4SSG1011 Principles of Geographical Inquiry

Is there a correlation between place attachment towards London markets and the spatial distance from it?

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1 Introduction

Place attachment is what binds people to places (Low et al., 1992), and plays a pivotal role in constructing the social function of markets. The recent discourse on London markets seems to be either regeneration, or resistance against gentrification and preservation of the market's sense of place. There is a struggle between stakeholders on what makes the market space a place. While the literature on street markets is more often about place rather than space, research on spatial interactions focuses on space. This research paper will provide the perspective of place in modelling spatial attraction towards London markets.

The research question is whether markets with a strong sense of place are ones that have a close social distance. In other words, do people living closer to the market experience a greater place attachment to it? A questionnaire is administered to four different markets, containing both numerical and qualitative data. The use of travel time to indirectly measure distance is explained in the methodology. The sampling method, survey design, and implementation is evaluated. Analysis will focus on questions that show a statistically significant correlation with travel time.

2 Literature Review

Yi-Fu Tuan (2001) viewed place as a "field of care" (pp. 164) and "centre of meaning" (pp. 173) in space. Place is experienced space. Doreen Massey (2005) argues that space is lived, dynamic, and socially produced. Then, place must be socially contested in the same way as space is, there are processes of exclusion and inclusion. Kelley (2019) contends that markets communities have a sense of place, because its space is enclosed and crowded. This draws onto the idea that place is for security and stability, while space is open and free. With stability comes conservation and resistance to things are "out of place", and the effort to protect things that the community thinks make this space their marketplace.

The literature on geographies of exclusion focus on the big picture in society, such as homeless people (Sibley, 1995). However, processes of exclusion and inclusion are present in very mundane parts of life. Exclusion necessarily produces inclusion (May, 2013). The preservation of a place for some is an exclusion of space to others. The marketplace community resists efforts from gentrification to privatization, excluding certain types of businesses or developments that are considered to be "out of place".

For example, Brixton and Shepherd's Bush Markets both had historical roots in black immigrants (Shepherd's Bush Market, n.d.) and Afro-Caribbean culture (Howarth, 2002), in reggae and the working class. Their sense of place is one of independent shops as opposed to franchise chains, and their growth is as organic as the food they sell (Gayle,

2016). They resist the rent increases (London Assembly, 2009) (Bryant, 2013), and evictions for redevelopment (see Save Brixton Arches (2015)). The conflict is between different actors on what kind of place should be made in this space. Traders has complained that there are now "more visitors than consumers" (Godwin, 2013). For council officers, the market hurt the appearance of the area. Social exclusion is accomplished by spatial boundaries, so it is crucial to examine the connection between space and place in the market. Does strong place attachment mean a tighter social boundary in space? While Tobler's (1970) first law of geography is that everything is related to everything, but closer things have more interactions, place attachment goes further than just spatial interaction.

3 Methodology

A questionnaire is used as it is efficient and cheap. Analysis will be easier because choices are restricted. However, it is more limited compared to a focus group in asking for specific details. The travel time question is straightforward, but most people rounded up their answers to the nearest five minutes, so in practice it is interval data. The place attachment questions are all single-choice ordinal data. It is simpler for both the interviewers in asking, and the respondent in understanding; it also reduces erroneous results and ensures the result must be one of the five choices (Thayer-Hart et al., 2010). Qualitative responses are also collected so respondents get a chance to elaborate deeper.

The target population is everyone that goes to the market. Respondents were randomly sampled within the boundary of the market. It is efficient, low cost, and quick. There is an equal chance of selecting any person in the target population. In practice the sample was self-selected by the surveyors, whose decision to ask someone is not random. Systematic sampling could have been used, for instance asking every 10 person. It maintains all the benefits but also improves the representativeness of the sample (Jenson et al., 2010).

The total sample size is 517 respondents. As the data is very positively skewed, a normal distribution was not assumed, so the z-score method of excluding outliers was not used. Values greater than $1.5 \times \text{IQR}$ were removed. The sample size was 504 responses without outliers and is fairly distributed among the markets.

There are three ways to estimate the distance between respondents to the market: travel time, postcode, and the nearest Tube/train station. The last two measures suffer from the modifiable areal unit problem, which is when detail is lost due to data being grouped into arbitrary zones (Harris et al., 2011), so the conclusion then depends on how the grouping is done. It is also vulnerable to Simpson's paradox, where a correlation between two variables appears to be negated when it is grouped by a third, hidden variable

(Wagner, 1982).

Postcodes are also less accurate to protect privacy. Both postcodes and stations are discrete, so pretending it is continuous is misleading. The travel time is technically continuous, but most rounded up their answers to the nearest 5 minutes.

Ultimately, the travel time was selected because the p-values of the regression analyses with the place attachment questions are the lowest. That means there are the most significant correlations with travel time. Additionally, using travel time as a metric is to use a relative space measure instead of an absolute space measure. This is more useful because place is not absolute, so space should be cognitive rather than absolute.

4 Results

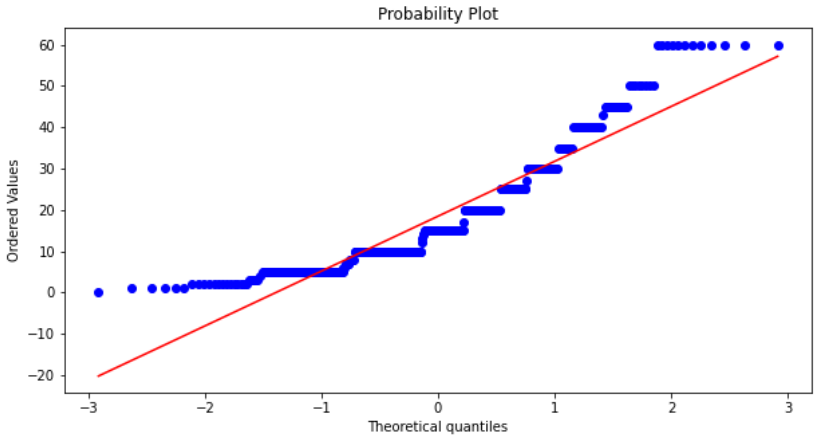

Figure 1: Quantile-Quantile plot of travel time (y-axis) against theoretical distribution (x-axis). The red line represents an ideal normal distribution.

The travel time is not normally distributed, because its Anderson-Darling test statistic (14.95) was much higher than the critical value (0.799) for a p-value of 0.05 (NIST/SEMATECH, 2013). In Figure 1, the Q-Q plot shows a convex curve, indicating a positive skew (Rigollet, 2016). There is a clustering towards multiples of five. The clear imbalance and the clustering means travel time cannot be assumed to be normally distributed, hence non-parametric statistics will be used.

As illustrated in Table 1, there are four questions with a majority of markets having a significant (p-value $> 5 \times 10^{-2}$) Spearman's rank correlation coefficient (ρ) against travel time. The Spearman's ρ is used instead of the R^2 value, because it is non-parametric (does not assume normal distribution), which makes it more suitable for ordinal and interval data. It estimates how well the two variables are monotonic (if a variable is increasing, the other increases).

	Question	
Market	Support local traders	Find unique items
Walthamstow	4.21×10^{-2}	3.67×10^{-1}
Chrisp Street	6.09×10^{-1}	6.25×10^{-1}
Shepherd's Bush	1.91×10^{-2}	8.18×10^{-1}
Brixton	2.11×10^{-1}	2.64×10^{-1}

	Question		
Market	More than shopping	Bump into friend	Revisit
Walthamstow	3.34×10^{-1}	4.17×10^{-7}	2.34×10^{-5}
Chrisp Street	9.68×10^{-2}	8.82×10^{-4}	6.96×10^{-5}
Shepherd's Bush	5.32×10^{-1}	1.15×10^{-1}	2.11×10^{-1}
Brixton	5.61×10^{-1}	9.30×10^{-4}	7.33×10^{-3}

	Question	
Market	Prefer over other markets	Frequency of visit
Walthamstow	9.95×10^{-3}	6.43×10^{-11}
Chrisp Street	2.36×10^{-1}	1.15×10^{-8}
Shepherd's Bush	6.27×10^{-2}	5.066×10^{-3}
Brixton	4.83×10^{-3}	1.11×10^{-7}

Table 1: The p-values of the Spearman rank correlation coefficient of the linear regression between travel time in each market to each question. Significant coefficients are coloured in green. Calculated with SciPy (Virtanen et al., 2020).

As "find unique items", "more than just shopping", and "support local traders" are not statistically significant, they will be excluded from analysis. Due to word constraints, only the frequency of visiting and likelihood of meeting friends will be analyzed.

Figure 2 shows the linear regressions between travel time and score given to the "bump into friend" question, by market. Other than Shepherd's Bush market (which was not significant), the markets displayed a reasonable negative linear correlation. This means it is less likely for people coming from further away to meet a friend in the market. This agrees with Tobler's first law, because people living closer to the market is more likely to interact with people. Because of the ordinal scores and the rounding of time, the points may look like a grid. But some points are actually multiple points overlaying each other, so points are made slightly transparent. There is a visible concentration of points in the top left, representing people near the market interacting more.

In the markets with significance, the p-values are certainly small enough, and the 95% confidence interval of the regression slope is narrow enough to reject the probability of no correlation. The caveat is that Shepherd's Bush Market is not significant enough and the confidence interval is large enough that a flat line is possible, so a correlation cannot

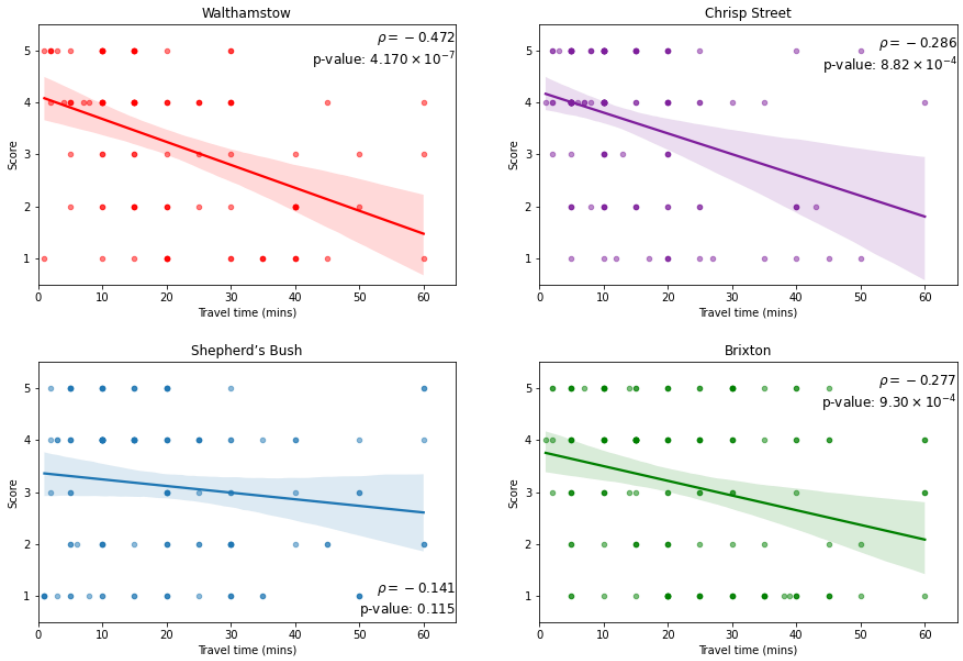

Figure 2: Correlation between reported travel time and score of bumping into a friend, with a 95% confidence interval of the slope. Lighter points represent fewer responses. Figure made using seaborn (Waskom et al., 2014).

be supported for the market.

While rent increases has been reported for Shepherd's Bush Market, the regeneration did not cause controversy like in Brixton, so the lack of correlation is not a big surprise. There were five responses in Walthamstow about declining quality and having less shops and variety. Several responses from Chrisp Street and Brixton also reiterated the need for regeneration. Brixton market had the most conflict over redevelopment, so it is surprising that Brixton has a relatively flat slope, indicating that the effect of distance on meeting friends is not very big. Still, the qualitative responses are overall positive about their experience of the market as a meaningful place. The responses about gentrification or some sort of decline supports the framing that markets are declining, but it is not the majority. Most have, however, offered suggestions to how the market can enrich their sense of place.

The frequency of visiting the market has the strongest correlation with travel time in all markets. In Figure 3, the 95% confidence intervals of the slopes are narrow and negative. However, the slope in Shepherd's Bush market is still flat enough that a no-correlation line is possible. A F-test on the regressions rejected the null hypothesis that an intercept-only regression model is better. The largest p-value is 6.47×10^{-16}. This shows that people close to the market are more likely to visit more frequently, supporting Tobler's first law that closer things interact more.

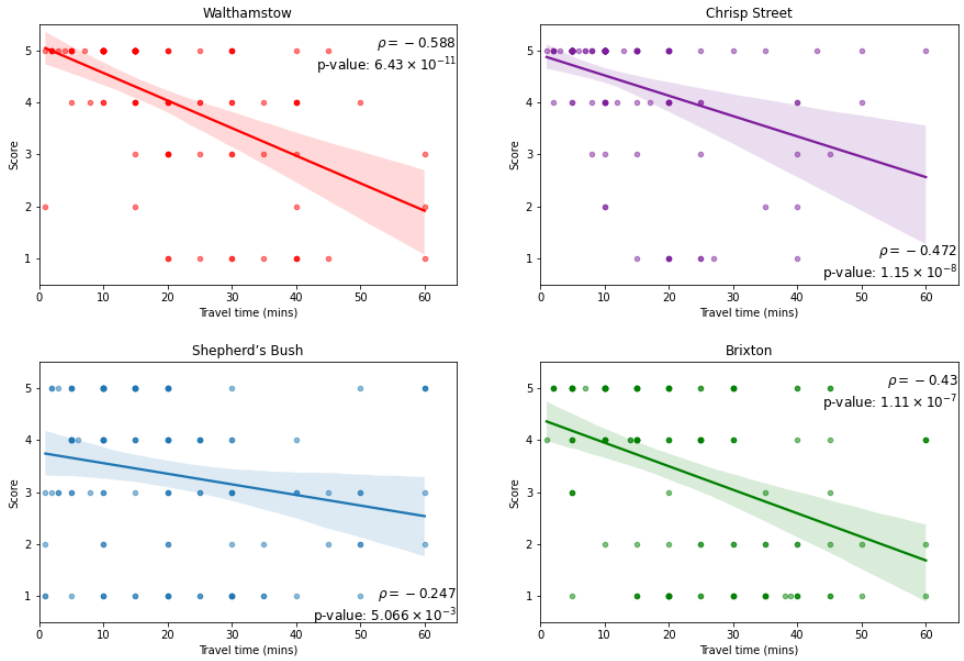

Figure 3: Correlation between reported travel time and score of market frequency, with a 95% confidence interval of the slope. Lighter points represent fewer responses.

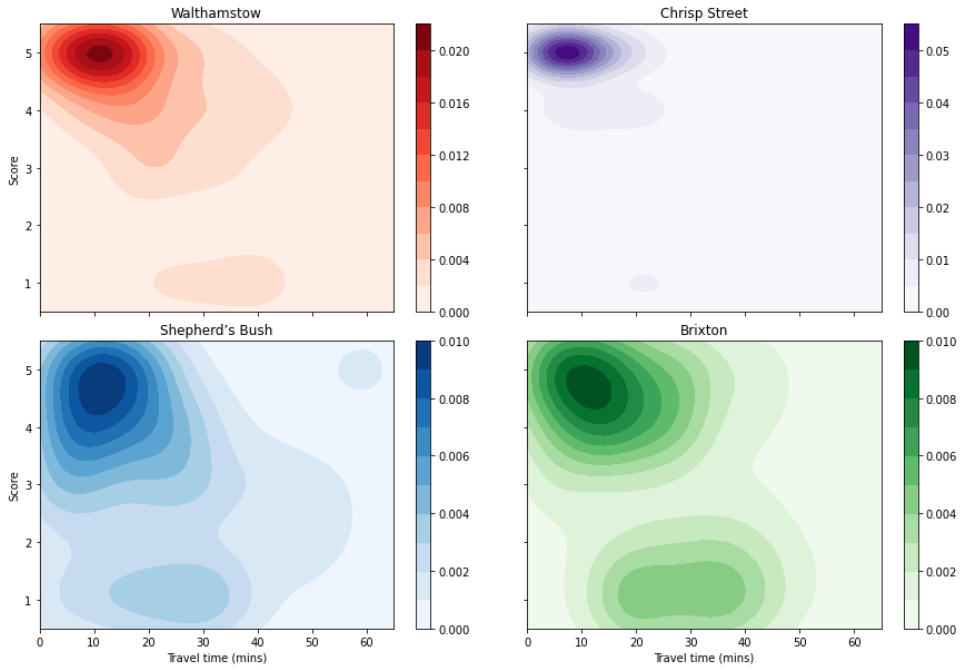

Figure 4: A bivariate kernel density estimation plot, showing a possible probability density function and where data points are concentrated at.

Figure 4 is a plot of the kernel density estimate (KDE), showing that points are clustered in the top left. It was previously difficult to see because most of those points have the same coordinates. The KDE is useful because it estimates the probability density function non-parametrically (VanderPlas, 2016). The pdf is not unimodal, because there

is a concentration of points in the bottom.

The limitation of this regression analysis is that the score is ordinal not continuous. This might be a reason in why some correlations were not significant and the residuals are high. The Spearman ρ is negative and magnitude is middling to low, so as travel time increases, the scores given decreases but not very consistently.

A Likert scale is used for all the place attachment questions. Whether if it is considered ordinal-categorical, or interval, is widely debated (Bertram, 2007). For example, the distance between each item might not be the same as consecutive integers (Jamieson, 2004). Using Spearman's ρ avoids assuming a probability distribution, unlike the mean, standard deviation, and the R^2 value.

5 Conclusion

The research question is whether there is a correlation between place attachment and spatial distance in London markets. Out of seven place attachment measures, only four has a majority of markets with a statistically significant regression, and only one where all markets were significant. Therefore, there is no strong support that place attachment is correlated with distance. The only safe conclusion is that Tobler's first law of geography somewhat holds for spatial interaction around London markets. The frequency of visiting the market does not necessarily indicate attachment, because of the difference between the frequency and the reported likelihood of revisiting. "Preferring over other markets" having a significant negative correlation with travel time can indicate spatial competition where shoppers are more likely to shop at a closer store than not, supporting Tobler's first law. Yet, it does not necessarily indicate place attachment. Furthermore, Rubin et al. (2006) found that 80% of customers in Queens Market said they could buy unique items, but none of the four markets had a significant correlation for this question.

Overall, there is no conclusive evidence that place attachment towards the four markets are correlated with spatial distance, only that spatial interaction usually decays with distance. The negative result is important as it implies that people's sense of place can persist against distance decay, and processes of resistance, exclusion and inclusion manifest itself across considerable space. More empirical research is needed on resistance and exclusion in London markets to verify that.

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