Song and speech: examining the link between singing talent and speech imitation ability

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1. Introduction

In this survey we investigated whether singing performance is a good indicator for aptitude in speech imitation (pronunciation in foreign languages).

2. A. Method

41 singers (beginners and advanced levels) were tested for singing abilities (evaluated online by 7 singing teachers) and speech imitation skills in English and Hindi (evaluated online by 7 native speakers for each language).

A) singing "Happy Birthday" - known to all participants;
B) singing two parts of an unpracticed song after listening 3 times;
SA (A and B = Singing ability)
C) reading "North Wind and the Sun" and repeating English sentences (English L2);
D) repeating Hindi sentences (unknown to all participants);
SI (C and D = Speech imitation ability)

2. B. Method

For testing the musical abilities we used the AMMA test (Advanced Measures of Music Audiation, Gordon, 1989) measuring the musical abilities on a perceptive level whereby the participants had to discriminate rhythmic and tonal changes of two musical statements, or indicate that they were the same. Furthermore, we employed working memory tests (Wechsler, 1939; Benner, 2005) for testing the participants auditory short term memory. The working memory test (WM) was composed of a digit span forward and a digit span backward subtest where participants had to repeat strings of numbers. The second working memory test (WM2) aimed at testing the participants' ability to remember non-words with a German-like phonetic quality (Benner, 2005).

2. C. Method

This survey included also an online questionnaire divided into non-factual and factual questions. The factual questions revealed the participants' musical expertise, singing experience, level of musical training, musical instruments acquired, educational background, socioeconomic status and foreign language proficiency including L2 onset, number of languages (dialects) spoken. The non-factual questions, multi-item scales concepts (Dörnyei, 2010), isolated the participants' singing behaviour during childhood.

3. A. Result

Singing performance is a good predictor for talent in speech imitation (Figure 3) as it showed a significant correlation, r_s = .57, p (one-tailed) < .01.

3. B. Result

The musicality parameter as measured by the AMMA test showed a medium correlation to the speech imitation skills (SI) r_s = .32, p (one-tailed) < .05. The working memory (WM) showed the highest correlation to the speech imitation ability (SI), r_s = .64, p (one-tailed) < .01 (Figure 2) while the non-words repetition test (WM2) showed a lower correlation to the speech imitation score (SI) than the working memory (WM), r_s = .48, p (one-tailed) < .01.

3. C. Result

The results showed that the educational background had a strong impact on the speech imitation ability (SI), r_s = .43, p (one-tailed). Singing during childhood had the greatest effect on voice quality suggesting that resonance, warmth, color, intensity, clarity are positively influenced by an active singing behaviour during childhood. Testing of the impact of singing exercises, the parameter creativity correlated most strongly with "years of singing lessons" while the latter had no effect on the participants' singing performance. The number of second languages spoken as well as dialect count showed no correlations to the participants speech imitation skills.

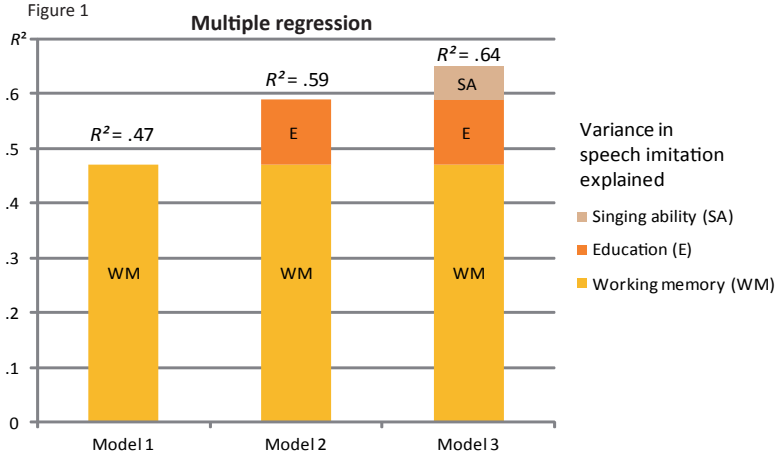
3. D. Result - multiple regression

In a stepwise multiple regression (Figure 1) 64 percent of the speech imitation score variance could be explained by working memory together with educational background and singing performance. Predictors such as musicality (AMMA), non-words working memory (WM2) and musical instruments played failed to reach significance in this model. In a second multiple regression (Figure 4) 66 percent of the speech imitation of unintelligible utterances could be explained by working memory (WM) together with singers sense for rhythm (SR) and voice quality (SQ).

4. Conclusion

Our findings point to the close relation between singing and speech articulation. This substantiates that both vocal behaviors draw on common grounds (vocal flexibility, onto- and phylogenetic development, neural orchestration, sound memory) with singing fitting better into the category of "speech" than "music" as far as the generation is concerned.

Figure 1



Model Summary[d]

	R	R Square	F Change	Sig. F Change	Durbin-Watson
Model 1	.68[a]	.47	34.45	.000	
Model 2	.77[b]	.59	10.90	.002	
Model 3	.80[c]	.64	5.88	.020	2.16

a. Predictors: (Constant), Working memory
b. Predictors: (Constant), Working memory, Education
c. Predictors: (Constant), Working memory, Education, Singing ability
d. Dependent Variable: Speech imitation

Figure 2

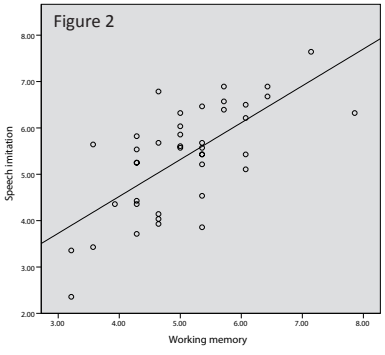


Figure 3

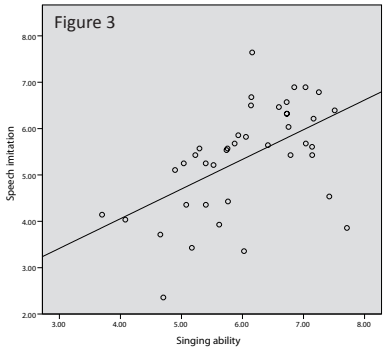
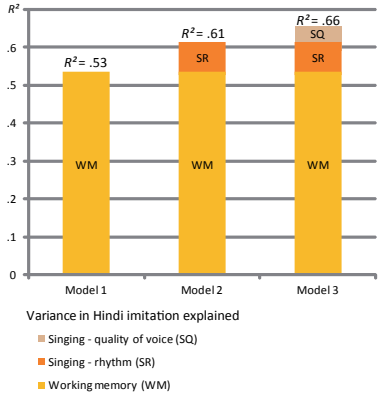


Figure 4



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