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Association Between Children's First Language Skills and Musical Sensitivity: An Exploratory Study

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Abstract

Present study aimed to investigate the potential association/relationship between children's listening comprehension, speaking ability, reading comprehension and writing ability of Bengali as first language (L1) and their musical sensitivity (music perception skill and musical performance) at primary level. The study was exploratory in nature and based on quantitative data. A correlational design was employed to examine the relationships in a sample of 35 children of VII standard. Researcher administered several age-appropriate standardized tests to measure language skills/proficiency and musical sensitivity among children. The findings demonstrated significant positive relationships between children's first language skills, music perception and musical performance at primary level. Researcher found that gender did not play any role in deciding children's first language skills (listening comprehension, speaking ability, reading comprehension and writing ability), music perception and musical performance at primary level. In present work investigator had made several recommendations for further studies.

Key Words: Listening Comprehension, Speaking Ability; Reading Comprehension; Writing Ability; Music Perception Skill; Musical Performance.

1. Introduction

Researchers had long been intrigued by the intricate multifaceted relationship between language and music in different age groups. Recent researches suggested common cognitive bases for both music and language among humans. While the relationships between those domains had been investigated in a variety of settings/contexts, the precise connection that existed between children's first language abilities/skills and musical sensitivity was relatively unknown. Thus, present study envisioned to evaluate potential relationship between those two fundamental human capacities i.e., first language skills and musical sensitivity among primary grade children. The term language skills referred to an individual's capacity and expertise to understand, use and comprehend any language in both written and oral form. It implied individuals innate capability to interact verbally (talk) and write effectively in languages they were accustomed to. In other words, it referred to one's ability to think (both creatively and rationally), articulate ideas, retrieve information, give instructions, reasoning, explain a point of view, comprehend and so on. In present study, children's first language skills were limited to listening comprehension, speaking ability, reading comprehension and writing ability of Bengali (L1) at primary level.

In the study, investigator outlined musical sensitivity as human's innate tendency to be effortlessly influenced by any musical elements (pitch, tone, melody, note, etc.) and genres (classical, hip-hop, instrumental, etc.). In present study musical sensitivity in children were limited to music perception skill and musical performance at primary level. In the research, music perception skill among children was characterized as a neuro-physiological capacity to perceive (identify and differentiate) different elements of music. It enabled children become conscious (sensitive) of various musical sounds, notes and other musical aspects, which they could interpret in their own unique way. In current study by musical performance researcher indicated a unique blend of musical skills and expertise among children which enabled them to sing songs. By investigating the association between specific first language skills and musical sensitivity, present study aimed to enrich the increasing corpus of research on multifaceted dynamics of child development.

2. Review of Existing Studies on Language Skills and Musical Sensitivity

❖ Studies Related to Linguistic Abilities and Musical Sensitivity

In past decades, researchers had investigated how language skills such as- development of language, awareness of phonological structures and language processing were related to music perception among children and adults. Some well-known scholars such as Anvari, Trainor, Woodside and Levy (2002); Goswami (2011); Slevc (2012); Patel (2014); Chung, Jarmulowicz and Bidelman (2017) had done researches in the area. In a study based on China conducted by Zhang, Meng, Wu and Zhou (2017) investigated the relationship between music perception (pitch discrimination and metric perception) and language skills of Chinese (L1) and English (L2). Researchers found that there were no correlations between music

perception and reading ability in children's native language (Chinese) but there was a positive association between music perception and writing ability in English. Swaminathan's (2017) study explored relationships between various language skills (reading, writing, vocabulary, fluency, grammar, accent, phoneme and speech perception) and musical abilities (musical competence, music aptitude and perception) among university students (Under Graduate level). The findings indicated a positive connection between speech and rhythm perceptions. Interestingly, reading ability was negatively related to musical competence. While speech perception and grammar showed some connection to musical competence. While reviewing related studies, investigator did not find any studies examining the relationship between first language skills and musical performance in children.

❖ **Literature on Gender and Musical Sensitivity**

After reviewing existing literature on gender and musical sensitivity, researcher found that very few scholars Punia and Jyoti (2016); Swaminathan (2017) found there were no gender differences among children and adults with respect to their musical sensitivity. Three were many scholars who found significant gender differences among boys and girls in terms of their musical sensitivity namely- Zhukov (2007); Sergeant and Welch (2009); Mecke and Sundberg (2010); Sergeant and Himonides (2014); Sergeant and Himonides (2016); Sree and Venukapalli (2020) and others.

❖ **Studies on Gender and Listening Skill**

While reviewing literature, researcher noted that majority of the scholars- Voyer (2011); Pence and James (2015); Abu-Snoubar (2017); Namaziandost, Sabzevari and Hashemifardnia (2018); Hidayanti and Umamah (2019) examined significant gender differences among boys/men and girls/women with respect to their listening skill/comprehension of both L1 and L2. In contrary to those studies, Bourdeaud'Hui, Aesaert and van Braak (2021) found no statistically significant gender difference in listening tests among primary grade students.

❖ **Literature on Gender and Speaking Ability/Verbal Comprehension**

There were many studies which revealed significant gender differences in speaking ability among boys and girls such as-works done by Vidal, Puig, Boget and Salamero (2006); Goldbeck et al., (2010); Sergeant and Himonides (2014); Abu-Snoubar (2017). In contrary to that Maitland et al., (2004); Van der Sluis, Posthuma, Dolan, de Geus, Colom and Boomsma (2006); Hyde (2016) found no significant differences in verbal comprehension scores achieved by boys and girls.

❖ **Studies on Gender and Reading Skill**

While reviewing related literatures investigator noted that Siegel and Smythe (2005); Chan, Ho, Tsang, Lee and Chung (2007) reported- gender did not play significant role in deciding reading skill/comprehension among boys and girls. On the other hand, scholars like Wargacki (2008); Hawke, Olson, Willcut, Wadsworth and DeFries (2009); Lynn and Mikk (2009); Wheldall and Limbrick (2010); Fayyaz and Kamal (2014); Punia and Jyoti (2016) found gender differences in reading comprehension among boys and girls.

❖ **Literature on Gender and Writing Ability**

For several decades, scholars had been keen to investigate the differences in proficiency in writing ability among boys and girls. Jones and Myhill (2007); Berninger, Neilsen, Abbott, Wijsman and Raskind (2008); Beard and Burrell (2010); Bourke and Adams (2012) found girls/women dominance in writing ability tests. Williams and Larkin (2013); Punia and Jyoti (2016) identified no significant gender differences in writing skill tests among boys and girls.

3. Methodology and Procedure of the Study

❖ **Research Questions**

After reviewing existing literature, researcher raised the following questions-

1. To what extent children's first language skills (listening comprehension, speaking ability, reading comprehension and writing ability) are associated with their music perception skill at primary level?
2. Do children's first langue skills (listening comprehension, speaking ability, reading comprehension and writing ability) are associated with their musical performance at primary level?
3. To what degree boys and girls are similar or different with respect to their first language skills at primary level?
4. To what extent boys and girls are similar or different with respect to their music perception skill and musical performance at primary level?

❖ **Objectives of the Study**

To answer the questions mentioned above, investigator framed four (4) objectives mentioned below.

i. To study the relationship between children's first language and music perception skills at primary level.
ii. To explore the relationship between children's first language skills and musical performance at primary level.
iii. To study whether boys and girls differ or same with respect to their first language skills at primary level.

iv. To examine whether girls and boys differ or same in their music perception skill and musical performance at primary level.

❖ **Variables of the Study**

In the study children's four basic language skills such as- listening comprehension, speaking ability, reading comprehension and writing ability of Bengali as first language (L1) were considered as independent variables. On the other hand, children's music perception skill and musical performance were considered as dependent variables for present research work.

❖ **Research Method and Procedure**

Present research work was exploratory in nature. Investigator employed quantitative research approach for the study. Correlational research design was adopted to examine relationships between children's first langue skills and musical sensitivity at primary level. Researcher used independent t-tests to measure gender differences among children with respect to their first language skills and musical sensitivity at primary level. Present study was conducted in a Bengali medium government-aided school in Howrah district of West Bengal, India. Initially, investigator requested all students of grade VII to respond/fill a music experience questionnaire. Analysis of music experience questionnaire revealed that all students were exposed to music and they were beginner or advanced-beginner in terms of musical exposure. Investigator employed purposive sampling strategy to choose 35 students (18 boys and 17 girls) from grade VII. Before administering standardized tests, researcher briefed detailed instructions to each participant.

❖ **Tools used in the Study**

Researcher used several tools to collect relevant data for present research work. Investigator developed and standardized listening comprehension, speaking ability, reading comprehension and writing ability tests of Bengali (L1). Shortened-Profile of Music Perception Skills (PROMS -S) developed and standardized by Zentner and Strauss (2017) was adopted to assess children's perceptual ability of music. To measure musical performance of VII grade students, researcher crafted and validated musical performance test.

4. Findings

Prior to data analysis, researcher used Shapiro-Wilk test of normality to ensure that collected data followed normal distribution (NPC). Investigator calculated mean and Standard Deviation (SD) of collected data and performed Pearson's product moment correlation coefficients and t-tests.

Table 1
Descriptive Statistics of Variables Used in The Study

Measures	N	Maximum	Minimum	Mean	SD
Linguistic Abilities					
Listening Comprehension	35	41	33	37.171	3.795
Speaking Ability	35	43	33	37.229	2.263
Reading Comprehension	35	41	33	36.457	2.536
Writing Ability	35	37	28	32.229	3.246
Musical Sensitivity					
Music Perception Skill	35	62	53	58.486	2.147
Musical Performance	35	38	28	33.343	3.325

4.1. Correlation Analysis between Children's First Language and Music Perception Skills

To measure the relationship between children's language skills of Bengali (L1) and music perception at primary level, researcher framed the following hypothesis-

Hypothesis 1: There exists a statistically significant correlation between children's first language and music perception skills at primary level.

For statistical testing, research hypothesis was translated into null form-

Null Hypothesis 7: There exists no statistically significant correlation between children's first language and music perception skills at primary level.

Researcher administered Pearson's product moment correlation coefficients (r) to examine the relationships between children's first language and music perception skills. Result of Pearson's product moment correlation coefficient (r) was given in table 2 and figure 1 below.

Table 2
Correlation between Children's First Language and Music Perception Skills

Measures		Listening	Speaking	Reading	Writing	MPS
Listening Comprehension	Pearson Correlation	1	.321	.316	.663**	.663**
	Sig. (2-tailed)		.060	.065	.000	.000
	N	35	35	35	35	35
Speaking Ability	Pearson Correlation	.321	1	.140	.140	.370*
	Sig. (2-tailed)	.060		.422	.422	.029
	N	35	35	35	35	35
Reading Comprehension	Pearson Correlation	.316	.140	1	.385*	.477**
	Sig. (2-tailed)	.065	.422		.023	.004
	N	35	35	35	35	35
Writing Ability	Pearson Correlation	.663**	.140	.385*	1	.587**
	Sig. (2-tailed)	.000	.422	.023		.000
	N	35	35	35	35	35.
Music Perception Skill (MPS)	Pearson Correlation	.663**	.370*	.477**	.587**	1
	Sig. (2-tailed)	.000	.029	.004	.000	
	N	35	35	35	35	35

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

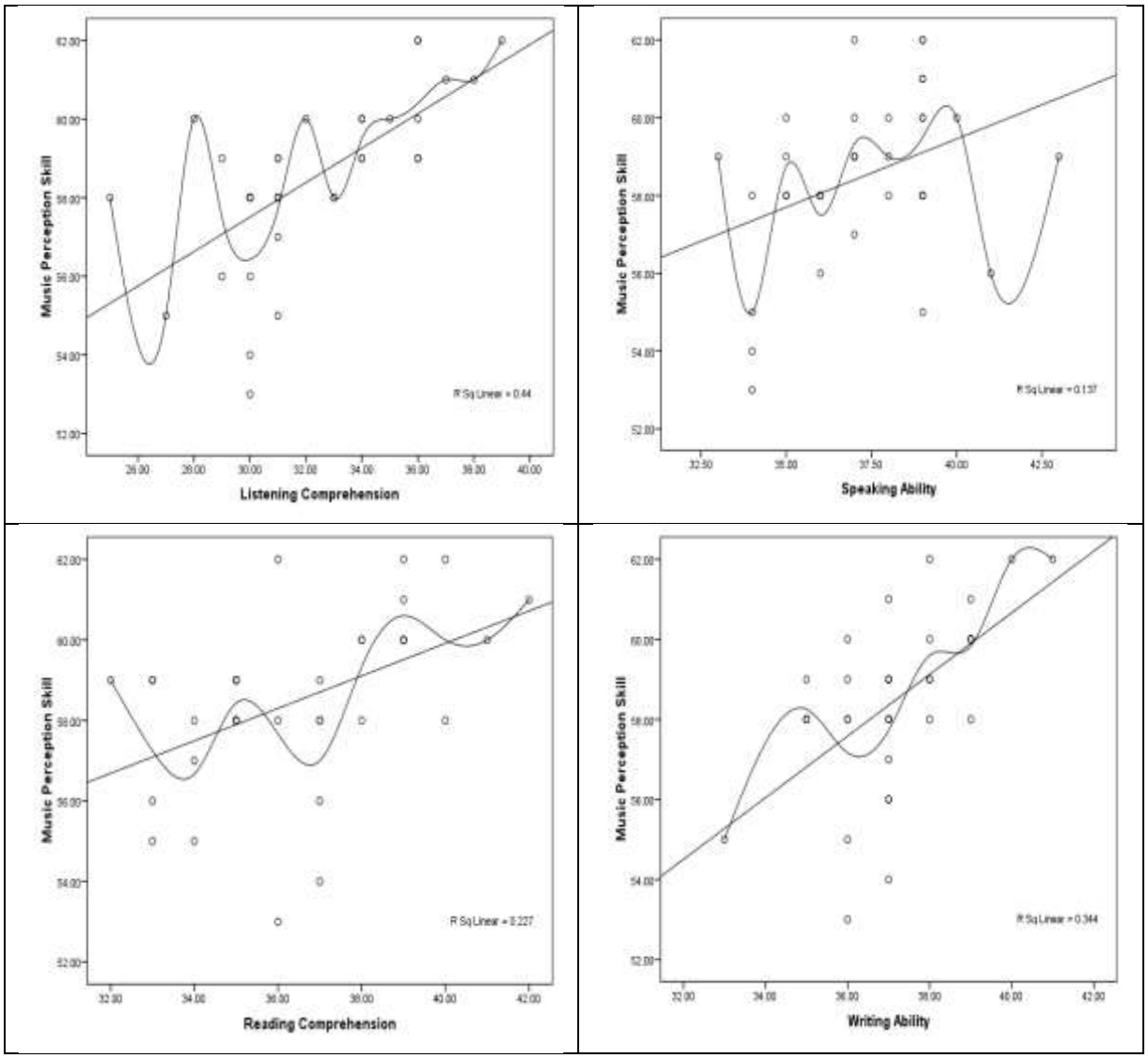
From table 2, it was observed that Pearson's correlation coefficient (r) of children's listening comprehension and music perception skill was 0.663 and the p-value 0.000, which was <0.05. It could be concluded that there existed statistically significant correlation between children's listening comprehension and music perception skill at primary level. Hence, null hypothesis was rejected.

From table 2, it could be observed that Pearson's correlation coefficient (r) of speaking ability and music perception skill was 0.370 and p-value was 0.029, which was <0.05. It could be concluded that there existed positive correlation between children's speaking ability and music perception skill at primary level. Thus, null hypothesis was rejected.

In table 2, Pearson's correlation coefficient (r) of children's reading comprehension and music perception skill was 0.477 and p-value 0.004 which was <0.05. It could be concluded that there existed positive correlation between children's reading comprehension and music perception skill at primary level. Thus, null hypothesis was rejected.

From table 2 it was observed that Pearson's correlation coefficient (r) of writing ability and music perception skill was 0.587 and p-value 0.000, which was significant at 0.05 level. It could be inferred that, there existed statistically significant positive correlation between children's writing ability and music perception skill at primary level. Hence, null hypothesis was rejected.

Figure 1
Scatterplot Depicting Correlation between Children's First Language and Music Perception Skills at Primary Level



4.2. Correlation Analysis between Children's First Language Skills and Musical Performance

Investigator was further interested to explore association between children's first language skills of Bengali and musical performance at primary level. For statistical analysis researcher framed the following hypothesis-

Hypothesis 2: There exists a significant positive correlation between children's first language skills and their musical performance at primary level.

For statistical testing, research hypothesis was translated into null form-

Null Hypothesis 2: There exists no significant positive correlation between children's first language skills and their musical performance at primary level.

Investigator employed Pearson's product moment correlation coefficients (r) between children's first langue skills and musical performance. Result of correlation analysis was mentioned in table 3 and figure 2 below.

Table 2
Correlation between Children's First Language Skills and Musical Performance

Measures		Listening	Speaking	Reading	Writing	MPER
Listening Comprehension	Pearson Correlation	1	.321	.316	.663**	.497**
	Sig. (2-tailed)		.060	.065	.000	.002
	N	35	35	35	35	35
Speaking Ability	Pearson Correlation	.321	1	.140	.140	.462**
	Sig. (2-tailed)	.060		.422	.422	.005
	N	35	35	35	35	35
Reading Comprehension	Pearson Correlation	.316	.140	1	.385*	.340*
	Sig. (2-tailed)	.065	.422		.023	.046
	N	35	35	35	35	35
Writing Ability	Pearson Correlation	.663**	.140	.385*	1	.313
	Sig. (2-tailed)	.000	.422	.023		.067
	N	35	35	35	35	35
Musical Performance (MPER)	Pearson Correlation	.497**	.462**	.340*	.313	1
	Sig. (2-tailed)	.002	.005	.046	.067	
	N	35	35	35	35	35

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

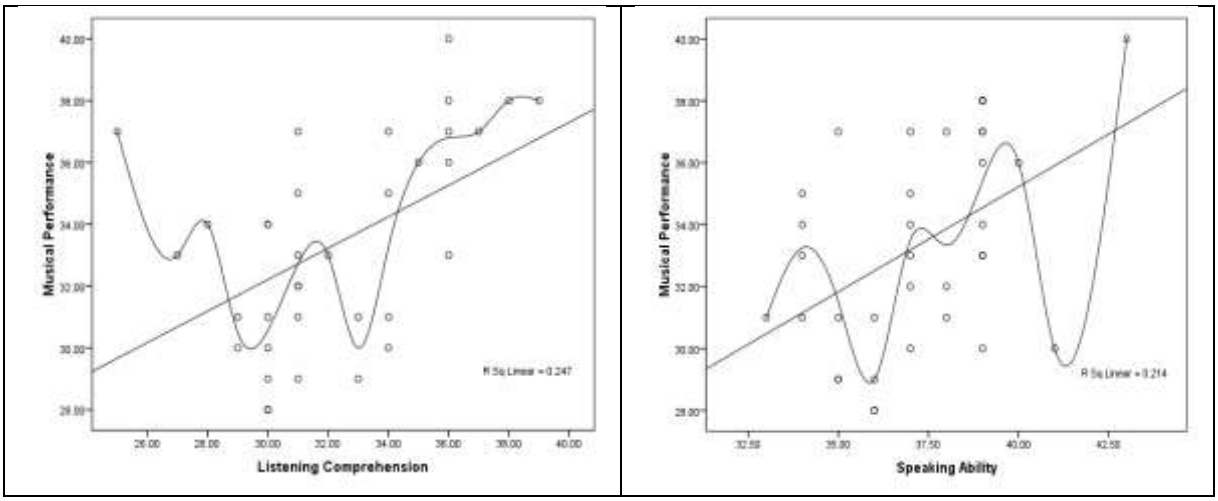
From table 3, it was observed that Pearson's correlation coefficient (r) of children's listening comprehension and musical performance was 0.497 and p-value was 0.002, which was <0.05. It could be concluded that there existed significant positive correlation between children's listening comprehension and musical performance at primary level. Thus, null hypothesis was rejected.

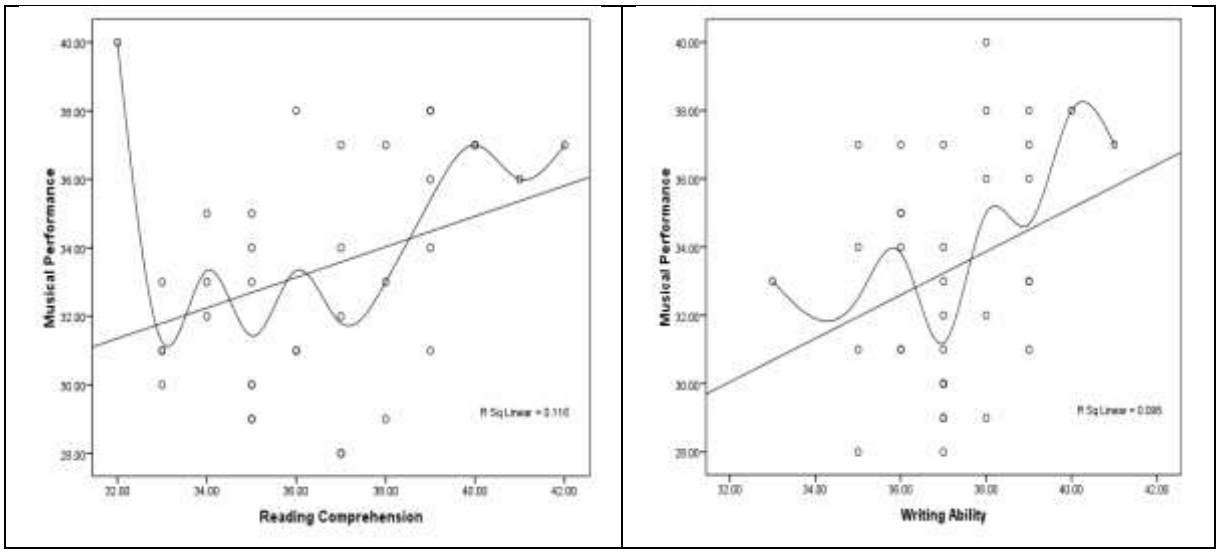
In table 3, t was also observed that Pearson's correlation coefficient (r) of children's speaking ability and musical performance was 0.462 and the p-value 0.005, which was <0.01. It could be concluded that there existed high positive correlation between children's speaking ability and musical performance at primary level. Hence, null hypothesis was rejected.

From table 3, Pearson's correlation coefficient (r) of children's reading comprehension and musical performance was 0.340 and p-value 0.046 which was < 0.05. It could be inferred that there existed positive correlation between children's reading comprehension and musical performance at primary level. Thus, null hypothesis was rejected.

In table 3, Pearson's correlation coefficient (r) of children's writing ability and musical performance was 0.313 and p-value was 0.067. It could be concluded that there existed positive but not statistically very significant relationship between children's writing ability and musical performance at primary level. Thus, null hypothesis was rejected.

Figure 2
Scatterplot Depicting Correlation between Children's First Language and Musical Performance at Primary Level





4.3. Analysis of Gender Differences in Children's First Language Skills

In present research work, investigator assumed that there existed gender differences in the mean scores achieved by boys and girls in their first language skills tests. To test the assumption, researcher framed one hypothesis mentioned below.

Hypothesis 3: Boys and girls differ significantly in the mean scores achieved in first language skills tests at primary level.

For statistical testing, research hypothesis was converted into null form, i.e.-

Null Hypothesis 3: Boys and girls do not differ significantly in the mean scores achieved in first language skills tests at primary level.

Four (4) independent sample t-tests were performed to measure gender differences in the mean scores achieved by boys and girls in first language skills tests. Result of the tests were depicted in table 4 below.

Table 4
Language Skills and Gender Differences in Children at Primary Level

Measure	Gender	Mean	SD	SE Diff.	df	t Value	p Value
Listening Comprehension	Boys	32.556	4.018	1.108	33	0.6083	0.5472
	Girls	31.882	2.233				
Speaking Ability	Boys	37.611	2.355	0.765	33	1.0291	0.3109
	Girls	36.824	2.157				
Reading Comprehension	Boys	36.5	2.771	0.871	33	0.1011	0.9201
	Girls	36.412	2.347				
Writing Ability	Boys	37.278	1.994	0.560	33	0.3910	0.6983
	Girls	37.059	1.197				

From table 4, it could be observed that mean and SD of boys in listening comprehension test were 32.556 and 4.018. Mean and SD of girls in listening comprehension tests were 31.882 and 2.233. Standard error of difference was1.108 and degree of freedom was 33. The calculated t-value was 0.6083 and p-value was 0.5472 which was greater than $\alpha = 0.05$. It could be concluded that there were 54.72% chances that null hypothesis could be true. Hence, null hypothesis could not be rejected. It could be inferred that boys and girls did not differ significantly in their listening comprehension test scores.

The mean and SD of boys in speaking ability test were 37.611 and 2.355. Mean and SD of girls in speaking ability tests were 36.824 and 2.157. Standard error of difference was 0.765 and degree of freedom was 33. The t-value was 1.0291 and p-value 0.3109 which was greater than 0.05. It could be concluded that there were 31.09% chances that null hypothesis was true. Therefore, null hypothesis could not be rejected. It could be inferred that boys and girls did not differ significantly in their speaking ability test scores.

From table 4, it was observed that mean and SD of boys in reading comprehension test were 36.5 and 2.771. Mean and SD of girls in reading comprehension tests were 36.412 and 2.347. Standard error of difference was 0.871 and degree of freedom was 33. The t-value was 0.1011 and p-value was 0.9201 which was greater than 0.05. It could be concluded that there were 92.01% chances that null hypothesis could be true. Therefore, null hypothesis could not be rejected. It could be inferred that boys and girls did not differ significantly in reading comprehension test.

The mean and SD of boys and girls in writing ability test were 37.278, 1.994 and 37.059, 1.197 respectively. Standard error of difference was 0.560 and degree of freedom was 38. The t-value was 0.3910 and p-value 0.6983 which was greater than 0.05. It could be concluded that there were 69.83% chances that null hypothesis was true. Hence, null hypothesis could not be rejected. It could be inferred that boys and girls did not differ significantly in their writing ability tests.

4.4. Analysis of Gender Differences in Children's Music Perception Skill and Musical Performance

Researcher was interested in examining whether there existed gender differences in children's music perception skill and musical performance at primary level and framed the following hypothesis.

Hypothesis 4: There exist statistically significant differences in the mean scores achieved by boys and girls in music perception skill and musical performance tests at primary level.

For statistical testing, research hypothesis was converted into null form, i.e.-

Null Hypothesis 4: Boys and girls do not differ significantly in the mean scores achieved in music perception skill and musical performance tests at primary level.

Two (2) independent sample t-tests were computed to measure gender differences in the mean scores achieved by boys and girls in music perception skill and musical performance tests. Result of the tests were depicted in table 5 below.

Table 5
Gender Differences among Children with Respect to their Music Perception Skill and Musical Performance

Measure	Gender	Mean	SD	SE Difference	df	t Value	p Value
Music Perception	**Boys**	59	2	0.714	33	1.4837	0.1474
	Girls	57.94	2.22				
Musical Performance	**Boys**	34.33	3.85	1.085	33	1.8798	0.0690
	Girls	32.29	2.33				

From table 5, it was observed that mean and SD of boys s in music perception skill test were 59 and 2. Mean and SD of girls were 57.94 and 2.22. Standard error of difference was 0.714 and degree of freedom was 33. The calculated t-value was 1.4837. The observed p-value was 0.1474 which greater than 0.05. The observed p value showed there were 14.74% chances that null hypothesis could be true. Therefore, null hypothesis could not be rejected. It could be inferred that boys and girls did not differ in their music perception skill test at primary level.

In table 5, it could be observed that mean and SD of boys s in musical performance test were 34.33 and 3.85. Mean and SD of girls were 32.29 and 2.33. Standard error of difference was 1.085 and degree of freedom was 33. The calculated t-value was 1.8798 and p-value was 0.0690 which was greater than 0.05. It could be concluded that there were 6.90% chances that null hypothesis was true. Therefore, null hypothesis could not be rejected. It could be concluded that there were 6.90% chances that null hypothesis was true. It could be inferred that boys and girls did not differ significantly in their musical performance test at primary level.

5. Conclusion

As mentioned earlier, a few studies had shown that children's linguistic abilities (both first and second language skills) were important factors influencing music perception skill and musical performance. Result of present study was in favour of the studies available in linguistic abilities and musical sensitivity area. By conducting the study, investigator established four key findings. First and foremost, researcher observed a significant positive association between children's first language and music perception skills at primary level. Secondly, researcher found a substantial positive association

between first language skills and musical performance in children at primary level. Third and fourth objectives were to determine gender differences in children's first language skills, music perception skill and musical performance at primary level. Results of independent t-tests revealed that gender had no significant influence on children's first language skills (listening comprehension, speaking ability, reading comprehension and writing ability), music perception and musical performance at primary level.

Current study was limited to four basic language skills of Bengali (L1) to determine the association with music perception skills and musical performance in children at primary level. Children's musical sensitivity could be associated with other linguistic components such as- phonology, morphology, syntax, semantics, pragmatics etc. Additional studies can be conducted in future by using those linguistic components and different age group people.

6. Conflict of Interest Statement

Researcher did not have any potential conflicts of interest for conducting the study.

References

1. Abu-Snoubar, T. K. (2017). On the Relationship between Listening and Speaking Grades of Al-Balqa Applied University English as a Foreign Language Students. International Education Studies, 10(12), 130-139.
2. https://doi.org/10.5539/ies.v10n12p130
3. Anvari, S. H., Trainor, L. J., Woodside, J., & Levy, B. A. (2002). Relations among Musical Skills, Phonological Processing and Early Reading Ability in Preschool Children. Journal of experimental child psychology, 83(2), 111-130. https://doi.org/10.1016/S0022-0965(02)00124-8
4. Beard, R., & Burrell, A. (2010). Writing attainment in 9-to 11-year-olds: Some differences between girls and boys in two genres. Language and Education, 24(6), 495-515.
5. Berninger, V. W., Nielsen, K. H., Abbott, R. D., Wijsman, E., & Raskind, W. (2008). Gender differences in severity of writing and reading disabilities. Journal of school psychology, 46(2), 151-172.
6. Bourdeaud'Hui, H., Aesaert, K., & van Braak, J. (2021). Exploring the Validity of A Comprehensive Listening Test to Identify Differences in Primary School Students' Listening Skills. Language Assessment Quarterly, 18(3), 228-252. https://doi.org/10.1080/15434303.2020.1860059
7. Bourke, L., & Adams, A. M. (2012). Is it differences in language skills and working memory that account for girls being better at writing than boys?. Journal of Writing Research, 3(3), 249-277.
8. Chan, D. W., Ho, C. S. H., Tsang, S. M., Lee, S. H., & Chung, K. K. (2007). Prevalence, gender ratio and gender differences in reading-related cognitive abilities among Chinese children with dyslexia in Hong Kong. Educational Studies, 33(2), 249-265.
9. Chung, W. L., Jarmulowicz, L., & Bidelman, G. M. (2017). Auditory Processing, Linguistic Prosody Awareness and Word Reading in Mandarin-Speaking Children Learning English. Reading and Writing, 30(7), 1407-1429. https://doi.org/10.1007/s11145-017-9730-8
10. Fayyaz, W., & Kamal, A. (2014). Role of Gender, Age, and Geographical Locality in Metacognitive Listening Skills of English as a Foreign Language. Pakistan Journal of Psychological Research, 29(2).
11. Goldbeck, L., Daseking, M., Hellwig-Brida, S., Waldmann, H. C., & Petermann, F. (2010).
12. Sex differences on the German Wechsler Intelligence Test for Children (WISC-IV). Journal of individual differences, 31(1), 22. https://psycnet.apa.org/doi/10.1027/1614-0001/a000003
13. Goswami, U. (2011). A temporal sampling framework for developmental dyslexia. Trends in cognitive sciences, 15(1), 3-10. https://doi.org/10.1016/j.tics.2010.10.001
14. Hawke, J. L., Olson, R. K., Willcut, E. G., Wadsworth, S. J., & DeFries, J. C. (2009). Gender ratios for reading difficulties. Dyslexia, 15(3), 239-242.
15. Hidayanti, I., & Umamah, A. (2019). Listening strategy: A link between gender and student's achievement. Abjadia: International Journal of Education, 4(1), 12-17.
16. Hyde, J. S. (2016). Sex and cognition: gender and cognitive functions. Current opinion in neurobiology, 38, 53-56.
17. Jones, S., & Myhill, D. (2007). Discourses of difference? Examining gender differences in linguistic characteristics of writing. Canadian Journal of Education/Revue canadienne de l'éducation, 456-482.
18. Lynn, R., & Mikk, J. (2009). Sex differences in reading achievement. TRAMES: A Journal of the Humanities & Social Sciences, 13(1).
19. Mecke, A. C., & Sundberg, J. (2010). Gender differences in children's singing voices: acoustic analyses and results of a listening test. The Journal of the Acoustical Society of America, 127(5), 3223-3231. https://doi.org/10.1121/1.3372730
20. Namaziandost, E., Sabzevari, A., & Hashemifardnia, A. (2018). The effect of cultural materials

21. on listening comprehension among Iranian upper-intermediate EFL learners: In reference to gender. Cogent education, 5(1), 1560601.
22. Patel, A. D. (2014). Can nonlinguistic musical training change the way the brain processes speech? The expanded OPERA hypothesis. Hearing research, 308, 98- 108. https://doi.org/10.1016/j.heares.2013.08.011
23. Maitland, S. B., Herlitz, A., Nyberg, L., Bäckman, L., & Nilsson, L. G. (2004). Selective sex differences in declarative memory. Memory & cognition, 32(7), 1160-1169. https://doi.org/10.3758/BF03196889
24. Michelle E. Pence & Terra A. James (2015) The Role of Sex Differences in the Examination of Personality and Active-Empathic Listening: An Initial Exploration, International Journal of Listening, 29:2, 85-94. https://doi.org/10.1080/10904018.2014.965390
25. Punia, V., & Jyoti, J. (2016). Effect of gender on underlying factors of multiple intelligence among school going children. International Journal of Science Technology and Management, 5(8), 778-786.
26. Siegel, L. S., & Smythe, I. S. (2005). Reflections on research on reading disability with special attention to gender issues. Journal of learning disabilities, 38(5), 473-477.
27. Sergeant, D. C., & Welch, G. F. (2009). Gender differences in long-term average spectra of children's singing voices. Journal of Voice, 23(3), 319-336.
28. Sergeant, D. C., & Himonides, E. (2014). Gender and the performance of music. Frontiers in psychology, 5, 276.
29. Slevc, L. R. (2012). Language and music: sound, structure, and meaning. Wiley Interdiscip. Rev. Cogn. Sci. 3, 483–492. https://doi.org/10.1002/wcs.1186
30. Sree and Venukapalli (2020). Musicality and Musical Sensitivity in Children. International Journal of Psychosocial Rehabilitation, 4. https://doi.org/10.37200/V24I4/26994
31. Swaminathan, S. (2017). Nonmusical Correlates of Musical Ability [Doctoral dissertation, University of Toronto, Canada]. https://hdl.handle.net/1807/8091
32. Van der Sluis, S., Posthuma, D., Dolan, C. V., de Geus, E. J., Colom, R., & Boomsma, D. I. (2006). Sex differences on the Dutch WAIS-III. Intelligence, 34(3), 273-289. http://dx.doi.org/10.1016/j.intell.2005.08.002
33. Vidal, A., Puig, O., Boget, T., & Salamero, M. (2006). Gender differences in cognitive functions and influence of sex hormones. Actas Esp Psiquiatr, 34(6), 408-415.
34. Voyer, D. (2011). Sex differences in dichotic listening. Brain and Cognition, 76(2), 245-255.
35. https://doi.org/10.1016/j.bandc.2011.02.001
36. Wargacki, J. E. (2008). High-stakes testing and the gender gap: A study of fourth grade reading performance on the Ohio achievement test (Doctoral dissertation, Bowling Green State University).
37. Wheldall, K., & Limbrick, L. (2010). Do more boys than girls have reading problems?. Journal of Learning Disabilities, 43(5), 418-429.
38. Williams, G. J., & Larkin, R. F. (2013). Narrative writing, reading and cognitive processes in middle childhood: What are the links?. Learning and Individual Differences, 28, 142-150.
39. Zhang, J., Meng, Y., Wu, C., & Zhou, D. Q. (2017). Writing system modulates the association between sensitivity to acoustic cues in music and reading ability: evidence from Chinese–English bilingual children. Frontiers in Psychology, 8, 1965. https://doi.org/10.3389/fpsyg.2017.01965
40. Zhukov, K. (2007). Student learning styles in advanced instrumental music lessons. Music Education Research, 9(1), 111-127. https://doi.org/10.1080/1461380060112758