**Neighborhood demographics and library placement:**

**A look into the placement of libraries in Minneapolis**

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Abstract

Libraries are recognized as an important part of a city. In addition to the educational resources they provide, libraries generate social capital. This study investigates if the city of Minneapolis, MN provides equitable access to libraries based on distance from a library and the racial makeup of each census block. Distance is measured as a straight line from centroids of each census block to the nearest library. Using Minneapolis’s 5964 census blocks, we find no signs of discrimination based upon not being white. Libraries tend to be located closer to areas with more people of color and higher population density.

1. **Introduction**

Public libraries provide a lot of benefits to people living in the US. Regardless of income or social status, anyone can walk into a library and use valuable resources at their local library. Beyond loaning books, libraries frequently loan out nonliterary materials such as music, movies, board games, and occasionally tools or kitchen appliances. Libraries are also great meeting places due to free entry and their nature of being a public space. For this reason, they are centers for interacting with individuals outside of your inner social sphere. Due to these benefits, libraries are centers for equalizing the educational and social gaps across groups with different racial and income backgrounds. In order to maintain equitable cities, residents should have equal access to libraries and the benefits they provide.

**Libraries as a source of social capital**

When studying the effect of libraries, researchers typically look at its contribution to social capital. There are several types of social capital. According to Johnson (2010), community level social capital is the willingness for a community to work together for the common good. Individual level social capital is the resources that someone gains access to due to social relations. Audunson, Essmat, Aabø (2011) view social capital as the interconnectedness of a community. They define two types of social capital: bonding social capital, which describes "bonds in closely knit groups such as in families, groups of friends, or religious congregations" and bridging social capital which "describes trust across these primary belongings." Regardless of the exact definition, social capital is generally understood to be social connections that enhance communal and individual resources. These connections make individual’s lives easier since they can lean on their social network for help.

Audunson, Essmat, Aabø (2011) studied the importance of public libraries as meeting places for immigrant women in Norway. In their study, they noted "Migration… implies dramatic reduction in social capital" but libraries became a way to rebuild social capital in a new city. "The respondents reported uses that were instrumental and linked to the system world of work, education, bureaucracy, and formal information, as well as uses linked to the life world of meaning, culture, and individuality." Having such a central place in these women’s lives, libraries have helped them adjust to living in a new country. Specifically in Minneapolis, there is a large immigrant Somali population. It is possible that these immigrants could benefit in similar ways so it would be good to ensure they have access to similar resources and meeting spaces.

Since they are locations for public meetings, libraries are spaces that foster civic engagement. Low income people are more likely to use libraries as a meeting place, similar to a public square. Aabø, Audunson, Vårheim (2010) interpreted this to mean that access to a public library increases low income people’s ability to be active citizens. This is because being an active citizen is frequently associated with communication and interaction with other citizens.   
Libraries are also spaces that people of diverse social, racial, and economic backgrounds will frequent (Sin 2011). This may foster opportunities for cross-class collaboration and interaction since there aren’t too many places that serve such diverse demographics due to cost being a barrier to entry. It is possible that exposure to people outside of your demographic can promote understanding of issues that other groups face. Hopefully, this awareness of other groups (specifically high income people knowing low income people) can promote less stigma around being poor, and motivate more equitable policy. Whether interactions at a library are coincidental (running into a friend) or planned (meeting to work on a project), libraries provide a unique space for social interaction.

The social capital created by libraries has the potential to lead to increased future earnings in a community. Whether libraries lead to increased educational attainment from the resources they offer or community support from social interactions initiated at a library, these benefits are hard to measure. When receiving public funding, projects are required to prove their worth. Since benefits of a library aren’t always easy to quantify, it is important that policy makers understand the positive externalities created by libraries. It is particularly important for low-income people that these resources are available. Because they are often endowed with less opportunities (fiscally and socially) at birth, libraries may supplement educational or social opportunities that they were not fortunate to have been born into. This can aid students in educational attainment or give them the social connections to obtain an internship or first job.

When looking at race, Japzon & Gong (2005) found that there are trends within race and library usage. White people and Asians were more likely to use libraries than African Americans and Hispanics. Japzon & Gong were concerned that this trend causes cyclical underfunding. Typically, libraries receive funding based on usage; however, if they are predisposed to having less patrons by being located in a neighborhood with more Hispanics and African Americans, they are less likely to be fully funded. Following these decreased funds, the services offered are worse and people are less likely to use services in the future causing additional decreased funding. This chronic underfunding could worsen preexisting issues in a neighborhood such as intergenerational poverty where people do not have the economic opportunity to move out of their neighborhood.

**Importance of library accessibility**

Since libraries hold an important role in a community for accessing information and fostering social interaction, multiple studies have been done to analyze library accessibility based on location. “Travel time and transport costs from library users' residence to be the main predictive variables for the frequency of their library's usage" Obokooh & Arokoyu (1991). There are several ways that distance has been measured in the literature. The simplest measure is a straight line approach. Donnelly (2015) measured the distance from the centroid of US decennial census tracks to the nearest library. Centroids are the center points of polygons. In this case the centroid is the middle most point of a census tract. Another approach is network analysis to measure the distance a patron would need to travel in order to visit their nearest library (Park, 2012). Both studies found that distance is a critical factor to library access; with Donnelly finding that people in urban areas have better access to libraries than people who live in rural areas.

Neighborhood characteristics is another topic for library accessibility. Koontz (1992) noticed that "the location of libraries has a long term effect on library use." Depending on placement, they can have higher usage. Japzon & Gong (2005) studied correlations between neighborhood characteristics and library usage. Race was one correlation, with Whites and Asians frequenting the library more often than Blacks or Hispanics. Education was the highest predictor of library usage. The authors speculated that this is due to educated people being comfortable in and knowing how to use a library. Income was another neighborhood characteristic that effected libraries. Sin (2011) found that there was a positive relationship between income and library services offered. In most US states, local government is the main source of library funding. So, a lower income neighborhood is less likely to have enough funding to offer the same resources as a higher income neighborhood.

Library services have the potential to be more beneficial for low income people since there is not a barrier to entry, assuming distance is not a factor. Higher income people may not need to use a library since they can easily afford a substitute for library services. For example, meeting at a coffee shop for a meeting, owning a streaming service rather than renting movies, buying books rather than renting them, or having Wi-Fi or a computer at home. Additionally, there is little stigma associated with using library services. High income people are typically more educated which increases their likelihood of using a library, so patronizing a library is not seen as unfairly taking advantage of the government. When looking at a library as a method of education, it is possible that library programs for children can motivate young people to excel in school. This would encourage low-income people to become educated and benefit from the college wage premium.

1. **Model and Data Description**

We use the following model to estimate the effect of census block demographics on library placement:

where *DISTANCEi* is the distance in miles from the centroid of the census block to the nearest library; *POCi* is the percent of people in the census block who are not white (all multi racial people are part of this group); *POPULATIONi* is the total number of residents in the census block, divided by 100 for easier interpretation. Knowing that many American cities have a history of discrimination, such as red lining, I hypothesize that an increase in people of color (POC) would increase the distance to the nearest library (β1 > 0). I posit that an increase in population density would have the opposite effect since city planners would want an important resource, libraries, to be located where the most people could easily access it (β2 < 0). We also recognize that income and educational attainment could factor into library placement since higher income people may have more influence over the location of important buildings and people with higher educational attainment are more likely to lobby for a library since they recognize its value. However, due to data limitations this was not possible, and it will be explored in future research.

Observations were obtained from the 2020 decennial census at the block level – the smallest division publicly available with 5964 blocks in the city of Minneapolis. Within R we calculated the POC variable; People were categorized as either white or POC, where all multi racial individuals were part of the POC group. The locations of each library were retrieved from the Minnesota Department of Education and plotted in ArcGIS. Using the distance variable was calculated using the near function in ArcGIS, measuring the distance from the centroid of the census block to the nearest library. The near function uses a straight-line approach which does not account for landmark barriers (rivers, lakes, highways, etc.) This approach assumes central place theory, the assumption that a customer will patronize the closest central place. Table 1 provides a set of summary statistics of the data used in this study. Table 2 shows the racial breakdown of Minneapolis to show the ratio of white to POC in the city. As seen in the table Minneapolis is approximately 60% white and 40% POC.

1. **Estimation Approach and Results**

Knowing that people of color tend to live in more dense housing in Minneapolis, we first tested for severe multicollinearity. This was not an issue with a coefficient of .2621, allowing us to proceed with the equation originally stated. Reported in Table 3, our results show a negative relationship between the POC and DISTANCE; neighborhoods with higher percentages of people of color tend to be closer to libraries. Statistically significant at the 1% level, on average for every 25% increase in POC, the census blocks are 1 block (.0495 miles) closer to libraries. 100% POC census blocks are generally about .2 miles (4 blocks) closer than 100% white census blocks. Graph 1 visualizes this relationship without effects of the population variable.

This is contrary to expectations but after further reflection the result is not surprising since the literature shows the importance of libraries in minority communities, so municipalities are more likely to take race into consideration when determining the location of public buildings. Additionally, urban areas tend to be more progressive so there may be an emphasis on providing resources to underserved communities.

Looking at the population variable, it was also significant and followed the initial hypothesis. However, its coefficient is quite small and estimates that blocks will be about a third of a block closer for every 100 people in the census block. The variable was not rescaled to a larger unit since the average population of the census blocks are about 70 people.

For further visual analysis, maps were created in ArcGIS to visualize the spread of POC and the census blocks that are within walking distance of a library. Map 1 shows the distribution of race in the city of Minneapolis with the blue dots signifying library location. Map 2 shows the distance from a census tract to the nearest library. The first (yellow) bucket is half a mile since that is within walking distance. From a quick look at the maps there doesn’t appear to be any correlation between percent POC and library accessibility. There are a few spots where majority white neighborhoods are farthest from a library. The dark red color identifies neighborhoods with farthest accessibility. These regions are primarily seen in neighborhoods with 80% or more white people, and they are generally higher income neighborhoods as well. Due their economic standing, residents in these neighborhoods are more likely to own a car so although their distance from a library may be farther, a car provides equal access to libraries.

1. **Conclusion**

In further studies I would like to see if the resources available at each branch varies by neighborhood demographics. This study shows that geographically, people of color have easier access to libraries, but it does not show the quality of each branch. Quality could be measured by types of services offered and hours of operation. I hypothesize that differences between branches could be influenced by their neighborhood’s ability to demand more/better services.

This analysis showed a positive correlation between the percent of POC in a census block and its proximity to a library in the city of Minneapolis. This is important because of the positive impact that libraries have on minority and immigrant neighborhoods. These benefits include: access to information (through books, media, and the internet), opportunities for civic engagement, and providing a public meeting space. Of course, none of these benefits are helpful unless people have access to them. For this reason, libraries need easy accessibility, which generally implies proximity to a person’s house.

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| ***Map 1*** | ***Map 2*** |
| Map  Description automatically generated | Map 2  Distance from a library |

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| --- | --- | --- | --- | --- | --- | --- |
| **Table 1**  **Summary statistics by census block (n= 5964)** | | | | | | |
| **Variable** | **Min** | **Q1** | **Median** | **Mean** | **Q3** | **Max** |
| % POC | 0% | 6.4% | 20% | 29.5% | 47.1% | 100% |
| Population | 0 | 23 | 61 | 73.1 | 85 | 3228 |
| Distance (miles) | 0 | .45 | .7 | .72 | .97 | 1.99 |

|  |  |  |
| --- | --- | --- |
| **Table 2**  **Minneapolis racial demographics** | | |
|  | **Count** | **Percent of population** |
| White | 259983 | 60% |
| Black | 82809 | 19% |
| 2 or More Races | 34819 | 8% |
| Asian | 25351 | 6% |
| Other | 25325 | 6% |
| Native American | 7473 | 2% |
| Pacific Islander | 202 | 0% |
| **Total** | **435962** | **100%** |

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| **Table 3**  **Estimated Model of Library Placement in Minneapolis** |
|  |
| (0.0075) (0.0160) (0.0046) |
| [0.000] [0.000] [0.001] |
| R2 = 0.0246, d.f = 5961 |

Note: Robust standard errors are in parentheses and p-values are in [ ].

**Graph 1**

Chart, scatter chart

Description automatically generated