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Music Deserts: How Social Inequality Affects Accessibility To Music Resources Important To Actively Participating In Music

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Abstract

Recent findings in the cognitive neuroscience of music suggest that active participation in music has benefits such as increasing reading comprehension, soothing babies, and helping increase synaptic activity, beneficial in differentiating music and speech from noise. However, these benefits are not accessible to all communities. Research done by Basmat Parsad and Maura Spiegelman for the U.S. Department of Education (2012) revealed that elementary and secondary schools with a higher rate of poverty have fewer music teachers, music courses, dedicated rooms for music, in addition to a lack of music equipment. The purpose of this research was to examine whether social inequality in the U.S. correlated with a lack of music instrument stores (MIS) in certain geographical regions. These areas can be thought of as Music Deserts. To examine if social inequality correlated with access to MIS, the number of MIS registered with U.S. Census data within zip codes of New York City and Chicago were quantified. U.S. Census data was utilized to identify characteristics of each zip code such as population size and median household income. After importing data into the Statistic Package for Social Scientists (SPSS), correlations between music stores per square mile, and factors such as education, income, and race were analyzed. Linear regression suggests that Music Deserts exist and can be associated with percentage of the population with a bachelor's degree or higher. It is important to recognize Music Deserts because they identify areas where a lack of resources deprive lower income communities from the benefits associated with active music participation.

Keywords: music education, music deserts, social stratification

1. Music Deserts

The term Music Deserts does not imply that people within low-income areas do not participate in music. My data suggests that within Chicago and New York City, low-income areas have less access to musical resources, thus creating what I call Music Deserts. I acknowledge that low-income areas enjoy and actively participate in music The main goal of my research was to ask if these low-income areas have the same accessibility to musical resources as people from a higher socioeconomic position. This emphasis in resources is similar to the USDA research done on Food Deserts. Food Deserts do not imply that people in low-income areas do not eat or that there is no food available in these areas. The most important implication of Food Desert research is that people in low-income areas have a lack of accessibility to fresh food and produce. In a similar way, people in Music Deserts also experience a lack of musical resources. Similarly, accessibility to musical participation can have benefits important for human development.

The significance of Music Deserts is important to identify because they not only exclude lower income people from musical resources, but they also deprive them of the associated benefits related to active music participation. This paper develops the concept of Music Deserts, as well as outlines how they are significant on a cognitive level, suggesting that a lack of resources has unintended cognitive consequences, such as reduced reading comprehension.

2. Literature Review

2.1 The Benefits Of Active Music Participation

The neuroscience field is exploding with research exploring the neurological benefits of music. Within the year 2015, one scholarly journal, *Annals of The New York Academy of Science*, published their fifth edition of "The Neurosciences of Music." This edition had 34 new articles written by researchers from around the world, focusing on how the brain processes and is affected by music. As a result, this scholarly journal acts as catalogue of the scientific achievements and is "a comprehensive guide to understanding how music uniquely contributes to programs of cognitive stimulation and rehabilitation" (*The Neurosciences and Music V: Cognitive Stimulation and Rehabilitation* 2015: viii). It also highlights how "the field has come a long way from basic research to the addition of clinical research and applied studies" (*The Neurosciences and Music V: Cognitive Stimulation and Rehabilitation* 2015: viii). The above statement emphasizes how the vast amount of past research is impacting the new research in the field today.

This abundance of recent scholarship has established the many benefits associated with creating and listening to music. Among these, researchers have shown how active music participation can help children decipher words and language in noisy environments (Moreno and Besson 2006) (Strait and Kraus 2011). This is because "[t]he auditory system has 'feedforward' neurons that transmit information about sound to the brain," as well as an abundance of "'feedback' neurons that carry information backwards from the brain to the ears" (Williamson 2014: 49). As a result, this 'feedforward', and 'feedback' highway "refines our everyday perception of sound – it tunes our ears." (Williamson 2014: 49). This research is significant because it highlights how flexible children's brains can be when music participation is introduced, and it also illiterates how music can positively influence the way people perceive their surroundings, providing cognitive clarity within noisy environments.

Music lessons have also been shown to increase reading proficiency in children (Anvari, Trainor, Woodside, and Levy 2002), and listening to music has been shown to reduce childrens' pain after major surgery (Suresh, De Oliveira and Suresh 2015). Most importantly, active music participation has been shown to have *more* cognitive benefits in six month old infants regardless of socioeconomic status resulting in "less distress to limitations, less distress when confronted with novel stimuli, more smiling and laughter, and easier soothability compared to those in the passive classes" (Trainor et al. 2012: 135). These are significant benefits that are provided to those who can afford the time and money to partake in active music participation.

2.2 Music Education And Social Inequality

Research suggests that less privileged people do not participate in music at the same levels as more privileged individuals (Elpus, and Abril, 2011). The U.S Department of Education has discovered that elementary schools that were composed of the highest concentration of poverty had fewer "dedicated rooms with special equipment" (U.S. Department of Education 2012: 15) than schools with less poverty. This trend was also apparent in secondary education; lower income schools had fewer music teachers, music courses, rooms dedicated to music, and special music equipment (Parsad and Spiegelman 2012: 22). This means that students who attend a low-income school will have less access to resources and time to actively participate in music in school.

Attending a low-income school is not the only factor that affects active participation in music. A two-year longitudinal study of high school students involved in music (n=621,895) showed that Hispanic students, males, and students of lower socioeconomic status were underrepresented among music students (Elpus, and Abril, 2011: 134-135). In addition, "Students scoring in the highest quartile on math or reading standardized tests were significantly overrepresented among music students, while those students scoring in the lowest quartile in math scores and the two lowest quartiles in reading scores were significantly underrepresented" (Elpus, and Abril, 2011: 134-137). By synthesizing this information, one can start to see how active music participation tends to be carried out by the very privileged within U.S. society. As a result, the benefits that can be extracted by actively participating in music also tend to be experienced by people who hold more privilege. Consequently, the primary research question that manifests itself is not if people of low-socioeconomic standing participate in music but rather, is a lack of participation in music affected by geological positioning? The secondary question then is if we can identify areas by variables associated with social inequality such as income, race, and education.

3 . Method

I analyzed zip code data from the U.S. Census for the cities of Chicago and New York City to identify the number of music instrument stores (MIS) registered with the North American Industrial Classification System (NAICS) for each zip code. I focused on music instrument stores because I wanted to identify an institution that facilitated musical resources that allowed and supports active participation in music. I chose New York City and Chicago because recent research in social stratification has shown that since the 1970s, social inequality has increased to the highest level within the major U.S. cities (Bischoff and Reardon 2015). U.S. census data was utilized because it provided insight into each zip code specifying population size, percentage of the population with a bachelor's degree or higher, median household income, square miles of zip codes, and race.

To identify MIS within zip codes, I utilized the online mapping program *SimplyMaps*. MIS were identified and recorded in SPSS along with the zip codes where they were found. To standardize the differences in zip code square mileage, MIS per one square mile was calculated (zip code square mile divided by music store in that zip code).

I input a total of 242 zip codes into SPSS between New York City and Chicago. Three of those zip codes had zero population and were then taken out of data analysis making the zip code count 239. Out of these 239 zip codes two of them had $0 total for average household income. These two data points were kept because they did have data in regards to variables such as: percentage of the population with a bachelor's degree or higher, and percentage of the population that is White alone, percentage of the population with a high school degree or higher, percentage of the population that is Latino, percentage of the population that is Black or African American alone, percentage of the population that is Asian alone, and population. Out of the data set, there were 181 zip codes for New York City (75.7 %) and 58 for Chicago (24.3 %). Median for the percent of the population with a bachelor's degree or higher was 32.1

Income was divided into five quintiles using the national median household income. The median household income of the two cities ($41,749) was within the range of the national median household income ($41,187- $68,212). The frequency of these quintiles is available in Table 1.

Table 1. Median Household Income in Quintiles

		Frequency	Percent
1st	$0- $21,432	2	.8
2nd	$21,433- $41,186	60	25.1
3rd	$41,187- 68,212	89	37.2
4th	$68,213- $122,262	77	32.2
5th	$112, 263- $245,556	9	3.8

A correlation test was run in SPSS with the following variables: MIS per square miles, income, population, percentage of the population with a bachelor's degree or higher, and percentage of the population that is White alone, percentage of the population with a high school degree or higher, percentage of the population that is Latino (any race), percentage of the population that is Black or African American alone, and percentage of the population that is Asian alone.

Linear regressions were run with the following variables: MIS per square miles (dependent variable) and income, percentage of the population with a high school degree or higher, percentage of the population with a bachelor's degree or higher, percentage of the population that is White alone, and percentage of the population that is Black or African American alone. This is because correlation tests showed these variables to have some sort of significant correlation.

4. Results

The data suggest a correlation between MIS per square miles and income, and the percentage of the population with a bachelor's degree or higher. Correlation analyses showed that there was a statistically significant correlation between MIS per square miles and income, percent of population with a bachelor's degree or higher, percentage of the population that is White alone, and percentage of the population that is Black or African American alone (Table 2)

Table 2. Correlation: MIS Per Square Miles

	Pearson's	Sig. (2 tailed)
Income	.227	.000
Percentage of the population with a high school degree or higher	.234	.000
Percentage of the population with a bachelor's degree or higher	.403	.000
Percentage of the population that is White alone	.238	.000
Percentage of the population that is Latino (any race)	-.121	.061
Percentage of the population that is Black or African alone	-.200	.002
Percentage of the population that is Asian alone	.111	.087
Population	-.044	.494

A linear regression was run to better understand the relationship between significant variables such as income, percentage of the population with a high school degree or higher, percentage of the population with a bachelor's degree or higher, percentage of the population that is White alone, and percentage of the population that is Black or African American alone with the dependent variable of MIS per square mile. Linear regression showed that when controlling for higher education and race, education maintains (p=.000) significance while income and race become insignificant (Table 3).

Table 3. Linear Regression: MIS

	B	Std. Error	Beta	t	Sig.
Income	-.311	.354	-.095	-.878	.381
Percentage of the population with a high school degree or higher	-.046	.041	-.175	-1.127	.261
Percentage of the population with a bachelor's degree or higher	.083	.014	.659	5.751	.000
Percentage of the population that is White alone	-.007	.014	-.070	-.493	.622
Percentage of the population that is Black or African alone	-.003	.012	-.026	-.234	.815

5. Discussion

One major limitation of this research is that it does not establish causality. Data suggest that the presence of Music Deserts is predicted by percentage of the population with a bachelor's degree or higher; however, it cannot be

determined if one causes the other. This has important implications because it means either 1) The lack of musical resources can decrease the percentage of the population with a bachelor's degree or higher, 2) that by implementing more musical resources and music programs, that we can increase higher education in a low-income area.

Research suggests several benefits of introducing music programs into low-income areas. Programs like the Harmony Project have been able to increase higher education obtainment among low-income students. The Harmony Project strives to "provide students from low SES backgrounds with music opportunities that enrich the students and their communities" (Kraus et al. 2014: 2). In a two-year study, it was found that students within the program "reinforce[d] literacy skills, enhance[d] the perception of speech in background noise, and strengthen[ed] the neural encoding of speech sounds in children from low SES backgrounds" (Kraus et al. 2014: 2). Most importantly, "[b]etween 2010 and 2014, 93% of Harmony Project alumni enrolled in post- secondary education, versus 67.6% of students graduating from public schools within Los Angeles County" (Kraus et al 2014: 2).

The Harmony Project is not the only organization that has had success in introducing music to low-income areas. The President's Committee on the Arts and Humanities has also implemented a two-year program called Turnaround Arts, which studied the effects of strong arts programs in specific schools. The evaluation found that the Turnaround schools saw an increase in both math and reading scores (Presidents Committee on the Arts and Humanities 2015). Though this program did not only focus on music, the underlying theme is that arts education can increase student achievement.

However, the correlation between higher education and Music Deserts could mean that the absence of music resources results in a decrease of the population with a bachelor's degree of higher. Since the cognitive neuroscience of music is showing how active music participation has many benefits, it is not absurd to then start asking how Music Deserts are affected by budget cuts to arts programs in low-income areas. Essentially, Music Deserts could be a result of the defunding of music programs, which has in turn decreased higher education obtainment. It is hard to say which scenario is correct due to the limitations of linear regression but the important part of this research is that we know that they are correlated.

Ideally, further research would look at informal music resources and musicians, such as the bucket players in Chicago. This is important because the ways in which music is socially constructed represents power structures, and those who are not considered traditional musicians reflect how musical norms are sustained through cultural hegemony (Martin, 1995). Since Music Deserts correlate with social inequality, it would be important to understand how the social construct of music manifests itself within Music Deserts. Additionally, looking at other variables such as access to transportation would provide a concise outline of Music Deserts. Further research would also benefit from analyzing additional cities and rural areas with GIS mapping.

6. Conclusion

In describing Pierre Bourdieu, Tia DeNora, a researcher in the sociology of music, once wrote, "culture represents a struggle over the definition of social reality and therefore the issue of the meaning of objects is also an issue of who defines or appropriates them, where, when, how and for what purpose" (1986:93). Music Desert research is important because it identifies an inequality that low-income people experience. Though Music Desert research has a long way to go, there is at least a term that people can use to identify the inequality they experience in regards to music accessibility.

This research is the first to show that Music Deserts do exist, and that higher education is the primary predictor of where we are likely to find them. Music Desert research is important because it shows there is a correlation between accessibility to music resources used to actively participate in music and higher education. This has important implications for social scientists and policy makers. By showing the relationship between higher education and Music Deserts, it is time to rethink the importance of music programs within the U.S. education system. Perhaps policy makers should focus on implementing STEAM (Science, Technology, Engineering, Art, Mathematics) instead of cutting arts programs. Where Music Desert research goes next will be up to future researchers and music educators who strive to counter such inequalities.

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