Supplementary Materials

Figure S1 shows the lyrics and the notes of the new song learning task. The song learning task was split up into two parts. The first part was to sing "whenever I miss, whenever I miss, I miss your smiling". In the second part, the whole sequence of the song was sung.

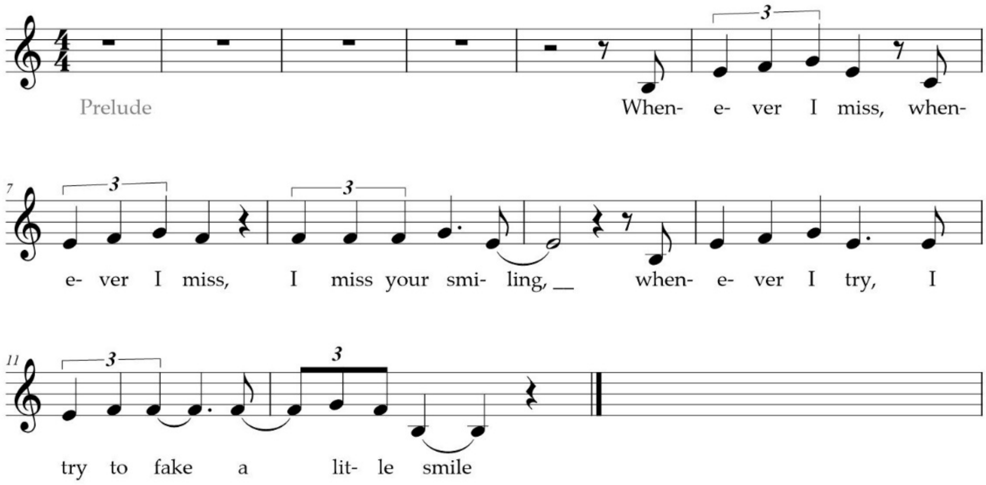

Figure S1| Lyrics and notes of the new song learning task.

Correlations

We provided the correlations of the individual melodic language perception scores in the five languages, the pronunciation tasks in the five languages and their relationship to the musical measurements, the STM capacity, the education score and the number of foreign languages.

Table S1| Simple Associations among the two Chinese language perception and production variables

Variable	Chinese PR	Melodic singing ability	Rhythmic singing ability	AMMA tonal	AMMA rhythm	STM	ES	No of FL
Chinese melodic P	.224*	.145	.104	.225*	.273*	.186	.211	.199
Chinese PR		.277**	.282**	.254*	.101	.368**	.131	.399**

Note. PR = pronunciation. P = perception.. T = tonal. R = rhythmic. STM = short-term memory. ES = educational status. No of FL = number of foreign languages. *p < .05 (uncorrected, two-tailed). ** p < .001 (uncorrected, two-tailed).

Table S2| Simple Associations among the two Japanese language perception and production variables

Variable	Japanese PR	Melodic singing ability	Rhythmic singing ability	AMMA tonal	AMMA rhythm	STM	ES	No of FL

Japan. melodic P	.287**	.162	.168	.291**	.288**	.163	.316**	.280**
Japan. PR		.390**	.363**	.380**	.271*	.459**	.211	.274*

Note. Japan. = japanese. PR = pronunciation. P = perception. T = tonal. R = rhythmic. STM = short-term memory. ES = educational status. No of FL = number of foreign languages. **p* < .05 (uncorrected, two-tailed). ** *p* < .001 (uncorrected, two-tailed).

Table S3| Simple Associations among the two Russian language perception and production variables

Variable	Russian PR	Melodic singing ability	Rhythmic singing ability	AMMA tonal	AMMA rhythm	STM	ES	No of FL
Russian melodic P	.252**	.105	.151	-.080	-.096	.236*	.155	.260*
Russian PR		.403**	.375**	.225*	.206	.470**	.220*	.555**

Note. PR = pronunciation. P = perception. T = tonal. R = rhythmic. STM = short-term memory. ES = educational status. No of FL = number of foreign languages. **p* < .05 (uncorrected, two-tailed). ** *p* < .001 (uncorrected, two-tailed).

Table S4| Simple Associations among the two Tagalog language perception and production variables

Variable	Tagalog PR	Melodic singing ability	Rhythmic singing ability	AMMA tonal	AMMA rhythm	STM	ES	No of FL
Tagalog melodic P	.079	.006	.036	.031	.051	.057	.179	.072
Tagalog PR		.530**	.541**	.440**	.430**	.275*	.190	.463**

Note. PR = pronunciation. P = perception. T = tonal. R = rhythmic. STM = short-term memory. ES = educational status. No of FL = number of foreign languages. **p* < .05 (uncorrected, two-tailed). ** *p* < .001 (uncorrected, two-tailed).

Table S5| Simple Associations among the two Thai language perception and production variables

Variable	Thai PR	Melodic singing ability	Rhythmic singing ability	AMMA tonal	AMMA rhythm	STM	ES	No of FL
Thai melodic P	.287**	.077	.083	.124	.144	.063	.083	.096
Thai PR		.400**	.406**	.219*	.190	.478**	.127	.288**

Note. PR = pronunciation. P = perception. T = tonal. R = rhythmic. STM = short-term memory. ES = educational status. No of FL = number of foreign languages. **p* < .05 (uncorrected, two-tailed). ** *p* < .001 (uncorrected, two-tailed).

As for the correlations, we also provided multiple regressions for the individual languages where the dependent variable was the pronunciation score of the respective five languages. The independent variables were included in the multiple linear regression models only if a probability of F-change < 0.05 was given. A stepwise method has been chosen and the ordering of the variables was based on purely mathematical decisions. We provided only the model with the largest number of predictors.

Table S6| Multiple regression models explaining the variance in language imitation.

Predictor	**Partial correlation (*pr*)**	***p*-Value**

Dependent variable: Russian PR		
$R = 0.67$, $F(1, 79) = 16.18$, $p < 0.001$		
No of FL	0.55	< 0.001
STM	0.41	< 0.001
Dependent variable: Chinese PR		
$R = 0.5$, $F(1, 79) = 8.17$, $p = 0.005$		
No of FL	0.36	< 0.001
STM	0.31	0.005
Dependent variable: Thai PR		
$R = 0.6$, $F(1, 78) = 7.69$, $p = 0.007$		
STM	0.40	< 0.001
Rhythmic singing ability	0.32	0.004
Thai melodic P	0.30	0.007
Dependent variable: Tagalog PR		
$R = 0.67$, $F(1, 78) = 8.95$, $p = 0.004$		
Rhythmic singing ability	0.37	< 0.001
No of FL	0.33	0.003
AMMA tonal	0.32	0.004
Dependent variable: Japanese PR		
$R = 0.61$, $F(1, 78) = 7.07$, $p = 0.009$		
STM	0.41	< 0.001
AMMA tonal	0.31	0.005
Japanese melodic P	0.29	0.009

Note. PR = pronunciation. P = perception. T = tonal. R = rhythmic.

STM = short-term memory. No of FL = number of foreign languages.

Melodic perception of languages (cluster analysis)

In order to test whether clusters of groups can be differentiated based on the melodic language ratings, a hierarchical cluster analysis was applied, in which all five scores for the melodic language ratings were considered. We used Ward's method (squared Euclidean distance), which resulted in two clusters of similar group sizes. Subsequent t-tests for independent samples revealed that all five language ratings were significantly different in both groups and showed the same pattern: one group (N=44) which perceived all five languages significantly more melodic than the other group (N=42). This illustrates that potential preferences for language typology were irrelevant in this regard. In order to avoid an accumulation of the alpha error for multiple testing we applied a Benjamini-Hochberg correction. The results are shown in Table S7. We named the two groups obtained in the cluster analysis 'high (High melodic LP)' and 'low melodic language perceivers (Low melodic LP)'.

Table S7| Melodic Ratings in Chinese, Japanese, Tagalog, Thai, and Russian.

Melodic ratings	**Low melodic LP: mean**	**Low melodic LP: SE**	**High melodic LP: mean**	**High melodic LP:SE**	***t***	**df**	***p***	***r***
Chinese*	4.52	0.34	7.11	0.28	-5.959	84	$p < .001$	$r = .54$

Japanese*	3.95	0.29	7.61	0.21	-10.432	84	$p < .001$	$r = .75$
Russian*	4.93	0.34	6.50	0.31	-3.453	84	$p < .001$	$r = .35$
Tagalog*	6.26	0.34	7.52	0.21	-3.206	84	$p < .002$	$r = .33$
Thai*	3.90	0.29	5.43	0.31	-3.580	84	$p < .001$	$r = .36$

*remain significant after Benjamini-Hochberg correction for multiple testing ($p < 0.05$)

ANOVAs and chi-square tests on musical status (professionals, amateurs, and non-musicians)

We performed a serious of chi-square tests. Results showed that there were no differences in participants musical training background between the high and low melodic perceivers, chi-square results, or in terms of participants sex, chi-square results. In order to test whether we can detect individual differences in the performance of music and language related tasks are based on the musical status, we performed a series of one-way ANOVAs. As there were unequal group sizes, we ran Welch-ANOVAs followed by Games-Howell post-hoc analyses for pairwise group comparisons. The ANOVAs were corrected for multiple testing by applying a Benjamini-Hochberg correction. Variables indicated by * remained significant after correcting for multiple comparisons. All ANOVAs were significant except for the dependent variable 'Melodic P of the languages' as shown in table S8 and S9. Results revealed that as expected the professionals performed significantly better in the musical and the PR total language tasks than did the non-musicians.

Table S8| Welch's F-test ANOVA musicians.

Variables	Welch's *F*	*p*	*ω*
PR total*	(2, 51.38) = 13.05	$p < .001$	0.48
AMMA tonal*	(2, 51.60) = 17.08	$p < .001$	0.57
AMMA rhythm*	(2, 52.59) = 20.93	$p < .001$	0.58
Melodic singing ability *	(2, 52.60) = 40.71	$p < .001$	0.72
Rhythmic singing ability *	(2, 54.10) = 40.30	$p < .001$	0.75
Melodic P	(2, 52.60) = 2.31	$p = .110$	--

*remain significant after Benjamini-Hochberg correction for multiple testing ($p < 0.05$)

As we had unequal group sizes Games-Howell post-hoc analysis was applied. The post-hoc tests illustrate the differences between the professionals, amateurs and the non-musicians. The group comparisons between amateurs and non-musicians are not provided here for two reasons. First, it is not important to provide information about differences in the musical performances between amateurs and non-musicians for this research. Second, the group differences in the PR total score between amateurs and non-musicians has already been provided in the two-way ANOVA in section 3.4 in the main analysis section. Table S9 below illustrates the findings of the Games-Howell post-hoc comparisons.

Table S9: Games-Howell post-hoc analyses.

Variables	Group comparisons and Means		Mean Difference	*t*	df	*p*	*r*
PR total*	professionals	amateurs					
	(*M*= 3.55; *SD*= 0.82))	(*M*= 2.84; *SD*= 0.71))	0.71	5.23	83	$p < .005$	0.50

		non-musicians					
		(*M*= 2.54; *SD*= 0.80)	1.01	-5,23	83	$p < .001$	0.50
AMMA	professionals	amateurs					
tonal*	(*M*= 29.73; *SD*= 5.49)	(*M*= 25.19; *SD*= 2.84)	4.54	6.54	83	$p < .001$	0.58
		non-musicians					
		(*M*= 22.94; *SD*= 3.48)	6.79	-6.54	83	$p < .001$	0.58
AMMA	professionals	amateurs					
rhythm*	(*M*= 31.87; *SD*= 3.46)	(*M*= 28.57; *SD*= 2.93)	3.30	6.74	83	$p < .002$	0.59
		non-musicians					
		(*M*= 26.06; *SD*= 3.75)	5.81	-6.74	83	$p < .001$	0.59
Melodic	professionals	amateurs					
singing	(*M*= 7.45; *SD*= 1.22)	(*M*= 5.60; *SD*= 0.76)	1.85	9.80	83	$p < .001$	0.73
ability *		non-musicians					
		(*M*= 4.95; *SD*= 0.97)	2.49	-9.80	83	$p < .001$	0.73
Rhythmic	professionals	amateurs					
singing	(*M*= 7.96; *SD*= 0.93)	(*M*= 6.41; *SD*= 0.51)	1.55	10.192	83	$p < .001$	0.75
ability *		non-musicians					
		(*M*= 5.97; *SD*= 0.78)	1.99	-10.192	83	$p < .001$	0.75

*remain significant after Benjamini-Hochberg correction for multiple testing ($p < 0.05$)