

# Knowledge of Popular Music and Singing Ability in North American and Non-North American University Students

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## Introduction and Background

Several studies have identified an increase in the ability to encode and recall popular music knowledge in the developmental period of adolescence (Krumhansl & Zupnick, 2013; Schubert, 2016). This heightened memory that persists throughout life is commonly referred to as a "reminiscence bump". Expanding on this idea, Krumhansl and Zupnick (2013) identified "cascading reminiscence bumps" for observed increased memory of the popular music of parents' and grandparents' adolescence in addition to one's own. They attributed this recognition pattern to the influence of exposure.

Musical knowledge is often acknowledged only in the form of formal musical training, but even those without formal training develop internal models simply by listening to and engaging with music. This everyday musical knowledge can appear in the form of:  
- musical preferences (influenced by internal and external factors) (Rentfrow et al., 2011)  
- music perception (influenced by exposure and expertise) (Werker & Hensch, 2015)  
- music production, specifically in forms that do not require additional materials (singing, etc.)

## Present Study

The present study sought to conduct a preliminary investigation into the effects of age, cultural exposure, and gender on everyday musical knowledge. Specifically, it looks at participants' knowledge of pop music, and singing abilities.

**Hypothesis 1.** Younger participants will be more familiar with the most recent music while older participants will be most familiar with pop music from their adolescence.

**Hypothesis 2.** Participants raised in North America will show an increased familiarity with the selected pop songs for all eras.

**Hypothesis 3.** Older participants will outperform younger participants on the singing tasks.

**Hypothesis 4.** Female participants will outperform male participants on the singing tasks.

## Methodology

Participants ( $N = 58$  for Session 1,  $N = 20^*$  for Session 2) recruited from first-year psychology courses at the University of Prince Edward Island.  
\* Excludes 3 participants with incomplete singing data

Table 1. Session 1 Participants				Table 2. Session 2 Participants			
19 year olds $M_{age} = 19.5$ $SD = 0.35$		20+ $M_{age} = 25.1$ $SD = 5.63$		19 year olds $M_{age} = 19.4$ $SD = .30$		20+ $M_{age} = 25.3$ $SD = 6.16$	
Country growing up	Male	Female	Male	Female	Country growing up	Male	Female
North American ( $n=29$ )	8	6	3	10	North American ( $n=10$ )	3	3
Non-North American ( $n=29$ )	2	12	3	11	Non-North American ( $n=10$ )	1	3
	10	18	6	21		4	6
	$n = 29$ (including 1 other than male or female)		$n = 29$ (including 2 other than male or female)			$n = 10$	
	$n = 10$		$n = 10$			$n = 10$	

**Session 1.** Participants responded to an online questionnaire on the Qualtrics platform. They were presented with clips from 36 songs that topped the North American charts (Billboard, RPM) from 1962–2021.

Participants were:  
- presented with 2 clips around 6 seconds in length; one clip from the chorus, one from a salient part of the song  
- asked to rate how familiar they were with the song and how they became familiar with it (not discussed in this poster)  
- asked to identify the song's title, artist and the year of its popularity

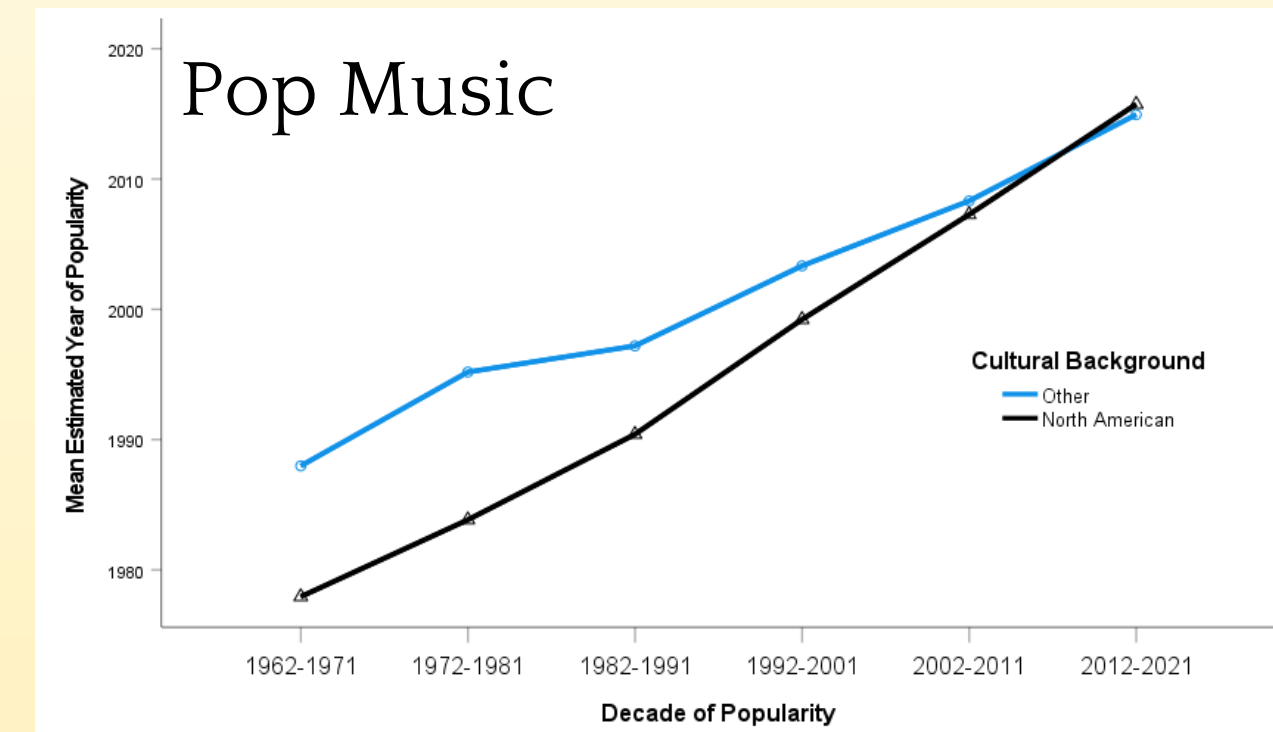
After being presented with the 36 songs and questions, participants were tested on their memory of those clips.

Participants were:  
- presented with 2 clips around 6 seconds in length; one clip they heard in the first part of the session and another that was popular around the same time  
- asked to identify which clip they had heard earlier in the study and their confidence in that answer

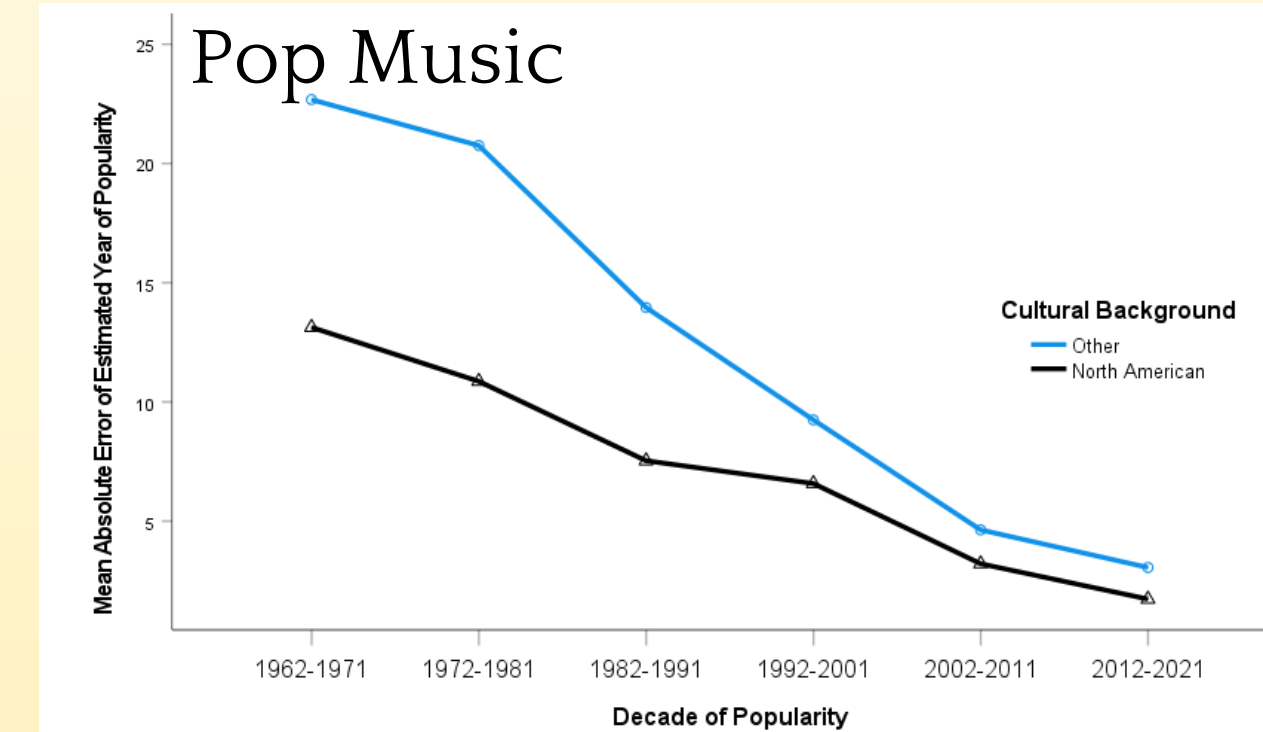
**Session 2.** Participants completed this session from 24 hours to 7 days after completing Session 1.

Participants:  
- were presented with a pre-existing singing test (MST) to familiarize themselves with the session's format  
- were presented with 21 unique audio prompts ranging from 1–32 notes in length and asked to sing them back. This process was completed twice with participants imitating the prompts using a different syllable each time. Pitch frequency was later analysed with Praat software.  
- completed the Goldsmith's Musical Sophistication Index, also known as the Gold-MSI, (Müllensiefen et al., 2014)  
- were asked to sing "Happy Birthday" several times at different stages throughout the session. Singing competence was rated by musicians.

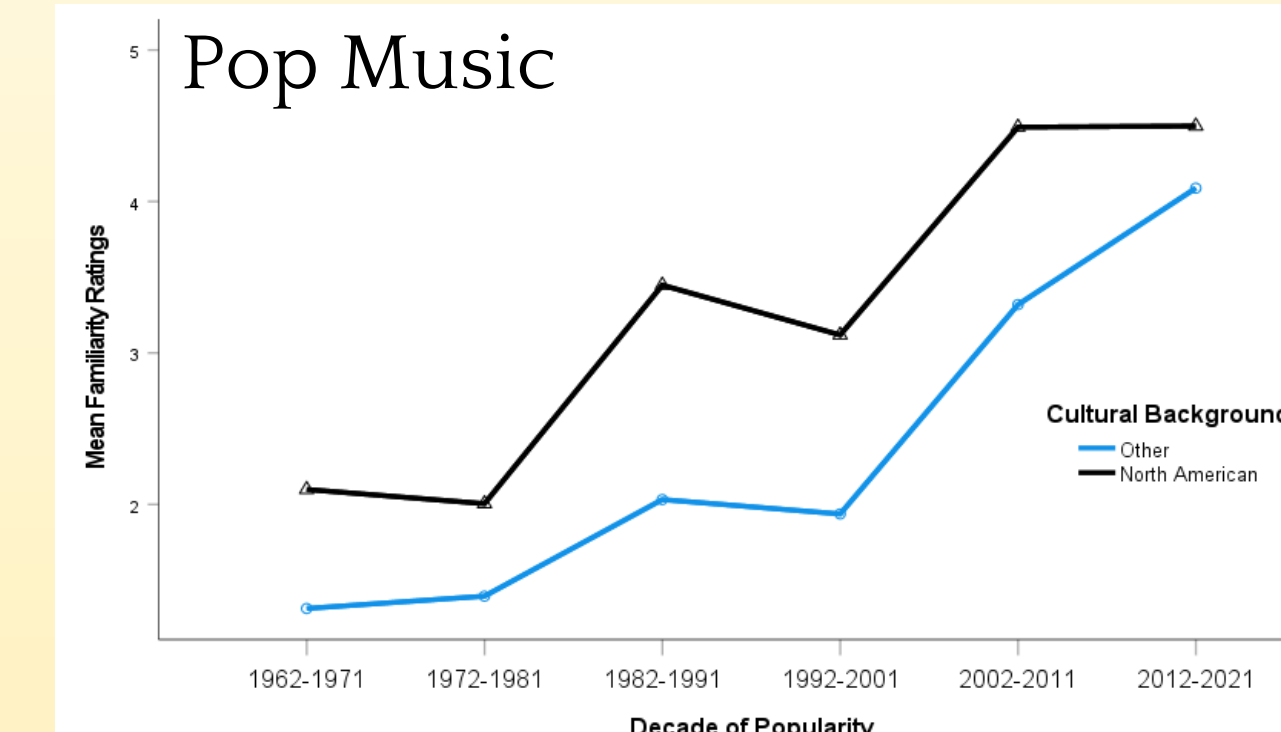
## Results



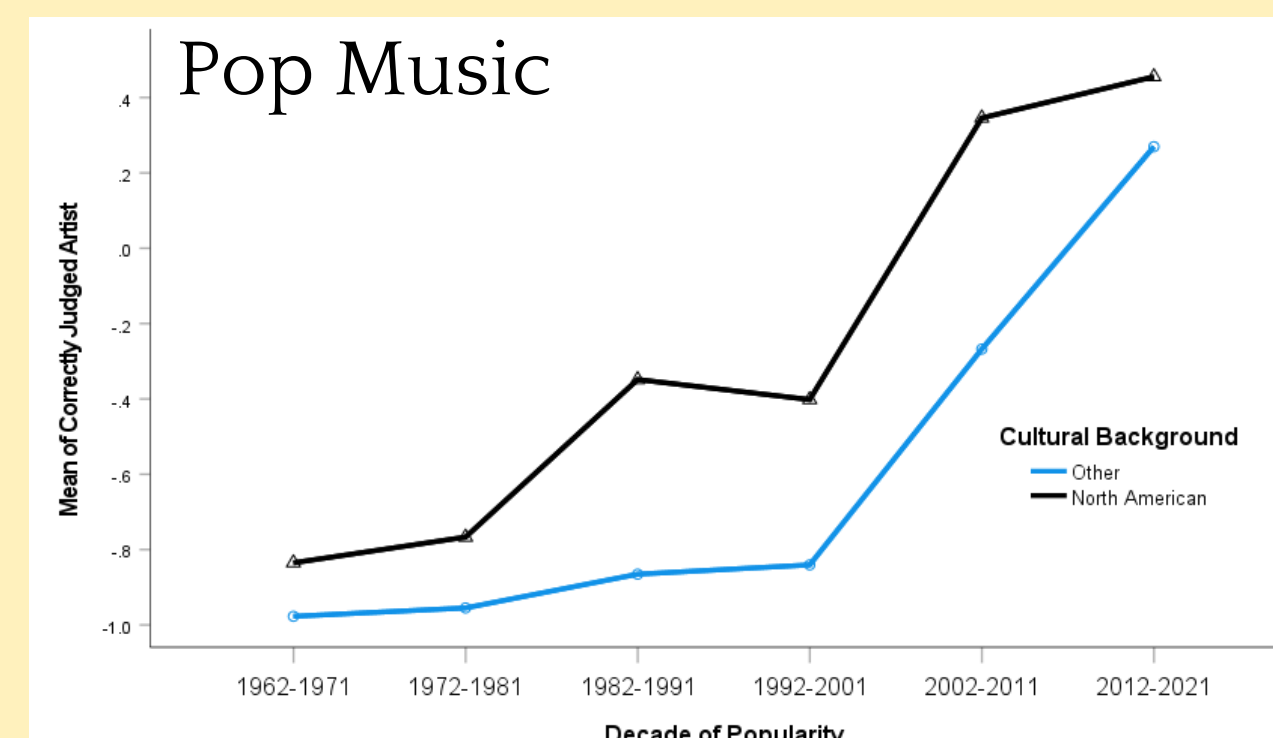
**Figure 1.1** Mean Estimated Year of Popularity for Participants with Different Cultural Backgrounds Across Six Decades  $F(1.97, 106) = 11.1, p < .001, \eta_p^2 = .17$ .



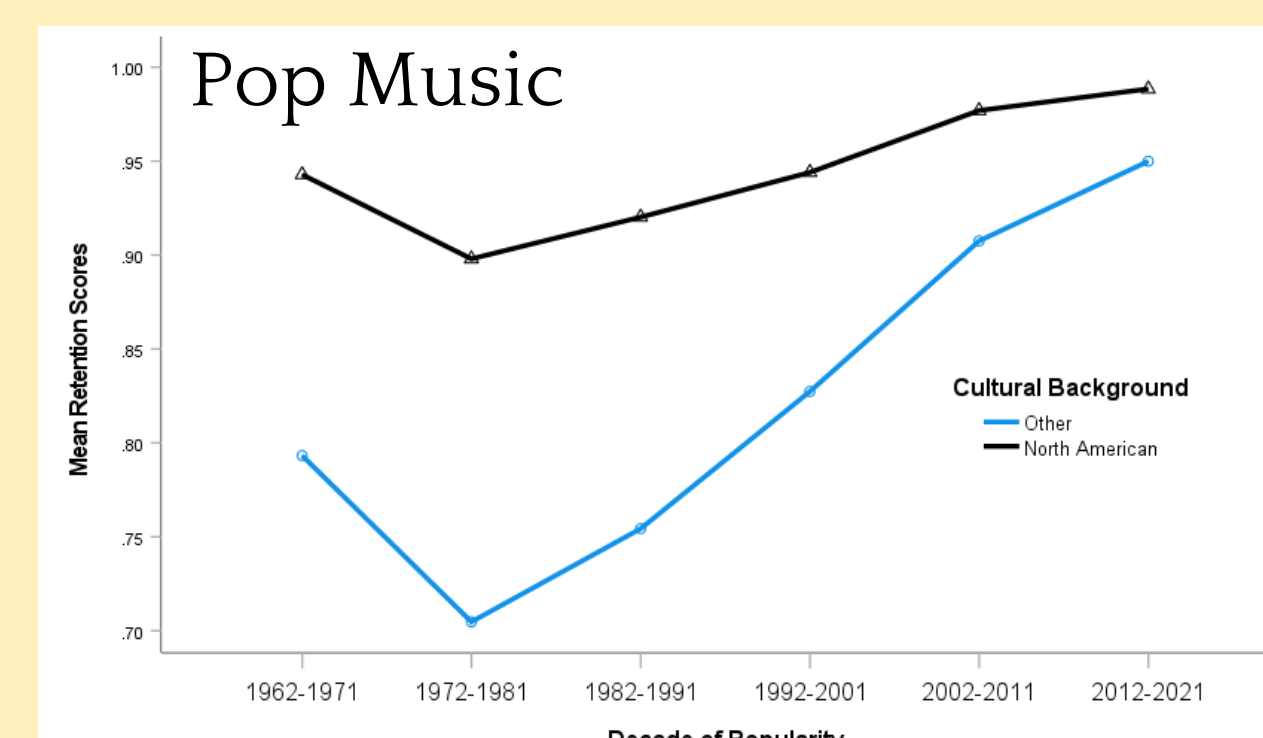
**Figure 1.2** Mean Absolute Error for Estimated Year of Popularity for Participants from Different Cultural Backgrounds Across Six Decades  $F(1.81, 97.6) = 9.75, p < .001, \eta_p^2 = .15$



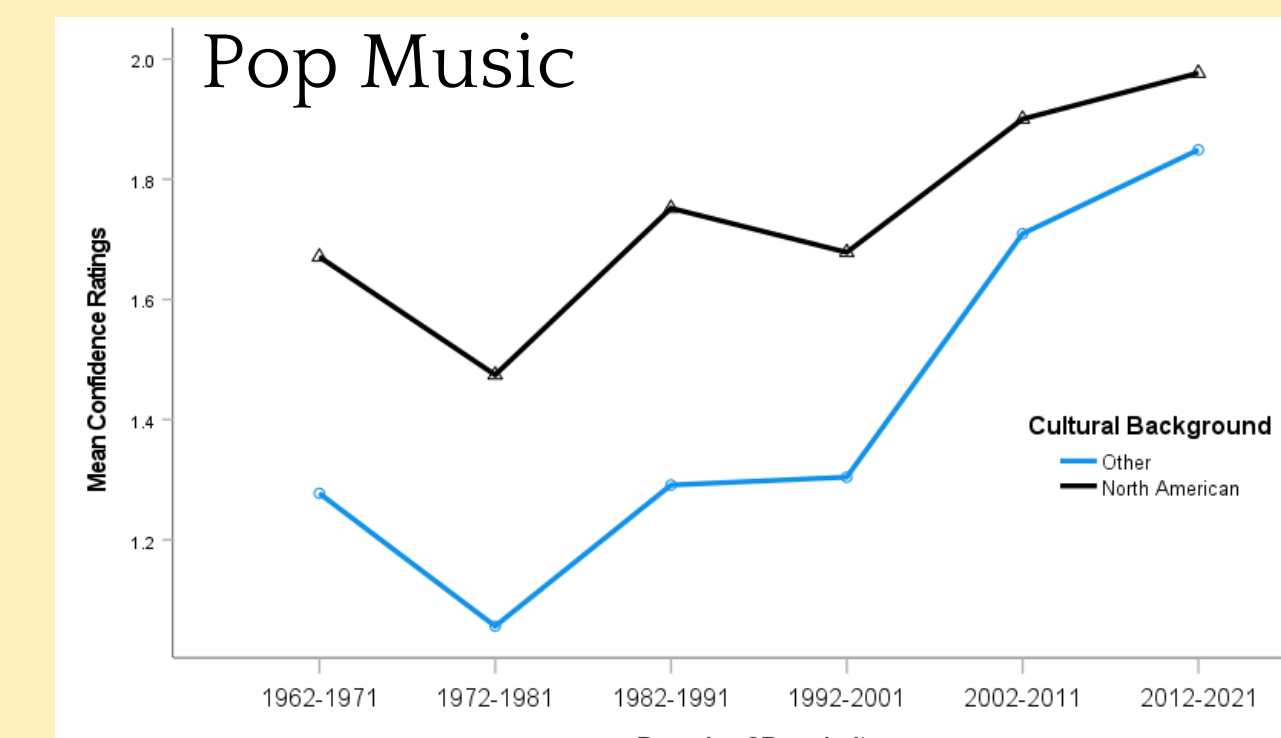
**Figure 2** Mean Familiarity of North American and Non-North American Participants with Popular Music Across Six Decades  $F(2.84, 153) = 8.3, p < .001, \eta_p^2 = .13$



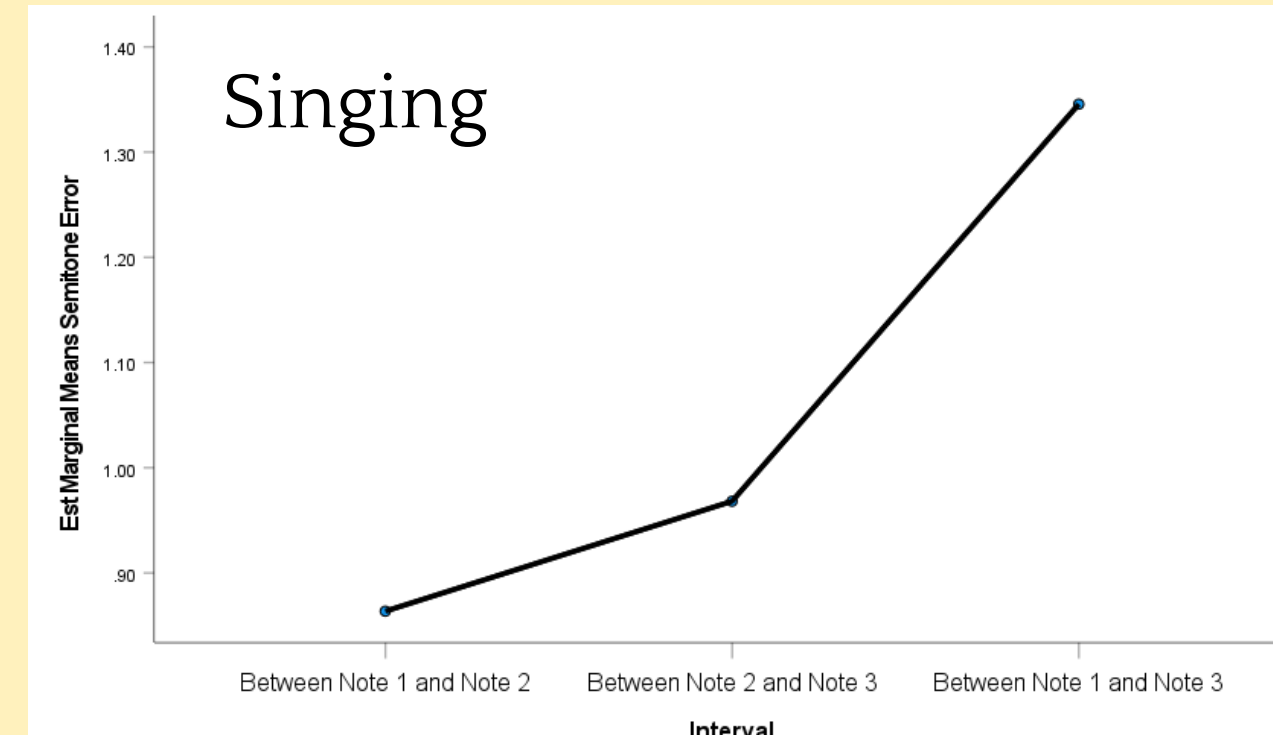
**Figure 3** Recognition of Artist for North American and non-North American Participants Across Six Decades of Popular Music  $F(3.27, 177) = 5.59, p < .001, \eta_p^2 = .094$



**Figure 4.1** Retention Scores for Participants with Different Cultural Backgrounds Across Six Decades,  $F(4.49, 242) = 3.22, p = .01, \eta_p^2 = .06$

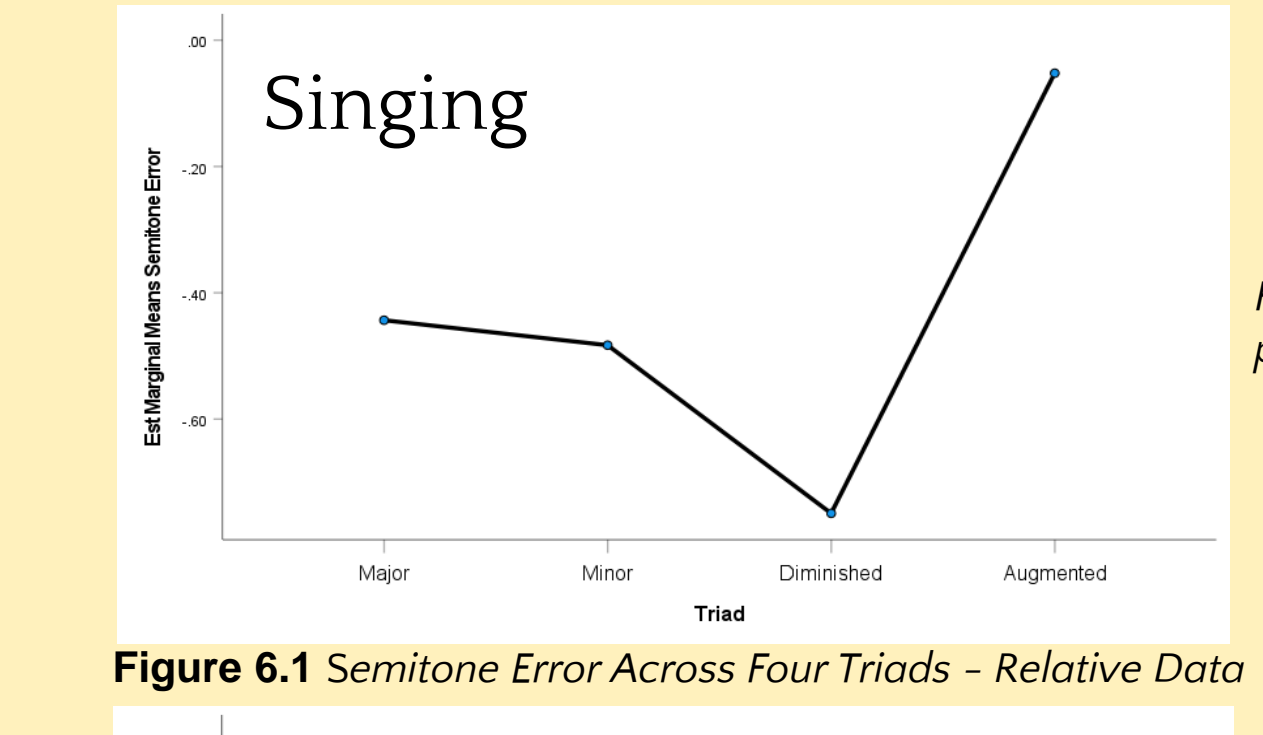


**Figure 4.2** Confidence Scores for Participants with Different Cultural Backgrounds Across Six Decades  $F(4.75, 256) = 4.57, p < .001, \eta_p^2 = .08$

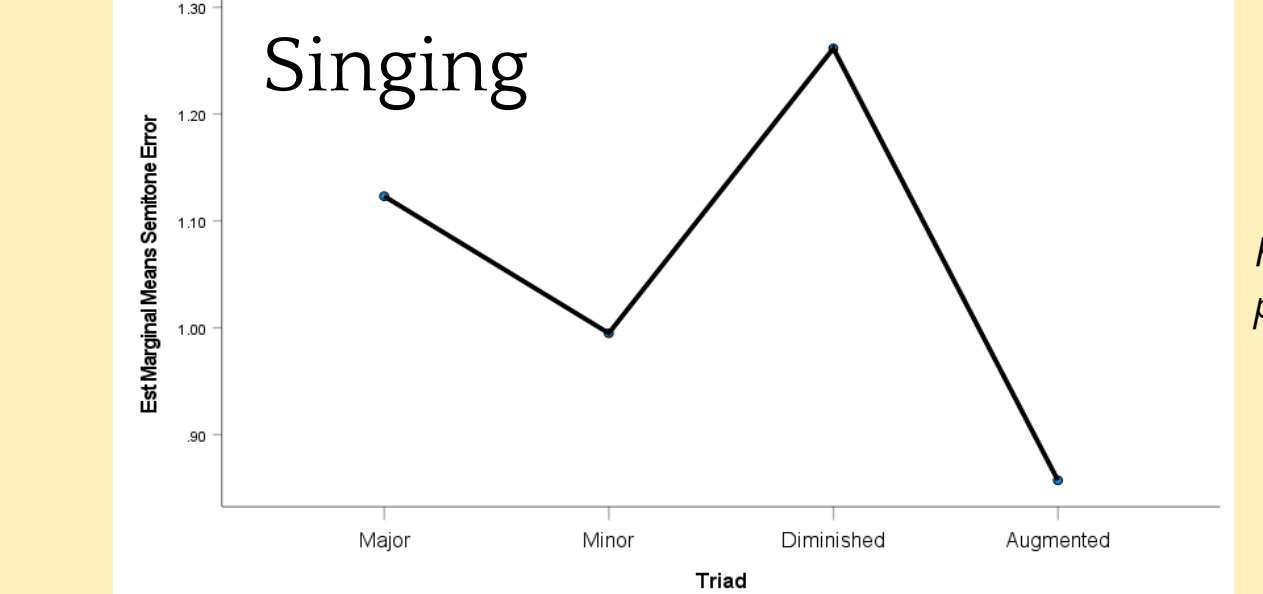


**Figure 5.** Average Semitone Error Across Intervals

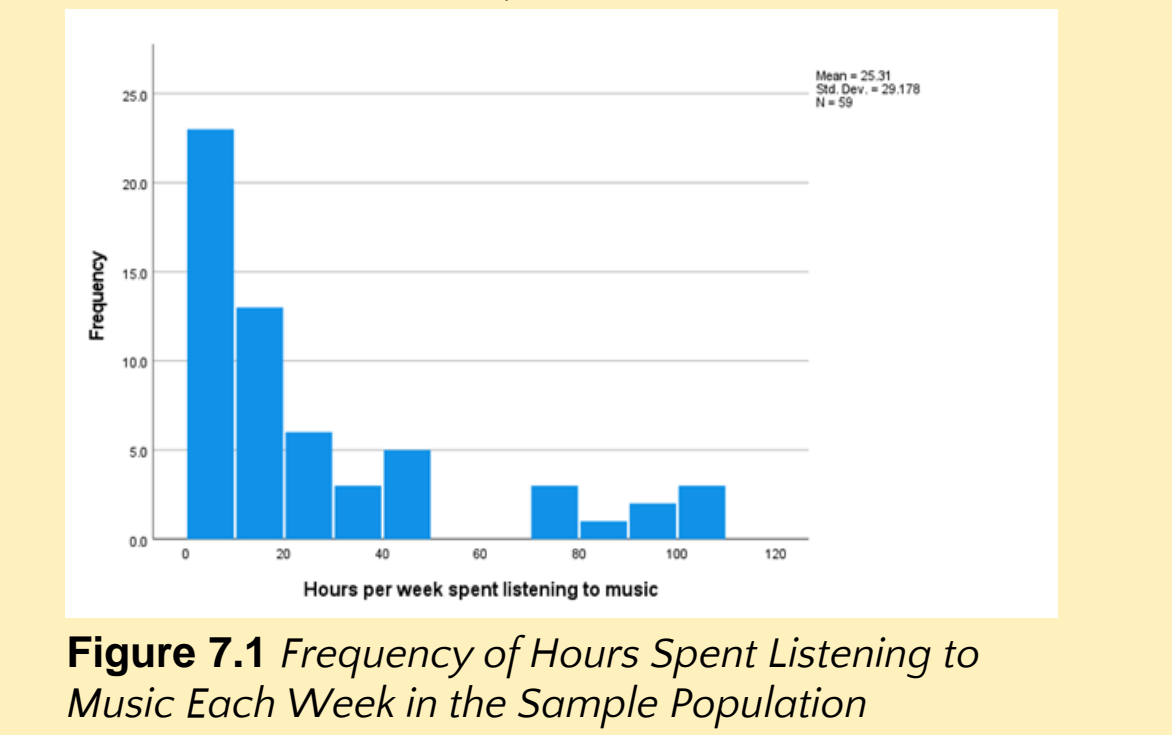
Musicians' ratings of participants' singing of "Happy Birthday" correlated with both General Gold-MSI scores,  $r(17) = .55, p < .01$ , and total pitch error for the major triad,  $r(18) = -.43, p < .03$ . These ratings also approached significance in their correlation with retention scores,  $r(21) = .34, p < .055$ .



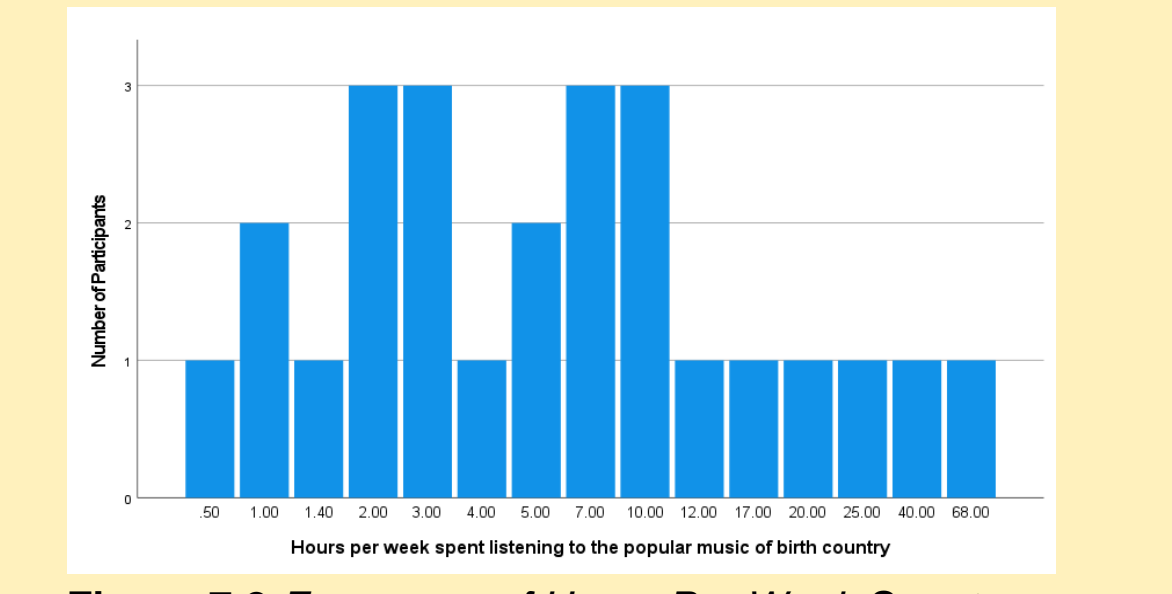
**Figure 6.1** Semitone Error Across Four Triads - Relative Data  $F(1.64, 13.1) = 4.65, p = .036, \eta_p^2 = .37$



**Figure 6.2** Semitone Error Across Four Triads - Absolute Aggregate Data  $F(1.75, 28.0) = 1.59, p = .22, \eta_p^2 = .09$



**Figure 7.1** Frequency of Hours Spent Listening to Music Each Week in the Sample Population



**Figure 7.2** Frequency of Hours Per Week Spent Listening to Popular Music of Birth Country

## Discussion

### Session 1.

Through all measures of familiarity, participants showed an increased familiarity with more recent music. This pattern was also present in the retention data. This is consistent with the view that newer songs are better encoded for youth due to increased familiarity with that musical style. It is also possible that the ability to name recent songs in the first section facilitated the retention of that song for the second part.

North American students consistently outperformed those who had lived most of their lives elsewhere on various measures of pop music knowledge. These differences were most dramatic for older styles of music, with the two populations converging as they attempt to identify more recent music.

Larger divergence in earlier decades could be the product of the lack of foundations for cascading reminiscence bumps.  
- If those who were raised abroad were not exposed to these musical styles by their parents, they may have less familiarity with the styles and more difficulty identifying the songs and the era they belong to.

The results for participants of different ages showed the same pattern as previous research (Krumhansl & Zupnick, 2013; Schubert, 2016) wherein younger participants outperformed the older. However, these differences were non-significant in our data, possibly due to small age differences between groups.

- age did have significant interactions with decade (familiarity, artist) and culture (year estimate)

### Session 2.

Using Pfordresher and Demorest's (2021) qualification of good singing as within half a semitone, the group counted in the absolute aggregate data were not good singers. In contrast, the sub-group whose relative data could be analyzed achieved an average error of less than .5 semitones, and thus, could be considered good singers.

Although gender differences in singing accuracy were non-significant, the trend was opposite to our hypothesis. For the triads, men tended to be the more accurate singers.

That musicians' ratings of participants' singing of "Happy Birthday" were correlated with total pitch error for the major triad,  $r(18) = -.43, p < .03$  and approached significance in their correlation with retention scores,  $r(21) = .34, p < .055$  may be the first time a relation has been shown between the ability to sing and the ability to retain excerpts of popular music, acknowledging that this relation only approached a conventional level.

## References

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