model (top line). Part b: second phrase.

Solo nr.	Syllables produced	Newly added syllables	Missing	Correct	Position changed
3	9	3	9	6	
7	9	4	10	5	
10	10	5	10	5	
13	9	4	10	5	
15	10	5	10	5	
23	13	6	7	8	x
24	14	8	10	5	
25	8	3	10	5	
26	12	4	7	8	x
27	15	7	6	9	x
28	13	5	7	8	x
33	9	3	9	6	x
	131	57	105	75	

Table 5: Quantitative analyses of the linguistic organisation. The percentage of correct syllables is 57%.

Tables 4a and b show how Hannes constructed step by step some kind of German lyrics of the song. The prominent word is the final one consisting of three syllables '*kas-ten-mann'*. He never used the full German composite *'Leierkastenmann'*, meaning organ grinder, although this was shown on a picture to him. We can conclude that he did not understand this word's meaning. All his newly added syllables are German phonems, but altogether, none of the lyrics he created express some kind of conventional meaning.

4. DISCUSSION

The analyses of a song learning process of a six-years-old boy growing up in a Turkish and Swiss-German environment reveals a lot of interesting and new phenomena. At first, we could say that he had considerable problems in organizing musical and linguistic elements when compared to mono-cultural children learning the same song [5]. He was very slow in adopting the song, and he only succeeded to accept fragments. Yet, the intention of this study was not to show the deficiencies of a bi-cultural child, but rather to analyze the creative strategies he used to understand and solve the presented problem. He was remarkably engaged and motivated to learn this new song. He was not at all discouraged by hearing the discrepancies between the song model and his own productions. The microanalyses of this singing allow identifying recurrent patterns and strategies he used to make up the song. As the figures and tables show, firstly, he accepted the beginning part of the melody, but not the words, he left out the middle part of the song, and he ended by accepting the words, but not the melody. These phenomena are known in psychology as primacy- and recency effects. As he went on, it becomes visible that he intended to end the song always on a descending pitch. For reaching this, it happened that he had to add a syllable or to manipulate the lyrics and the melody. In making the German lyrics, he adopted 57% of the syllables, and he created new syllables and word that were German-like. His lyrics show that he did not understand the given meaning, although supported by a picture. He did not create new meanings related to the German language. His melodic organization also deviates strongly from the model: In all songs, he enlarged the pitch range, and he sung larger intervals than given in the model. Most amazing, he produced a lot of stable intervals, up to 45%. For a better understanding of this behavior, it would be necessary to gain insights into the Turkish songs he had been growing up with.

Hannes was also faced with problems concerning the temporal organization: He kept on using a regular beat accentuated at the first note. Correspondingly, the lyrics of the model song are trochaic. But this pattern created problems when the accents of the melody violated his way of organizing the lyrics. He once gave priority to the temporal pattern of the melody. But there are other occasions (e.g. solo 24, 27) when he might have changed some elements in order to match the meter of both, melody and lyrics.

Altogether, the boy's high interest in solving the task reveals a high adaptive potential. Hannes sung not only perceptively stable pitches but also stable intervals. He was not yet discouraged or hampered by internalized conventions as we can expect with adolescents and adults. Yet, it is an open question, how his singing is organized when he sings Turkish songs and what could be detected about his level of controlling the parameters, the flexibility, and indices of consciousness about his own actions. Unfortunately, we missed to include such behavior.

5. CONCLUSION

These kinds of results were only possible to obtain by using a methodology that allows analyzing the singing at an almost culture-free level, namely, based on acoustic measures. The microgenetic method deconstructs song singing or melodic performances into a simultaneous configuration of relevant parameters (pitch, time, syllables). By that, the complexity of the description is ensured. It allows assessing behavioral organization and its change over time. Moreover, because this method emphasizes acoustic measures as basic and as almost culture-free, descriptions of performed melodies allow going beyond a particular musical or tonal system. For understanding universal developmental mechanisms and how they manifest in various cultural settings, it is important to have research tools that assure to gain some common descriptive grounds [7]. The study of children with bi-cultural backgrounds is very challenging, because the researcher needs knowledge of the two cultures. The children are highly adaptive, and thereby develop creative strategies for handling their dual half cultures, in the context of singing, with respect to language and music.

6. REFERENCES

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