Instrument Development: Validating A Music Listening Scale

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Introduction

Music is a universal language, transcending linguistic barriers and connecting people across cultures. Music's capacity to evoke emotion, foster empathy, and create shared experiences underlines its powerful role in cross-cultural communication. This study aims to understand how music facilitates cultural bridging by examining participants' emotional responses to music and their sense of global connection during listening sessions. Drawing from Wycisk et al. (2022) on immersive music experiences, this research investigates the following question:

Research Question: How does music influence cross-cultural communication, emotional resonance, and cultural empathy?

Reason for Study: This study seeks to uncover whether music listening can be an effective tool for enhancing cross-cultural understanding and communication. This may have applications in social integration, education, and community-building initiatives.

Methodology

Participants

A total of 121 participants were collected. After data cleansing, 89 participants were used for the pilot study, with an effective sample of 85 after a second data cleaning and removing incomplete responses. The participants represented diverse backgrounds, allowing for an examination of music's impact on a broad cross-section of individuals.

Procedure

Participants completed a survey via Qualtrics URL link, which included questions on their music listening habits, emotional engagement, and perceived connection to the world through music. Responses were collected across ten questions on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Instrument

The survey instrument, modeled on Wycisk et al.(2022), the Immersive Music Experience Inventory (IMEI), was designed to capture various dimensions of the listening experience. The original survey had 25 questions. The group chose eight questions with slight modifications and added two demographic questions (age and pronouns).

Data Analysis

Descriptive Statistics

The descriptive analysis showed a positive skew for questions about enjoyment and emotional impact, indicating that participants rated their music experience positively. Key descriptive statistics (means, standard deviations, skewness, and kurtosis) were analyzed for each item, revealing the following trends:

- **Higher Ratings:** Questions on stress relief (Q4) and reminiscence (Q5) had the highest mean scores, suggesting that participants used music as a medium for emotional regulation.
- **Lower Engagement:** Questions about feeling globally connected (Q8) and focusing solely on music (Q2) received relatively lower scores, indicating lesser engagement in these areas.

Frequencies

For most questions, ratings are skewed towards higher values (3-5), especially in **Q1**OverallListening, **Q4**EscapeListening, and **Q5**Reminiscence. Some questions, like **Q8**ConnectedToWorld and **Q9**IdentityPronouns, received more lower ratings (1-3). With Q9Identity Pronouns, the accurate rating was 39.3 % identified as He, 52.8% identified as She, and 4.5% identified as Them with 3.4 % having no response to this question. A general trend of positive responses (ratings of 3-5) can be seen across most questions.

Table 1

Statistics

		Q1overalllistening	Q2NoDistraction	Q3EnjoyedMusic	Q4EscapeStress Listening	Q5Reminicsce	Q6FeelAwePerformer	Q7Enjoy NewMusic	Q8ConnectedTo RestofWorld	Q9IdentityPronouns	Q10Age
N	Valid	87	87	87	87	87	87	87	87	86	87
	Missing	29	29	29	29	29	29	29	29	30	29
Mean		3.52	2.64	3.77	4.28	4.08	3.82	2.92	2.72	1.64	3.70
Std. Deviation		1.033	1.056	.961	.872	.979	.909	1.014	.924	.572	1.556
Skewness		-.404	.338	-.968	-1.758	-1.534	-.860	-.041	.310	.201	-.262
Std. Error of Skewness		.258	.258	.258	.258	.258	.258	.258	.258	.260	.258
Kurtosis		-.314	-.741	.640	4.005	2.737	.976	-.273	-.082	-.711	-.980
Std. Error of Kurtosis		.511	.511	.511	.511	.511	.511	.511	.511	.514	.511

Note. This table comprehensively summarizes the distributions for each question in our dataset, including the mean, standard deviation, skewness, and kurtosis.

Reliability

Cronbach's alpha was calculated to assess the internal consistency of the scale:

- **Initial Reliability (10 items):** The scale had a Cronbach's alpha of 0.674, which is below the acceptable threshold of 0.70, suggesting moderate reliability issues.
- **Improved Reliability (9 items):** Removing Q10 (age-related item) raised the alpha to 0.811, indicating higher internal consistency. This finding implies that Q10 may have weakened the overall coherence of the scale.

Table 2

Reliability Statistics

Cronbach's Alpha	N of Items
.811	9

Table 3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1OverallListening	29.52	22.864	.632	.672
Q2NoDistractionsListening	30.36	24.774	.430	.706
Q3EnjoyedCollection	29.23	24.086	.573	.685
Q4EscapeListening	28.71	24.867	.544	.692
Q5Reminicense	28.91	24.650	.488	.698
Q6AweofTalent	29.17	24.805	.521	.694
Q7EnjoyedNewExperience	30.07	24.701	.458	.702
Q8ConnectedToWorld	30.26	25.087	.479	.700
Q9IdentityPronouns	31.35	29.100	.156	.738
Q10Age	29.31	28.500	-.030	.811

Factor Analysis

Principal Component Analysis (PCA) with Varimax rotation was conducted to identify factors underlying the scale:

KMO and Bartlett's Test: A KMO value of 0.766 and a significant Bartlett's Test ($p < .001$) confirmed sampling adequacy and inter-item correlations suitable for factor analysis.

Table 4

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.766
Bartlett's Test of Sphericity	Approx. Chi-Square	249.595
	df	45
	Sig.	<.001

The KMO value of .766 and Bartlett's Test of Sphericity is 249.595 with 45 degrees of freedom and a p-value of <.001showing that the data has an acceptable range. Because the p-value is less than 0.05 not just the Chi-square and df, there is a correlation between the variables and I can reject the null hypothesis.

Table 5

Communalities

	Initial	Extraction
Q1OverallListening	1.000	.730
Q2NoDistractionsListening	1.000	.761
Q3EnjoyedCollection	1.000	.676
Q4EscapeListening	1.000	.593
Q5Reminicense	1.000	.675
Q6AweofTalent	1.000	.590
Q7EnjoyedNewExperience	1.000	.413
Q8ConnectedToWorld	1.000	.392
Q9IdentityPronouns	1.000	.641
Q10Age	1.000	.749

Extraction Method: Principal Component Analysis.

Note. The weakest association is Q7 and Q8

Table 6

Component Transformation Matrix

Component	1	2	3
1	.767	.635	.099
2	-.614	.769	-.176
3	.187	-.074	-.979

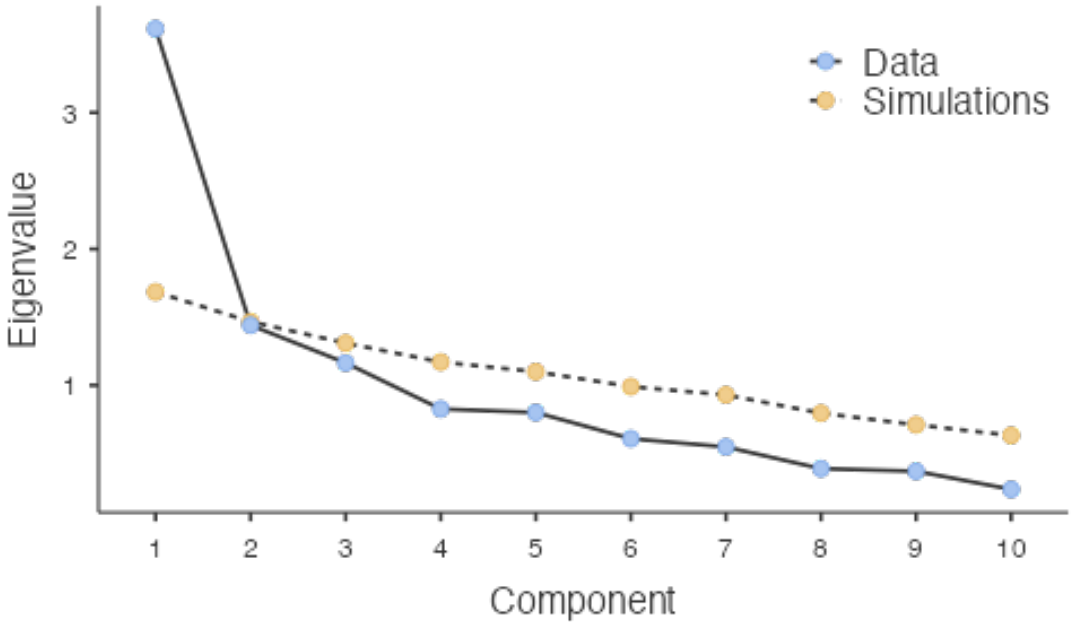
Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Figure 1

Scree Plot

The scree plot indicated three components with eigenvalues >1, accounting for 62.2% of the total variance. This breakdown suggests three distinct factors related to listening experience, emotional impact, and cultural connectivity.

- **Factor 1:** Listening Experience (e.g., Q1, Q2, Q3)
- **Factor 2:** Emotional Impact (e.g., Q4, Q5, Q6)
- **Factor 3:** Cultural Connectivity (e.g., Q7, Q8)



One-Way Analysis of Variance (ANOVA) and Correlation Analysis

While ANOVA was conducted to assess differences in participants' emotional engagement and listening experiences based on demographic categories, **Spearman's rank-order correlation** was employed to investigate the relationships between ordinal variables in the survey.

- **ANOVA Results:** A one-way ANOVA was used to explore whether age or other demographic factors influenced responses to the "Listening Experience" and "Emotional Impact" factors. However, no statistically significant differences were found across most groups, suggesting relatively uniform experiences across demographic categories.

- **Spearman's Rank-Order Correlation:** This method was applied to measure the strength and direction of associations between demographic factors (e.g., age, gender identity) and specific survey responses. The correlation analysis revealed:
    - A moderate positive correlation between **age** and **Q5 (Reminiscence)** ($r_s = 0.43$, $p < 0.01$), indicating that older participants tend to associate music more strongly with past memories.
    - A weak negative correlation between **age** and **Q8 (Connected to the World)** ($r_s = -0.25$, $p < 0.05$), suggesting that younger participants might feel a stronger global connection through music.

ANOVA
Table 7

F1ListeningExperience

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.956	2	2.978	4.064	.021
Within Groups	60.826	83	.733		
Total	66.782	85			

Table 8
ANOVA Effect Sizes[a,b]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
F1ListeningExperience	Eta-squared	.089	.001	.205
	Epsilon-squared	.067	-.023	.186
	Omega-squared Fixed-effect	.067	-.023	.184
	Omega-squared Random-effect	.034	-.011	.102

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
b. Negative but less biased estimates are retained, not rounded to zero.

Table 9

ANOVA
F2EmotionImpact

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.182	2	1.591	2.959	.057
Within Groups	44.638	83	.538		
Total	47.820	85			

Table 10

ANOVA Effect Sizes[a,b]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
F2EmotionImpact	Eta-squared	.067	.000	.175
	Epsilon-squared	.044	-.024	.155
	Omega-squared Fixed-effect	.044	-.024	.153
	Omega-squared Random-effect	.022	-.012	.083

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
b. Negative but less biased estimates are retained, not rounded to zero.

Table 11

ANOVA

F3Culture2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.821	2	.911	1.398	.253
Within Groups	54.063	83	.651		
Total	55.884	85			

Table 12

ANOVA Effect Sizes[a,b]

			95% Confidence Interval	
		Point Estimate	Lower	Upper
F3Culture2	Eta-squared	.033	.000	.121
	Epsilon-squared	.009	-.024	.099
	Omega-squared Fixed-effect	.009	-.024	.098
	Omega-squared Random-effect	.005	-.012	.052

a. Eta-squared and Epsilon-squared are estimated based on the fixed-effect model.
b. Negative but less biased estimates are retained, not rounded to zero.

Nonparametric Correlations

Table 13

Correlations

			F1Listening Experience	F2Emotion Impact	F3Culture2
Spearman's rho	F1ListeningExperience	Correlation Coefficient	1.000	.381**	.447**
		Sig. (2-tailed)	.	<.001	<.001
		N	88	88	87
	F2EmotionImpact	Correlation Coefficient	.381**	1.000	.388**
		Sig. (2-tailed)	<.001	.	<.001
		N	88	88	87
	F3Culture2	Correlation Coefficient	.447**	.388**	1.000
		Sig. (2-tailed)	<.001	<.001	.
		N	87	87	87

**. Correlation is significant at the 0.01 level (2-tailed), indicating strong evidence that these relationships aren't just random or a coincidence.

Note. These results show that people's background characteristics, like their age or gender, can influence how they experience and connect with music in different ways. The moderate correlations between the constructs indicate that different aspects of listening, emotional impact, and cultural engagement are linked, and these connections could vary depending on individual differences.

Conclusion

This pilot study supports the hypothesis that music can facilitate cross-cultural emotional resonance and communication. Music emerges as a potentially transformative medium, fostering emotional connection and empathy that transcends language and cultural differences. However, factors like age influence the depth of emotional impact and engagement, highlighting the need for further research into demographic variations.

Limitations: As a pilot study, the sample size is limited, and some scale items did not exhibit ideal reliability. These findings point to areas for instrument refinement in future research.

Future Directions: Subsequent studies could explore a broader demographic, refine the instrument for higher reliability, and delve into specific cultural contexts to better understand music's role as a communication tool across various cultural boundaries.

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Appendix -A

Data Cookbook

Music and Communication Through Cultures for Boundary Spanning (Research)

Demographic Data

Pronoun Identification: (1=He, 2=She, 3=They)
Age: (1=18-24, 2=25-34, 3=35-44, 4=45-54, 5=55-64, 6=65+)

Instrument Questions (Likert 1-5)

Instructions: Select one level of agreement for each of the ten statements.

	Question Code	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. *The listening experience captivated me.*	Q1 Experience Captivation	(1)	(2)	(3)	(4)	(5)
2. *While I was listening, hardly anything could distract me.*	Q2 Listening No Distraction	(1)	(2)	(3)	(4)	(5)
3. *I enjoyed the piece of music.*	Q3 Enjoyment	(1)	(2)	(3)	(4)	(5)
4. *I can escape from stressful situations by listening to music.*	Q4 Escape stress listening to music	(1)	(2)	(3)	(4)	(5)
5. *When listening to music I remember my past.*	Q5 Reminisce	(1)	(2)	(3)	(4)	(5)
6. *Listening to music I feel a sense of awe for the talent of the performer.*	Q6 Awe for the talent of the performer	(1)	(2)	(3)	(4)	(5)
7. *I enjoyed listening, as it was a new kind of listening experience for me.*	Q7 Enjoyment due to a new listening experience	(1)	(2)	(3)	(4)	(5)

8. *While listening, I felt as if I were connected to the rest of the world.*	Q8 Connection to the rest of the world	①	②	③	④	⑤	
9. How do you identify (he/she/they)?	Q9 Identity	①	②	③			
10. What is your age range?	Q10 Age	①	②	③	④	⑤	⑥