Supplementary Table 5. A table summary of included studies according to the PICOS criteria for normal hearing group

Study	Participant				Music Training		Outcomes	Findings
	Intervention Group		Control Group					
	Age (year)	Number of sub.	Age (year)	Number of sub.	Stimuli	Duration		
Reza et al. (2019)	8 to 12	25	8 to 12	25	Continuous music training (at least 30 minutes of regular session)	30 min: 2x/week 2 years	i) Temporal fine structure sensitivity	Temporal fine structure- low frequency i) 250Hz: Mann-Whitney (99.5) ii) 500Hz: Mann-Whitney (83.5) iii) 750Hz: Mann-Whitney (97)
Francois et al. (2012)	8	12	8	12	Music group: Combination of Kodaly and Orff Music training. Control group: Painting training	1 years and 2 years	i) Speech harmonics ii) Tonal abilities	Transitional probabilities between the two group. i) T1 ($p= 0.003$) ii) T2 ($p=0.007$)
Kraus et al. (2014)	8.5	26	8.6	26	Harmony project music training class. i) pitch matching and rhythm skills ii) musical styles and notation iii) basic vocal performance & recorder playing	3-10 months; 2x/week, 4 hours per week	i) Pitch discrimination ii) Rhythm discrimination iii) Pitch accuracy iv) Rhythm accuracy	i) Neural encoding of harmonics (rho = 0.385, p = 0.0052) ii) response consistency (rho=0.391, p=0.049)
Yun Nan et al. (2016)	4.7	30	5.1	16	i) Pitch training with piano	6 months 45 minutes/3x	i) Word discrimination ii) Pitch discrimination	Discrimination performance i) Word (pre-post): 1.4 (1.1) ii) Pitch (pre-post): 1.1 (1.4) iii) word (music-control): p = 0.044 iv) pitch (music-control): p = 0.372
Verney John (2013)	5.0	192	4.9	190	i) Rhythm metronome task ii) Music beat iii) Singing	N/A	i) Metronome drumming task (accuracy) ii) Beat alignment to music	i) Singing in time: 74.3 (60.0), 73.5 (66) ii) Singing the rhyme without music: 91.7 (79.0) ii) Singing the rhyme with music: 98.6 (87.0).
Tong et al. (2018)	20.97	30	22.50	30	i) Pitch height discrimination task ii) Pitch interval discrimination task	6 months 45 minutes/3x	i) Pitch height discrimination task ii) pitch interval discrimination task ii) Rhythm accuracy	i) Duration of music training X pitch discrimination: $p <0.01$, $F(2, 55) = 7.33$. ii) Duration of music training X tone language: $p <0.05$, $F (1, 56)= 6.35$
Moreno et al. (2009)	7.83	37	8.498	32	i) Formal music training program ii) Pitch and melodies discrimination	2h/ 2session /week Phase 1 (3 weeks) Phase 2 (24 weeks) Phase	i) Pitch discrimination `task ii) Electrophysiological data iii) Short-term working memory.	Phase 1 i) Neuropsychological assessments (music X control): 1.06 (2.54) ii) Pitch discrimination (Pitch X session): $F_{1,30} = 29.76$, $p <0.001$. iii) Pitch discrimination (pre-post): $p< 0.006$. iv) Speech task (speech X session) : $F_{1,30} = 26.56$, $p <0.001$.
Lukacas et al. (2019)	7.85	30	8.1	16	i) Vocal and rhythmic games ii) Musical hearing of melody, rhythm, harmony, and timbre iii) Skills of singing, listening, improvisation, music literacy	45/session 4x/week 37 weeks	i) Cognitive abilities ii) Reading and phonological awareness	MMA i) Pitch discrimination: 50 (23.37), p = 0.345 ii) Tonal memory: 37.86 (24.86), p = 0.916 iii) Chord analysis: 34.29 (11.58), p = 0.812 iv) Rhythm memory: 30.71 (20.93), p = 0.279

Study					Intervention	Duration	Measures	Results
							iii) Music abilities (Arnold Bentley's MMA; pitch, tonal memory, melody, rhythm)	
Fotidzis et al. (2018)	19.5	18	20.5	19	Enrollment into music training program.	Two years of formal music training	Advanced Measures of Music Audition (AMMA; rhythm and tonal)	i) Musical rhythm amplitude: $r = 0.74$, $p < 0.001$. ii) Reading comprehension: $r = 0.60$, $p < 0.009$. iii) Reading comprehension: $r = 0.55$, $p = 0.016$.
Frischen et al. (2019)	5.7	33 (pitch) 33 (rhythm)	7.02	33	i) Pitch training ii) Rhythm training	20 min/session 3x/week 20 weeks	i) Rhythm: meter execution, perception, imitation and production ii) Pitch discrimination, intonation, sound production, joint signing.	i) Inhibition (statue test) of pitch group: T0: 11.11(2.14), T1: 11.81 (2.20) ii) Inhibition (statue test) of rhythm group T0: 10.46 (2.47), T1: 12.17 (1.93). iii) Working memory (matrix span) of pitch group: T0: 46.81 (9.12), T1: 51.11(9.16). iv) Working memory (matrix span) of rhythm group: T0: 50.27 (7.50), T1: 48.92(10.96).
Habibi et al. (2015)	6.68	15	7.16	15	Venezuelan system of musical training (El Sistema)	6 to 7hours/weekly 2 years	i) Tonal (pitch) perception task ii) Rhythm discrimination task.	Behavioral response accuracy i) Same pitch X different pitch: 62 (15.9) ii) Music X control: $p = 0.001$ ERPs in tonal perception i) Music X control: ($p = 0.03$) ii) Music X laterality: F (2, 68) = 5.64, p = 0.006,
Ireland et al. (2018)	8.94	130	11.32	83	i) Structured music exercise (using book) ii) Unstructured (free playing)	30min/session 2.5 years	i) Rhythm synchronization task ii) Tapping and continuation task iii) Melody discrimination task iv) Syllable sequences discrimination task	i) e-RST percent correct: $F_{6,10} = 83.18$ (6.10) ii) e-RST Synchrony: $F_{11,33} = 70.82$ (11.83) iii) TCT paced variability: 0.13(0.001) iv) e-MDT percent correct (melodies): 72.27 (18.36)
Lappe et al. (2011)	32.52	24	33.42	20	i) Piano training	30 minute/session 8x within two weeks	i) Piano correct score ii) MEG data.	i) group x pretraining/post training: (F (1,17) =5.098; p= 0.039) ii) pre-training/post-training and hemisphere gave a significant main effect of training, (F (1,18) =6.54; p = 0.022
Manuela et al. (2009)	4.11	13	4.8	18	i) Orff instrument	1x/week 4.8 months	i) Instrument priming vs no priming score.	i) priming condition in piano timbre: t(11) = 2.17, $P = 0.05$ (by 121 ms), ii) condition with trumpet timbre: $t(15) = 2.74$, $P < 0.05$ (by 195 ms). iii) priming and timbre, $F(1,25) = 9.68$, $P < 0.01$.
Cohrdes et al. (2018)	5.9	65	5.8	64 67	i) Tonal discrimination ii) Rhythm repetition bodily synchronization with music	45/session 2x/week 6 months	i) Home musical environment ii) Sound discrimination iii) Tonal discrimination iv) Rhythm repetition v) Harmonic progression vi) Emotion recognition vi) Synchronization	i) accuracy for sound discrimination, t(200) = 9.69, p < .001, d = 0.86. ii) tonal discrimination, t(200) = 32.77, p < .001, d = 0.77. iii) harmonic progression, t(200) = 1.38, p = .17, d = 0.15. iv) 50% chance accuracy with $t(199) = 17.68$, $p < .001$, $d = 1.64$. v) rhythm repetition: t(197) = -2.68, p = .008, d = 0.25