

**Customisation and Urban Design: Evaluating the role of informal street user modifications in the distribution of static activities and perceptions of streetscape settings**

**Richard Martin Timmerman**

University College London

Doctor of Philosophy in Planning Studies

I, Richard Martin Timmerman, confirm that work presented in this is thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Signature ..... Date .....

## **Abstract**

*Since the mid-twentieth century, the urban planning and design practices have battled to counter their association with the creation of dead urban spaces. This deadness is conveyed in their lack of pedestrian activities – conviviality, spatial interactions – and negative perceptions of such spaces. In a variety of ways, urban design theorists have suggested that the negative impressions of planning are connected to the system's inability to acknowledge the opinions of those subjected to it. The process of producing public spaces often result in inflexible scenarios that fail to acknowledge constantly changing end-user requirements. In several narratives, planning processes are compared to the monotony of mass-production processes – a linear process that limits participation and variety in designs by their end-users.*

*Today, manufacturing processes offer mass-customisation as an approach towards diversifying end products, devolving design powers to customers who informally modify and optimise their products. Mass-customisation allows for end-user modifications throughout a product's creation and post-construction. While collaborative design is embedded into many urban design processes, comparable flexibilities and successes observed in mass-customisation are not apparent.*

*Through the empirical study of three London retail high streets, with contrasting population demographics, the impacts of informally customised streetscape features on the distribution of static pedestrian activities are scrutinised. Evidence is tested against the opinions of a selection of pedestrians distributed in streetscape regions with varying intensities of customisation.*

*This research finds that an increased presence of customisation results in increased pedestrian activities, vitality, and positive spatial perceptions. It also finds that there is an optimal level of complexity associated with informal modifications, corresponding with past studies concerning the negative impacts of over complexity on human responses to spatial settings – a theoretical threshold. Therefore, moderate implementations of customisation are linked to the increased clustering of static activities and satisfaction across varied demographics and spatial settings.*

## Impact Statement

The contents of this thesis can be applied to enrich academic explorations into understanding the function of places. Additionally, it presents modifications to methods used by urban designers and similar professionals engaged in spatial analysis. It compares existing processes of mass-customisation, found in product design, to the production of urban spaces. A new perspective on the implementation of informality in urban morphology discussions emerges – an urban space, a product, can subsequently be altered directly by its end users – customisation. This research contributes an understanding of how acts of customisation can impact on the specific pedestrian activities and production of satisfactory urban spaces. It also contributes fresh theoretical insights to urban design on the impacts of over complexity to the vitality and perception of urban spaces.

The core academic contribution of this thesis is an enriched understanding of the conditions in urban spaces that result in human-spatial interactions, indicated by their overall popularity. This research builds on previous studies covering informal interactions in the creation of lively urban spaces. In addition to urban planners and designers, findings are potentially useful for anthropologists with an interest in human-environment interactions. The findings can also ground studies exploring the impact of specific spatial configurations on pedestrian flows, where it emphasises the importance of informality in the creation of captivating streetscapes.

This thesis introduces a method of spatially measuring the presence of urban attributes that are usually discussed subjectively in qualitative studies. It introduces a fresh heat mapping method that builds on the ‘Star Model’ (Varna, 2014) and quantitative approaches to measuring the ‘life’ of buildings (Salingaros, 2006). This method potentially provides data useful in rationalising static pedestrian distributions alongside space syntax tools such as convex mapping and axial lines (Al Sayed et al, 2014). The heat map can be applied as tool to enhance spatial analysis exercises conducted by a variety of professionals involved in environmental design, potentially ranging from interior designers through to master planners.

The benefits outside of academia principally concern the factors that lead to the popularity and satisfaction of urban spaces. Presented herein is an advocacy for facilitation of informality in design approaches, supported by evidence of naturally lively streetscapes in urban settings that are not rigorously regulated but gradually modified by their users.

New methods are introduced that automate several observation tools defined by Jan Gehl and Brigitte Svarre (2013). An app is introduced called Parade™ that uses consumer-grade GPS data to quickly geo-tag pedestrian activities.

Parade™ can be repurposed to trace pedestrian routes through urban spaces. The app provides useful data for business analysts interested in the foot-fall and popularity of high street segments or single retail units.

Additionally, a new method is introduced that measures colours extracted from photographs. It involves the semi-automated identification of dominant colours, providing faster alternatives to approaches like the ‘Sky View Factor pipeline’ (Middle et al, 2017). This tool can also be applied to colour-based studies such as those concerning urban greenery (Middel et al, 2017) or rooving types (Yang, 2016).

## **Acknowledgements**

The completion of this thesis has been the product of a variety of experiences that caused me to reflect and improve the integrity of my character. Fortunately, throughout the high and the low points of this journey, I have been graced with support and generosity from true friends and family.

I am ever grateful for the support of Professor Stephen Marshall, my primary supervisor, who has been selfless in his advice and encouragement. Despite the obscurity of my research topic, he enthusiastically recommended conferences and actively involved me in UCL's academic life. I am also grateful for Dr Robin Hickman's genuine interest, guidance and perspectives during crucial points of my research.

I take this opportunity to specifically thank my family for their support and encouragement throughout my studies, and am especially grateful for my brother, Roderick Timmerman, who helped to develop the Parade™ app featured herein.

Finally, I give thanks to Sharon Richardson and the staff at UCL's Centre for Advanced Spatial Analysis (CASA) who made it possible for me to analyse 4G networks through the provision of anonymised data from Open Signal for each of the case studies covered in the analysis chapters of this thesis.

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## 1 Introduction

*This chapter begins by discussing our human desire to adjust and adapt things. It then goes on to introduce the continued criticism of urban planning and its machine, urban design, as being unable to produce completely satisfactory spaces largely because of the despotism still apparent in its present-day practices. It briefly compares the growth and transition of comparable design processes that have gone further by allowing customisation towards the creation of ideal end-products for end-users. Also, it briefly explores the present state of studies concerning the impact of informal design interventions on the perceptibility of urban spaces and highlights the need for empirical evidence in testing the influences of informality in street user behavioural responses. From this exploration, key research questions were derived. These questions aim to test the novel applications of methods that measure the impact of customisations in three transitional urban spaces – streetscapes. Finally, this chapter provides an overview of the structure of this thesis.*

### 1.1 Problem

*“Gentlemen. If it looks like a bunker, smells like a bunker and allows sunlight in like a bunker: logic dictates-then-that it is a library or school, hospital, or town hall” – Gywn in Jordison and Kieran, 2003*

People constantly alter and modify designed entities in order to optimise their functionality for addressing their individual needs. When using an office chair for the first time, we tend to adjust the height, handles, and seatback angle to our personal satisfaction. Guitarist Jimi Hendrix (b. 1942, d. 1970) took a standard Fender Stratocaster electric guitar and, being left-handed, turned it upside down, reversed the strings, and changed its sound through a variety of effects, in order to produce a sound with which he could work with. Although his efforts were primarily selfish, the music he produced became hugely popular causing him to be inducted into the Rock and Roll Hall of Fame, and for two of his guitars to be added to America’s Smithsonian archives.

In this respect, what Jimi Hendrix did was not out of rebellion but out of necessity. When man-made structures are dropped and left in the oceans, they are repurposed by marine creatures and vegetation resulting in features such as artificial reefs. Such reefs not only bolster sea life biodiversity in ways beneficial for fishermen, but also provide popular settings for snorkelling, scuba diving, fishing, and glass bottom boat tours (Johns et al, 2001). It is a basic instinct for nature to optimise or adapt designs to suit their needs – we are no exception to this.

It is not unusual to find evidence of informal modifications to the design of urban spaces in the form of street art, sculpting, and alternative uses to name but a few interventions. In some instances, such informal modifications are regarded as having a positive impact on the perceptibility of an environment. Exceptional examples were noted with Simon Rodia's Watts Towers in Los Angeles and Nek Chand's Rock gardens in Chandigarh, both of which are considered as transformative factors in dystopian urban fabrics by specific sources. Simon Rodia's towers are considered as a response to the "scattered collection of shacks, trailers, and weather-beaten bungalows...improvised" conditions of the Watts neighbourhood by filmmaker William Hale (1957) who records a mixture of bewildered responses from locals – mostly positive to Rodia's contribution (ibid.). Nek Chand's construction of the Chandigarh Rock Garden is a direct response to Le Corbusier's culturally insensitive 1950s mass redevelopment of Chandigarh and is now a popular tourist attraction in the city (Kochan, 2016). Everyone has their own way of seeing, interpreting, and assessing an urban environment (Romice et al, 2010). However, it can be argued that the majority of informal changes applied to urban spaces are made by distinctive minorities – independent business owners who put up chalkboards, street artists, street performers, and guerrilla gardeners. Nonetheless, questions as to whether such informal modifications definitively alter the popularity of an urban space remain largely unanswered in quantitative terms.

Taking into consideration human responses towards descriptively bland urban environments that lack a sense of place, it is apparent that people are more driven to modify and enhance aspects of the environment, transforming it into something that has 'meaning' to them or that 'responds better' to their needs.

There is a certain flexibility offered by bland environments that accommodates customisation. In Chandigarh, the singular vision of Le Corbusier provides a perfect foundation for design provocations that result in creative responses such as Chand's Rock Garden. More subtle informal designs are noted in the colours of façades, signage and symbolisms presented in the present-day city mainly to reflect cultural traditions (see Figure 1).



*Figure 1. Chandigarh's Sector 17 during Diwali (source: Sharma, 2017 – Hindustan Times). Note the different interior lighting colour hues and temperatures.*

A counter-argument supporting the facilitation of blandness is connected to mankind's natural inclination to improve the look and feel of an entity, making it more relatable. Indeed, blandness in design has been associated with the stimulation of creative responses (Mahnke, 1996; Hanes, 2005 – discussed further in section 3.5). Therefore, a potential role of urban design could be to provide deliberately bland urban spaces with the intention of allowing local communities to ultimately define the final aesthetic, physical and functional properties.

Our knowledge of human responses towards informal interventions in urban spaces is limited to a scattering of isolated studies, where it can be further argued that many of these studies do not feature social theories found in 'cognate' disciplines such as psychology, urban geography, sociology, and the

humanities (see Cuthbert, 2007). This situation contributes to increased criticisms of urban design theory, some of which challenge the practice's scientific foundations (Cuthbert, 2007; Marshall, 2012). It is therefore increasingly imperative that empirical proof is presented which both quantitatively and qualitatively tests theories concerning the impact of informal interventions on the use and life of urban spaces.

Scientists have long sought to identify and replicate the components of life in all things, where their subject becomes a self-sustaining and interactive entity, usually manifesting the vitality, vigour, or energy of the entity (Oxford Dictionary, 2014). The same is true for the social scientists practicing in the fields of urban planning and design as they seek to revitalise 'dead' urban spaces and/or create new spaces that are popular and self-sustaining in convivial and interactive terms; this is evidenced in their positive intensity of use and heightened levels of activities within. However, it can be argued that such conditions occur naturally and cannot be deliberately manipulated; rather, the development of popular spaces is a gradual and deregulated process, when explored in component terms such a process is perceptively chaotic. In 1965, Christopher Alexander inferred that it is impossible to conceive the complexity of overlapping urban features, comparable to the structures of mathematical semi-lattices, in a single mental act (see Alexander, 1965, p. 17). To counteract the chaos, rationality through regulation and suppression of seemingly erratic design interventions take the form of schematic masterplans that are frequently criticised as failing to embody vernacularisms especially in the long term.



Figure 2. Excerpt of Louis XIV ordering the construction of Les Invalides [source: History of the King, 1716-24. Versailles, Château De Ve]



In his book *Urbanisme* (1925), Le Corbusier, wrote “[homage] to a great urbanist: This despot conceived great things and realised them. The brightness of his glory covers the country, everywhere. He was able to say: I desire! Or such is my pleasure” (p. 285) when describing Louis XIV ordering of the construction of Les Invalides (Brott, 2014), located in the 7<sup>th</sup> arrondissement of Paris, France (see Figure 2). This statement is subsequently synonymous with Le Corbusier’s subjectively utopian plans like the *Radiant City* and the built examples such as *Chandigarh*, India. In this instance, the despot is the planner. The narcissism associated with the despot/despotism is comparable to the ‘single thought’ planning and design approaches connected to the conception of dysfunctional urban realms. Recent past studies have discussed the dangers of despotism in urban planning, where a single entity has complete control over a situation. Rational planning responses towards perceptively chaotic spaces were most prevalent in the early to mid-twentieth century and were often championed by visionaries (Callahan and Ikeda, 2014). Of Le Corbusier, James C Scott wrote, “[He] had no patience for the physical environment that centuries of urban living had created. He heaped scorn on the tangle, darkness, and disorder, the crowded and pestilential conditions of Paris and other European cities at the turn of century.” (Callahan and Ikeda, 2014, p. 13 – quoting Scott, 1999, p. 112). The key danger of a singular vision is apparent in in Le Corbusier’s development of Brasilia, criticised by Ricky Burdett as ‘not having the key ingredients of a city: messy streets, people living above shops, and offices nearby’ (Banerji, 2012 while interviewing Burdett in 2010). Today, complete despotism, conveyed by a plan – produced by its machine, Urban Design, has largely been superseded by models of community participation that offer a level of autonomy to the design of urban space, to the communities served.

However, criticisms are still apparent with design still having an inability to reflect the ideals of its end-users. A common criticism of the planning system is the apparent disproportionate power wielded by socially-detached urban designers and planners when shaping spaces to be used by a dynamic/transitional demography of pedestrians (Jacobs, 1961; Arnstein, 1969; Fung, 2004; Alexander et al 2012). Therefore, it is assumed by this research that involvement falls into two broad categories:

1. Passive involvement. Interactions are passive as an urban space is allowed to grow over time, with end-users adjusting the urban morphologies and aesthetics to suit their own needs (see CESE, 2005; Marinetto, 2003).
2. Active involvement. The opposite of passive involvement. The end users of spaces interact with the design and development of an urban space during fixed points in its development. Here, they are manipulated or guided by planners and urban designers towards the conceptualisation of a fully functional urban space. This is an older concept that is inspired by Arnstein's Ladder where she classifies processes commonly found in planning including 'consultation' and 'informing' as forms of tokenism (Arnstein, 1969). Alexander argues that true participation that leads to successful designs takes the form of piecemeal growth (1975) but fails to examine actual responses, beyond his own, to environments that have formed as a result of piecemeal growth in his later works (1986, 2002, 2004, 2005, Alexander et al, 2012).

In the latter, elements of despotism are still ingrained in the regulation of spatial qualities at a micro-morphological level: the removal of street art, banning of street performers and the enforced uniformity of door colours in keeping with design codes. Such actions potentially suppress creativity theoretically linked to the 'life' of urban spaces. Under these circumstances, it is possible that areas with less regulation are potentially more likely to be viewed favourably by their end-users.

While planning continues to struggle with the production of satisfactory urban spaces, other industries have displayed success in allowing clients and/or end users the ability to customise their end products. There is the potential that the adoption of similar techniques in planning, can result in similar levels of success.

This thesis explores the effectiveness of environments conceived largely through self-build practices on their subsequent popularity, where local residents and businesses actively determine its aesthetic, physical, and functional elements – pedestrian reactions to already 'customised' urban

environments. It presents quantitative evidence that contributes rationale to devolved design practice as an alternative model for engagement in the still criticised practices of participatory design and planning. A practical example of such an approach is the possible provisioning of blank public spaces, urban spaces that have the flexibility to be constantly enhanced by their end-users. This study not only contributes an exploration into a novel concept to the design of urban spaces, but also tests the feasibility of a tool that attempts to address criticisms regarding time constraints, costs, and similar inflexibilities associated with community consultation exercises. Additionally, it is an approach that potentially engages a larger demographic; this is discussed further in the conclusions (Chapter 9). While the circumstances surrounding the origins and key actors, processes are not explored in detail, this thesis focuses on studying the effects of spaces that have gradually grown through an accumulation of end-user interventions, on the subsequent perceptions and observed behaviours within a selection of urban spaces.

## **1.2 Research Questions**

In essence, the problem provides evidence that individuals have inbuilt tendencies to modify and create designs in order to satisfy their own needs. The subsequent assumption is that spaces exhibiting more informal design interventions are more likely to be appreciated by their end users. In public spaces, this results in instances of informal interventions. However, such interventions are typically perceived as chaotic and unregulated, thus not in keeping with design codes. Regardless, regulated urban spaces are often perceived as 'dead', and the unregulated are unofficially considered as 'lively' or 'vibrant'. Authors, such as Alexander, champion the organic growth of urban spaces through enabling end-user interventions, comparing the process to growth of flora and fauna (Alexander et al, 2012). When he compares the production of buildings and public spaces to mass-production, urban design inherits the inadequacies of the system, and attention is drawn to implementations of end-user feedback and interventions in processes known as customisation. Customisation is fully defined in Chapter 2, and manifests in urban spaces through their post-construction modification without regulation, and without the direct involvement of a designer. However, the success of hypothetical 'do nothing' strategies by urban planners and designers in the

production of urban spaces, where the character of a space is allowed to grow naturally over time, have not been discussed in strictly empirical terms, where there is a call for further scientific testing of urbanist theories (Cuthbert, 2007; Marshall, 2012). Where end-users in an urban context become ‘street users’, a key question that remains unanswered is ‘whether street user customisations result in increases in street user activities and satisfaction values in urban spaces?’

Answering this question is partly achieved through an exploration of previous research studying the impacts of customised urban environments on levels of satisfaction. These studies are typically ethnographic and therefore more subjective or exploratory rather than being objective, often providing little by way of quantitative data through empirical analysis. Therefore, the hypothetical answer is grounded on parallel studies concerning responses to customisation as observed in situations where it is an easily recognised process – mass customisation. To completely answer the question above, several sub-questions are asked that intend to produce empirical evidence towards quantifying the impact of customised environments on how people respond and use spaces. Answers to questions are ascertained principally through fieldwork analysis.

These three sub-questions are as follows:

- 1. What is the influence of customisation on the occurrence of static pedestrian activities?*
- 2. What are the influencing factors other than customisation, which determine the location of static pedestrian activities?*
- 3. Do apparent positive/negative correlations correspond with the distribution of street user satisfaction?*

Once customisation processes are understood in an urban context, and expected responses towards customisations have been ascertained, the purpose of the fieldwork is to test the impact of customisations on subsequent pedestrian behaviours and opinions. Components of the literature reviewed in the early part of this thesis provide theoretical answers to these questions, however, it is the fieldwork that provides definitive results by measuring the impact of customised environments on pedestrian behaviours.

This thesis finds that the fairest way to explore these questions is through the study of streetscape settings because they intersect with regions with varying degrees of end-user customisation, which can be analysed simultaneously in regions with varied baseline demographics. The case studies are distinguished primarily through their diversity profiles but each carry the common trait of having a street market. High Streets with street markets are important because of their ability to seamlessly transition between 'customised' and 'stock' urban morphologies; they incorporate land uses and spatial configurations that range from considerably conventional to niche, regulated to unregulated.

In answering these questions, it is hoped that the benefits of transitional shifts from mass-production to specific mass-customisation processes resulting in products that are tailored to customer needs, noted in manufacturing industries, can effectively be realised in urban design – a process that has similar characteristics to mass production. The placement of a priority for end-user participation carries the strong possibility of also addressing the perception of the planning process being subject to despotism.

The components this thesis strives to explore and build upon by answering these questions, are summarised in Figure 3.

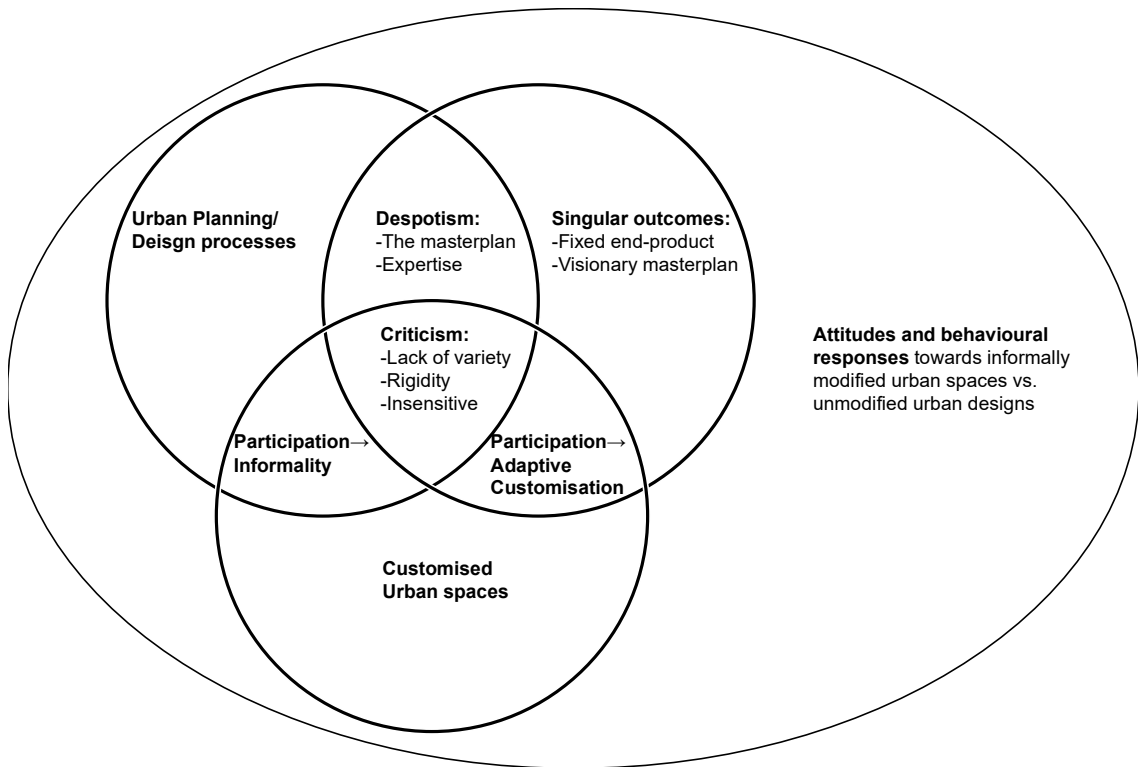


Figure 3. A Venn diagram overview of the core connecting themes that feed into this thesis

The problem identifies that urban planning is still regarded as an exclusive process that exhibits the hallmarks of despotisms, compounded by singular and rigid visions when it comes to design of public spaces. Like urban planning and urban design, mass production processes have come under fire for their lack of variety and insensitivity in the design of products that have to be used by a broad range of individualities. Literature reviewed in this thesis reveals that manufacturers have gradually moved away from mass production processes to mass customisation, specifically adaptive customisation that gives a customer the power to alter and optimise a product to their individual specification after it has left the factory. A rough interpretation to this in urban design is apparent in the informal redesign of urban spaces leading to resulting in 'customised' urban spaces. This thesis seeks to assess attitudes and behavioural responses towards customised urban spaces and examine how they contrast to unmodified (stock) characteristics and features.

### **1.3 Methodology and objectives**

To address the questions above, this study primarily adopts a quantitative approach towards the provision of empirical data which analyses the impact of informal customisations on the dispersal of a range of static activities. In the context of this thesis, liveliness refers to numbers and distributions of people present within an urban space. With popularity being the main indicator of success in urban spaces, the impact of urban customisation in everyday urban spaces are subsequently compared to the successes of customisable everyday products. Liveliness is the manifestation of 'life', where 'life' is synonymous with increased informality in an urban environment's composition, stimulated by deregulation within an urban planning context.

Groundings are taken from studies that examine the quality of urban design on reactions, feelings and attitudes towards a public space. These are examined through literature surrounding the work of William H Whyte's 'Social Life of Small Urban Spaces' that examines the placement of people in relation to specific urban features and environmental conditions, Henry Shaftoe's 'Convivial Urban Spaces' that examines urban environmental conditions that lead to social encounters in urban settings, and Quentin Stevens' 'Ludic City' that explores the conditions linked to play and interpersonal interactions in urban spaces.

To measure life, Nikos Salingaros' approach to measuring the life of building façades, using Alexander's conjecture of organicness (1997; Salingaros and Mehaffy, 2006), is readapted both, in terms of the analysed criteria and its spatial application, in order to begin to address the first research question. Instead of measuring 'life' as per Salingaros' definition, the approach focuses on measuring the presence of informal interventions, customisations. The criteria were modified to measure urban design features, while the spatial application moved away from a single thing, a building or space, to the accumulation of features found within a space. The revised attributes follow a similar approach to Georgiana Varna's Star Model, which measures the publicness of urban spaces (2014). Instead of measuring the sociability of spaces, the categories are made to measure the presence of customisation. Fourteen attributes are identified and measured in a subdivided quadrant of a streetscape. The scores

are essentially averaged to give a 'customisation score', which represents the intensity of customisation presence – the higher the score, the more subjected a quadrant has been to customisation. A key deliverable of this method is a heat map that visualises the spatial distribution of areas that have or have not been extensively modified by their end-users. This methodical approach is detailed in section 5.1.3 and the results are discussed in Chapter 6.

The second part of the first research question addresses 'the occurrence of static pedestrian activities', a Jan Gehl approach to measuring the 'life' or busyness of an urban space (2011; Gehl and Svarre, 2013). Gehl suggests the mapping of static activities by marking points or symbols on to a map which corresponds with a particular activity. However, this approach presented several challenges including:

- Human error – the accuracy of marking a map from a vantage point – issues concerning depth of field and viewing angles
- Time taken to record the distribution of static activities along a streetscape setting – activities can shift with time (i.e. more prominent at lunch breaks in late afternoon)

The practical application of Gehl's method resulted in a hybrid approach that relies on a tool created specifically for this research, an App called Parade™ (Timmerman and Timmerman, 2018). Using freely available consumer GPS data, Parade™ debuts a method of mapping static activities, by replacing random human error with a calculated computer-error, in the placing of points in an urban space. The app also provides a time efficient way of mapping activities throughout an urban space, by recording an activity at the touch of a button as the researcher places themselves in proximity to a static activity, thereby assigning it an appropriate category. This approach is discussed in full in section 5.1.4 and its results are fully discussed in Chapter 6. It also features in Chapters 7 and 8; in 8 the tool repurposed as a pure geotagger and applied to modify and enhance Yodan Rofé's feeling maps technique (2004).

The second research question concerns the role of factors other than customisation in the distribution of static activities. For this research, three externalities are explored:

1. Street furniture (identified in Transport for London indices)



2. Land uses
3. Mobile network coverage

In the case of street furniture, static activities are matched against spatial occurrences of street furniture recognised by Finch et al (2010). These are identified using a combination of Parade™ and Google Earth, and spatially mapped against the customisation heat map and the static activities captured by Parade™. To capture the influence of street furniture types, their occurrences are appended as metadata to the customisation heat map. This approach enables regression analysis between static activities, their proximity (within 10 metres) to a land use, and their respective customisation scores (see sections 5.2.3 and 7.1).

The approach taken to measure the impact of land uses on static activities relies on proximities to particular land uses at distances of less than 3.5 metres. Pedestrians falling within this distance are considered to be under the influence of that particular land use, where the presence of customisation scores data makes it possible to analyse whether customisation overrides the presence of a land use, acts as a catalyst, or plays no significant role in the activities that occur close to a particular land use. This method is detailed in section 5.2.3.2, where the results are discussed in 7.2.

To test whether pedestrian activities are more likely to be influenced by mobile network strengths – good phone signal reception of no less than 4G, data was obtained from Open Signal through UCL's Centre of Advanced Spatial Analysis (CASA). Signal strength averages were calculated against the 10-metre polygon array of the customisation heat map resulting in a data set on which static activity distributions could be compared to signal strengths using regression analysis.

To address the third question, concerning whether there is a relationship between customisation and street user satisfaction, qualitative data was collected from 130 pedestrians who participated in a satisfaction survey. This data adopts a similar approach found in Serviscape surveys, used to measure the quality of indoor spaces (see section 5.3.1). To measure the quality of outdoor urban spaces – 'Urbiscapes', the criteria of Serviscapes were converted

to cover outdoor characteristics instead of indoor ones. The technique was further modified by building on Rofé's feeling map tool – here Parade™ is used to geotag Urbiscape surveys with GPS enabling the data to become mappable and to be analysed using geographically weighted regression (GWR, see 5.3.4).

To aid the significance of the findings of the Urbiscape analysis, choice-based conjoint analysis (CBC) is used to determine whether satisfaction is based on subjectivity or is influenced to some extent by the immediate aesthetic, physical, and functional characteristics of immediate environmental surroundings. The CBC task involved asking pedestrians to choose between fictitious spatial configurations that either exhibited evidence of customisation or were largely unaltered and heavily regulated.

The overall findings of this research reveal a weak positive correlation between high levels of customisation and high levels of static activities. This correlation is strengthened when pedestrians were engaged in activities that interact directly with the built environment. Pedestrians are more likely to pay attention to their surroundings when situated in an environment that has been subjected to extensive customisation. This key finding is supported by the pedestrian opinion survey that saw a greater willingness to retain the characteristics of customised settings. However, pedestrians are more likely hypothetically to modify regions that are comparatively stock. Nonetheless, weak correlations can be attributed to the presence of external influencing factors. For example, high mobile network strengths do correlate with locations of where people stand or sit to enjoy life. Where externalities appear to be influential, an increased presence of customisation performs the role of a catalyst, and its presence is more likely to attract static activities.

This research presents evidence that can be used towards the conception of alternative approaches to conventional participatory planning practices by demonstrating the versatility of modifiable urban spaces. Finally, this research aims to enhance the tools currently used to analyse pedestrian activities in urban spaces and the assessment of environmental quality using innovative takes on familiar mapping methods.

## **1.4 Structure**

The literature review is found within the next four chapters of this research. This is because this thesis brings together literature from distinct non-built environment fields including environmental psychology, product design theory, and anthropology – bridging the gap between innovative findings in these fields and urban design theory. This is necessary towards enriching an understanding of how public urban spaces work – presently, there are only limited/outdated studies in existence today.

The first half of this thesis delves into literature that establish an urban context for customisation processes that ultimately results in changes to urban forms. Discussed in this section are also expected responses towards acts of customisation by users of urban environments, based on past studies that note attitudes and interactions with customised products and isolated studies on urban spaces.

The second half analyses data collected in the field. It discusses the impact of distinctive customisations on behavioural responses and satisfaction in urban spaces. This is achieved by studying distributions of static activities along the length of streetscapes that have been customised to varying degrees. So, the emphasis is not to study the reactions to processes of customisation, but rather to study reactions towards customised urban spaces.

Chapter 2 delves further into the research problem and discusses past research findings on the conditions associated with the creation of lively urban spaces. It builds on several of Jane Jacobs' ideas concerning the production of urban space presented in her book, 'The death and life of great American cities' (1961). It finds similar observations of dissatisfaction in other production industries and notes Christopher Alexander's comparison of planning processes to mass-production. It finally delves into how the manufacturing industry has taken steps towards enabling more end-user input in the production of satisfactory end-products, through the use of mass-customisation.

Chapter 3 begins by defining customisation and how it currently embeds itself into manufacturing processes. It introduces Pine's four faces of customisation (1993) and compares these to existing design processes apparent in the participatory and informal design processes in urban settings, essentially applying mass-customisation concepts to urban design's production of public spaces. It pays special attention to adaptive customisation, where street users informally modify a design to their satisfaction following its construction. Here, literature indicating the environmental and spatial conditions that lead to adaptive forms of customisation are discussed. Finally, manifestations of customisations in built environments are introduced.

Chapter 4 seeks to establish the expected hypothetical response to customisation by pedestrian users by discussing emotional responses to customised and stock environments based on physiological cues including patterns, colours, and blandness. It then explores the findings of previous studies which investigate opinions and attitudes towards folk art, graffiti and street art, guerrilla gardening and urban knitting.

In Chapter 5, the methodology redefines the research problem as based on hypothetical assertions established in the literature review chapters. It outlines the objective strategy adopted towards objectively addressing the research questions introduced in section 1.2, and introduces a novel approach in the assessment of informal interventions found within urban spaces, essentially based on Salingaros' formulas for measuring 'life' in buildings (1997; 2006) and Georgiana Varna's Star Model (2014). It introduces new and modified data collection tools, including heat mapping techniques, activity mapping with GPS, Urbiscape, and reapplications of choice-based conjoint analyses. These tools are detailed in sections 5.1 to 5.3. Section 5.4 concerns the criteria used to select the case studies. Taking into consideration that other factors may determine how a person behaves in an urban space, section 5.2.3, introduces methods in analysing the impact of these externalities against customisation.

The research analysis is divided across chapters 6, 7, and 8 and analyses collected data towards answering the research questions completely.

Chapter 6 discusses the influence of customisation on the distribution of static pedestrian activities, where a weak positive correlation is observed with the majority of activities. It studies two data sets that represent general static activities and a more in-depth study, with activities following a similar typology to those used by Gehl and Svarre (2013).

Chapter 7 looks at the role of external influencing factors on the particular static activities. It goes on to test the role of customisation in the static activity distributions, finding that customisation acts as a catalyst in land uses correlations, and 'streetscape features'/street furniture. In the case of mobile network signals, it has found that customisation is more likely to influence engaged activities despite the presence of relatively strong 4G signals.

Chapter 8 explores the impact of customisation on pedestrian satisfaction. It takes into consideration the demographic components of age and status – whether a person was a local or a visitor to the case in which they were surveyed. Using geographically weighted regression, and frequency analysis, it was found that customisation not only influences the perceptibility of an urban setting, but also the likelihood that a person will opt for customised features over those that are comparatively 'stock'.

The final chapter 9, forms the discussions and conclusions of the thesis and begins by summarising the key findings of both the literature review and the analysis towards answering the research questions. Specifically, it outlines how the thesis contributes to similar studies conducted by academics such as William H Whyte, Henry Shaftoe, and Quentin Stevens. It goes on to summarise the originality of the research with the unique approach to measuring spatial urban qualities with heat mapping, and activities with GPS tagging. Finally, it suggests ways in which the findings and techniques can be used to enhance both the academic and practice arms of urban design. Notably, this chapter concludes with the suggestion that 'doing less' might actually be 'doing more' in terms of gifting the end-users of urban spaces the final say in how they are rendered and used.

Overleaf are visualisations of how these chapters are connected and interact (Figure 4 and Figure 5).

PhD Chapters Map  
Core themes and Objectives

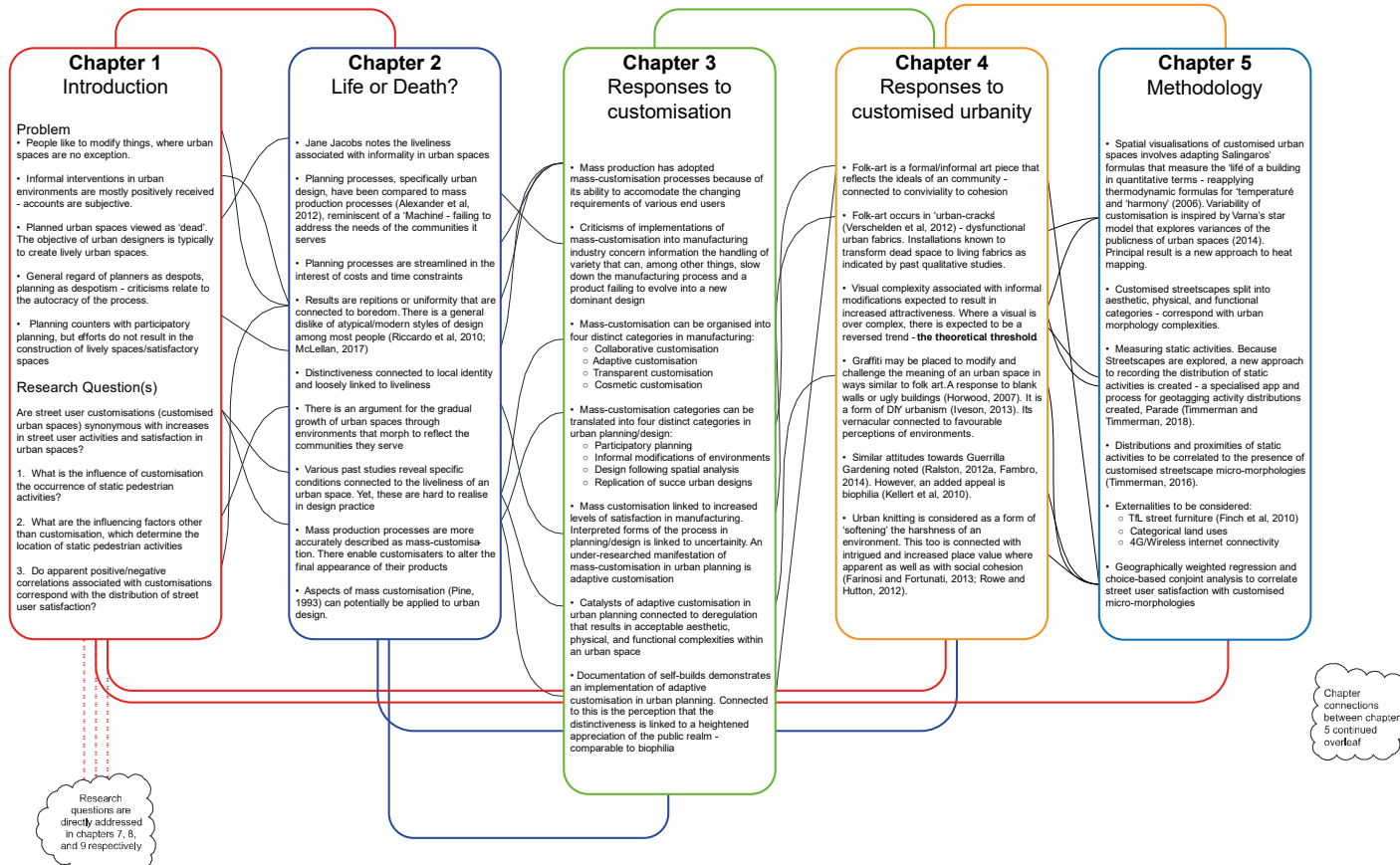


Figure 4. PhD Map of chapters. This thesis transitions from discussions as customisation processes, as an alternative to conventional participatory planning, to responses to 'customised' urban spaces.

PhD Chapters Map  
Core themes and Objectives

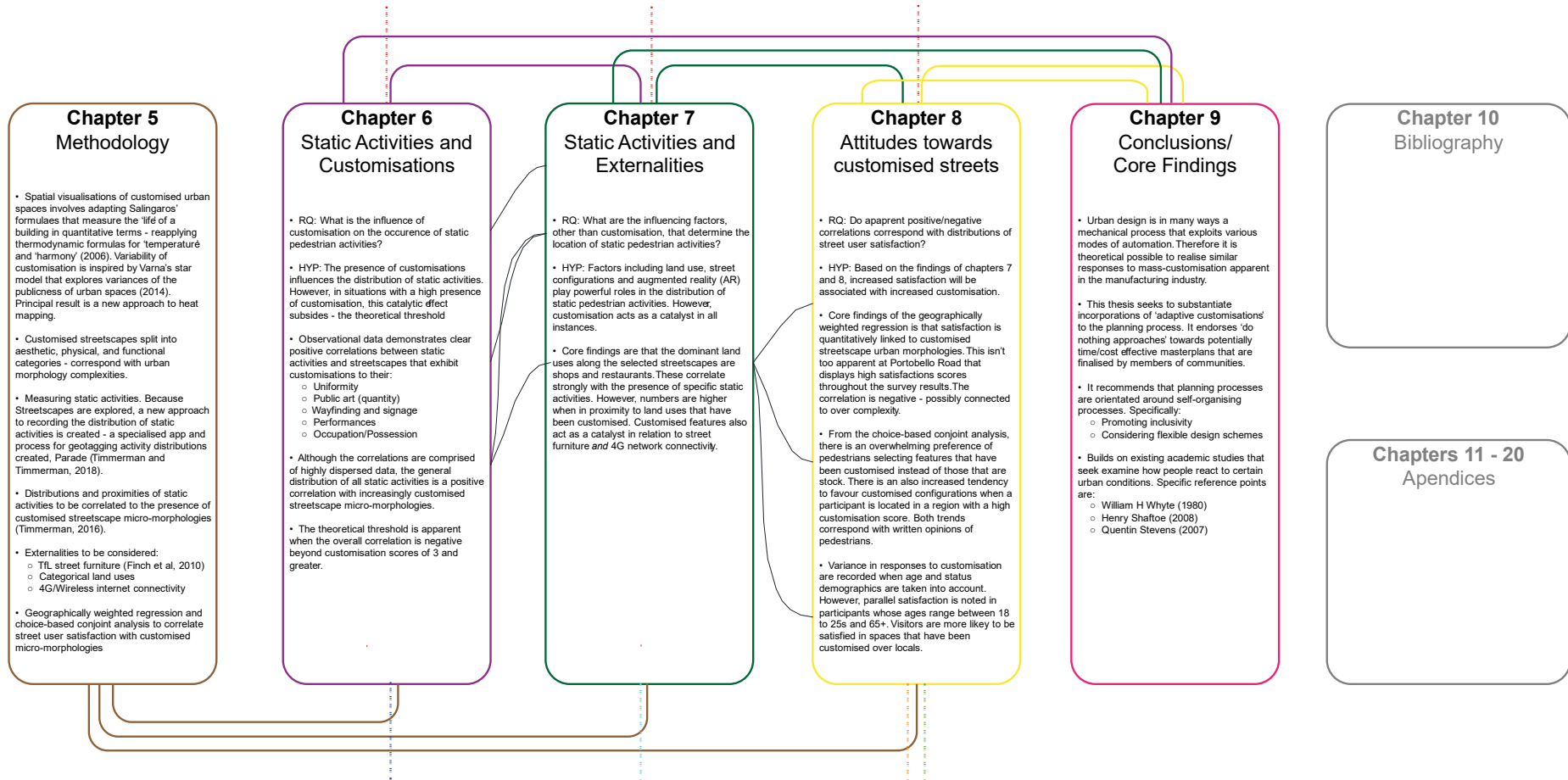
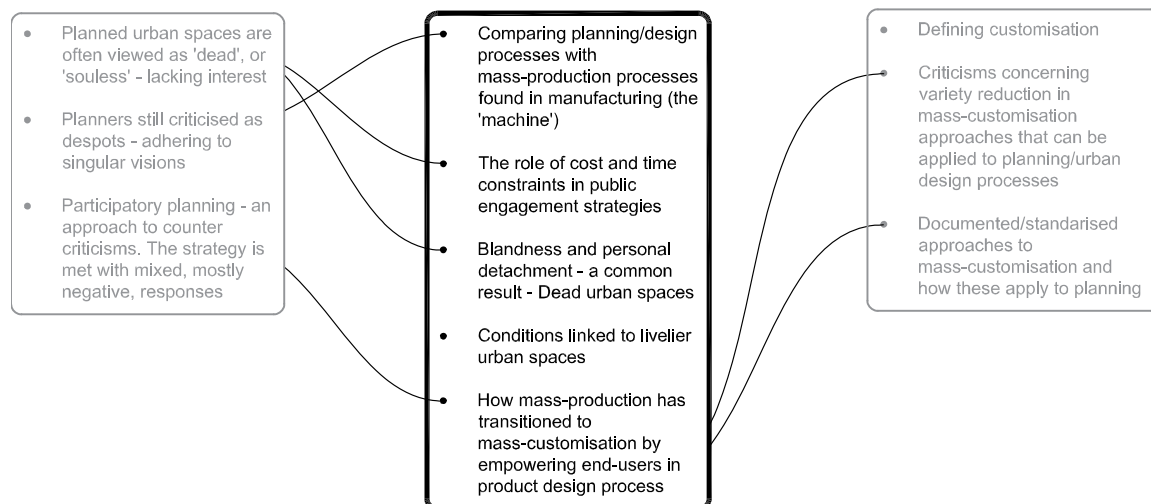


Figure 5. Map of PhD chapters. Chapters 6 to 10 focus on exploring responses to customisation, testing its viability as a viable participatory planning tool in the creation of lively urban spaces.



## 2 Life or Death? Products of the Machine of Urban Planning



*“The streets were alive with children playing, people shopping, people strolling, people talking. Had it had not been a cold January day, there would surely have been people sitting” – Jane Jacobs (1961, p. 19)*

Urban planning and design have long sought to create urban spaces which are highly appreciated and desirable. A widely acknowledged early attempt at this was Ebenezer Howard’s three magnets diagram (Figure 6) which drew on the positive attributes of town and country to form the philosophical town-country template used in the creation of ‘Garden Cities’.

Howard’s model would ultimately inspire the growth of suburbia. Subsequent prescriptive and ‘paternalistic’ approaches (Hall, 2002), found in urban design, exploited the ‘Machine Age’ to materialise idealistic urban fabrics in the form of implementable town plans – classic examples are Le Corbusier’s ‘Radiant City’ and Frank Lloyd Wright’s ‘Broadacre City’ (Fishman, 1982).

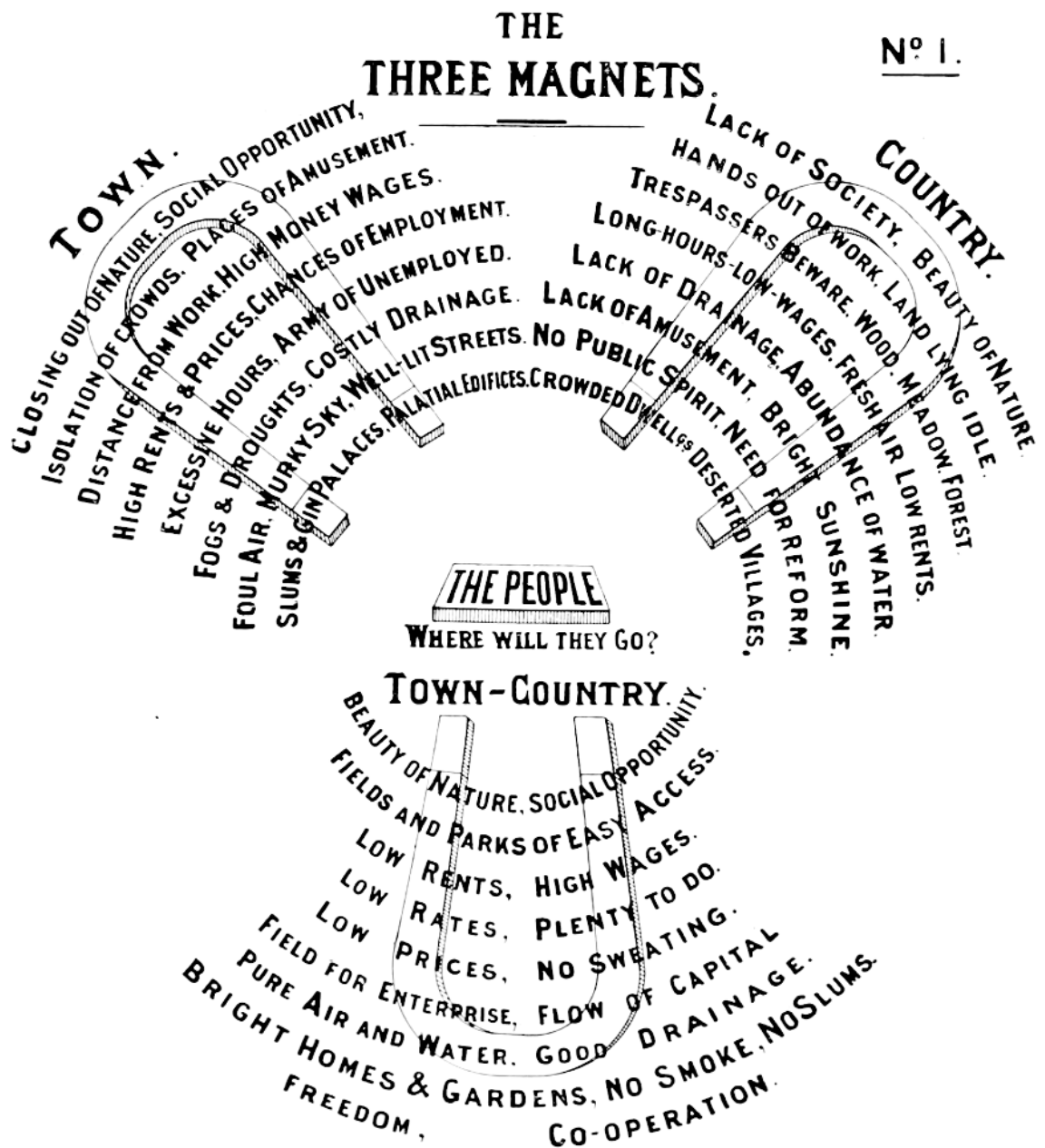
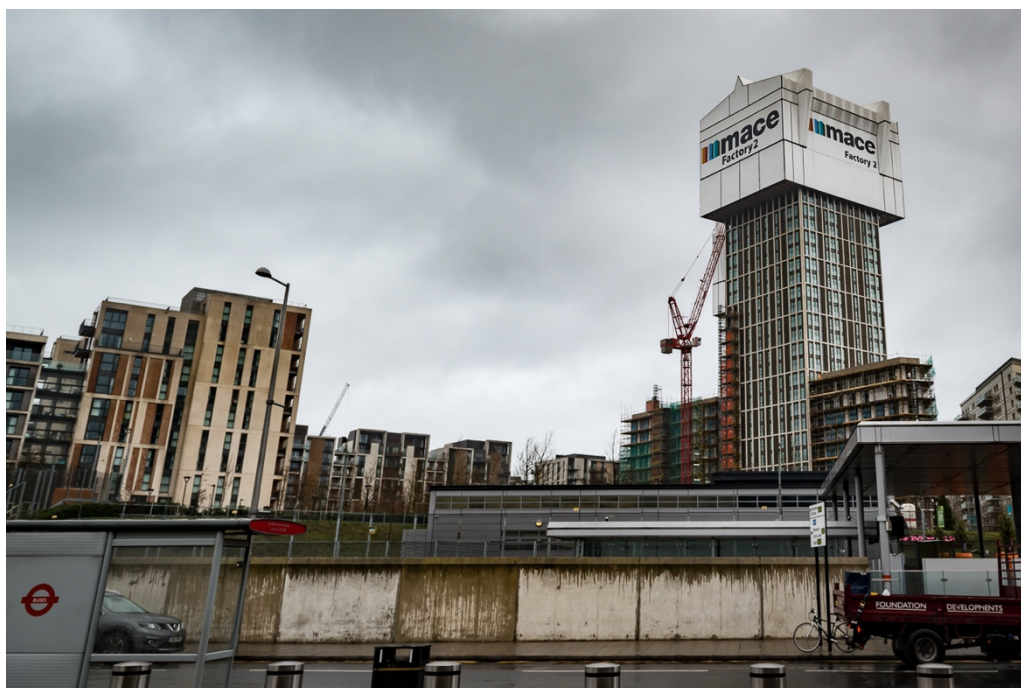


Figure 6. Ebenezer Howard's Three Magnets: Town, Country, and Town-Country (Howard, 1902)

The 'Machine' is mass-production. According to Fishman, the integration of the Machine into planning processes grew out of Wright's questioning of whether "[industrialisation] was the necessary enemy of art and democracy" (ibid. p. 165). Although Le Corbusier observed the destructive effects of The Machine in the loss of meaningful design, he saw its integration with the production of space as inevitable and did little to remedy the situation (see ibid. p. 174). Nonetheless, like Howard's Magnets, Le Corbusier and Wright's models were attempts to "revitalise work and reconcile man with nature" (ibid., p. 164). Their methods of replication, prefabrication and master planning are still in use today and the past

criticisms, synonymous with their approach's creation of dead and unappreciated spaces, still prevalent in today's responses to urban planning.



*Figure 7. Mace 2 Factory at East Village, Stratford. Note the 'Mace factory 2' towards the right of the image and the identical floors immediately below it. (Source: the author)*

Following the London Olympic Games in 2012, the Athletes Village was converted into a residential district now known as East Village. The village was primarily constructed using prefabrication and replication techniques (Moore, 2012). Some 1,001 units were constructed by student accommodation developers Unite (Moore, 2014), and construction continues at the park notably using techniques that have been perfected by Mace Limited with their use of Dorman Long Technology's Pinned Climbing Jack Systems, which builds at a rate of one storey a week (Domanlongtechnology.com, 2017), skeuomorphs of actual factories (see Figure 7). In a provocative 2014 article, the Guardian newspaper collected the views and opinions of readers who are local to East Village (readers and Perry, 2014). The sole expressed view on the design of the housing expressed disdain towards its 'large and characterless' appearance. Although the majority of comments found on destination review site 'Trip Advisor' are positive for the East Village, comments specific to the design of the apartments at Queen Elizabeth Olympic Park describe them as soulless (Tripadvisor.co.uk, 2017). The techniques used in creating these perceptively 'dead' environments were a direct implementation of the Machine, where the associated public realm is potentially considered dystopian. They were used to

save on time and costs, where little to no input was required from the residents. However, these approaches have been criticised in the past as being the main cause for the figurative 'death' of urban spaces. According to Larry Ford (2000), urban spaces are defined and identified by the buildings around them. Conversely, urban spaces can be designed to showcase a development by creating key views (ibid.). In recent years, this symbiotic relationship has suffered (see Ford, 2000, p. 24). Badly designed buildings are leading to poorly designed/received public spaces.

Concerning the evaluative qualities of a building exteriors, Jack Nasar states in plain terms that:

*“Design professionals and others involved in both large-scale and small-scale new construction and renovation create public eyesores” (Nasar, 1994, p. 377)*

He expresses that uniformity and boredom in design can be avoided by design reviews that encourage 'pleasantness' in the following ways (Nasar, 1994, pp. 396 – 397):

- Ordering elements (compatibility, connections to the typical, and styles or stylistic elements that appear to fit a purpose)
- Familiar and historical elements
- Moderate complexity
- Popular over “high” styles
- Reductions in artificial nuisances (traffic, dilapidation, litter, billboards, poles and wires, and incompatible land uses).

The failure of building professions in addressing the above are apparent in ongoing academic debates concerning aesthetic judgements of built environments. A core result is a substantial wealth of materials offering various guidance on how to improve the look and feel of an urban space but that are typically bespoke to a spatial/streetscape typology and usually unable to be applied generically. Despite this, comprehensive implementable approaches have yet to be realised as is evidenced by the documented ability of the design of urban spaces to either positively or negatively influence their subsequent use (Ferdous, 2013). According to a Technical University of Delft study concerning

the redesign of affordable housing façades, specifically, the visual aspects, there are many studies that suggest that the “public generally dislike modern or atypical styles and that, independent of location, architectural style has a great effect on their judgement” (Riccardo et al, 2010). In her thesis entitled ‘Contemporary environmental colour design praxis in the urban context’, Galyna McLellan (2017) builds on Riccardo et al’s work by studying the role of colour in environmental satisfaction. She found that purposeful applications of faded colours on building façades by designers resulted in public dissatisfaction and the repainting of surfaces without the designer’s approval. She notes that this likely occurs because of the inability of purposeful applications of colour to convey symbolic meaning or cultural associations (ibid.).

Distinctiveness that intentionally strengthens local identity by using local materials in a spatial design is considered a key component in the development of successful public spaces (Heffenan et al, 2013). It is integral to the perceptions of lively frontages along with activity, access, conviviality and comfort, safety, robustness, and flexibility (ibid.). Investigating whether a relationship exists between the quality of active frontages and public perceptions of public spaces, Heffenan et al’s study find that the general public are more interested and more comfortable in the ‘context of better-quality active frontages’ (ibid., p. 101). A finding that is comparable to McLellan (2017) and that builds on Gehl et al (2006). In both, symbiotic relationships are revealed between liveliness, active frontages and interactive features present in public spaces. These presented with same perspectives as those presented by Nasar (1994), where Gehl et al write that “[present-day cities] no longer hold appeal of pedestrians” (p. 36) because of their inability to capture the interest of the pedestrians.

From these brief examples, it is apparent that urban designers and planners, in various ways, often fail to construct urban environments that are objectively appreciated by local peoples because of their own subjectivity. This is crucial because a quantifiable outcome of the provision of unattractive public realm is apparent in property values, according to research presented by Kinga Pawlicka in 2014. She notes that ‘growing competition between cities tends to be accompanied by an increasingly marked interest in the architectural

attractiveness of objects' (Pawlicka, 2014, p. 131) and later goes on to state that aesthetics are pivotal in deciding whether to invest in a series of buildings with similar characteristics – the building with the more attractive features, including distinctiveness, is most likely to be considered for investment.

The opposite of 'death' or disuse in urban spaces is 'life' or well-used settings. From 1965, Alexander argues that liveliness can only be achieved by allowing the gradual growth of urban fabrics through the accumulation and overlap of ideas (parts), where the time element will ensure that they come together to form a 'whole' (Alexander, 1965; 1981; 1979; 1987; 2002; 2004; 2005; Alexander et al, 2012; Jiang, 2015). In his most recent work 'The battle for the Life and Beauty of the Earth', he essentially categorises the production of urban spaces into two systems: A and B. In System-A, an urban space is allowed to develop naturally overtime; System-B spaces are constructed using prefabrication and other techniques that place emphasis on efficiency and economy (Alexander et al, 2012). He essentially argues that System-A spaces exhibit more life and beauty than System-B. He also parallels System-B with the rigidity of mass-production. However, his suggestion that System-A results in a synergy of processes conducive of 'life' is subjectively explored within the remotely homogenous context of the Eishin Campus, outside of Tokyo (ibid). Furthermore, his definition of life is convoluted by his attempts to compare natural form to positive human emotions, again, from a subjective point-of-view. Consequently, both 'life' and the impact of spaces that 'have grown over time' are concepts that require further discussion.

From an Architectural perspective, Salingaros expands Alexander's interpretation of life by describing it as, "the degree that one connects with a building in the same way that one connects emotionally to trees, animals and people" (Salingaros, 1997, p. 1). He then goes on to introduce an entropic approach towards measuring 'life' based on the common characteristics found on buildings. However, his definition of life engages the concept of biophilia – man's natural affinity with nature, and how this is expressed. Kellert et al write that the "aesthetic attraction to nature is one of the strongest inclinations of the human species...fostering capacities for curiosity, [and]...exploration...Some of our most

successful buildings and landscapes foster an aesthetic appreciation for natural process and form” (2010, p. 14). Salingaros infers that it is possible to measure the extent to which buildings and objects capture the interest of an individual. Because of its formula-based methods, it is possible to apply Salingaros’s method to measure other inanimate objects found in urban spaces and the extent to which they embody life. However, a specific measure of liveliness – more central to this research, has not been specifically presented by Salingaros to date.

According to Gehl (2011), the liveliness of an urban space can be measured by its overall busyness. This indirectly supports Alexander’s notion of life within the context of where he conveys the features that he finds attractive in a design (Alexander, 2004). However, Gehl’s definition of life describes cumulative situations where people are collectively attracted to a feature or situation in an urban space, of which Alexander can potentially be one such person, leading to its overall busyness or liveliness. Past studies demonstrate that specific conditions are connected to the perceived liveliness in urban spaces.

## **2.1 Conditions associated with liveliness in urban spaces**

William H Whyte states that 'street life' is directly related to how intensively used an urban space is (Whyte, 1980; 1988). Therefore, crowding becomes a defining attribute of 'street life' and is starkly contrasted with 'empty spaces' (Whyte, 1980, pp. 10 – 12). In a study of 'the social life of small urban spaces' Whyte initially correlates the congregation of people to specific microclimatic/environmental conditions. For example, he states that "where the sun was, [people] sat; where there was none they didn't" (Whyte, 1980, p.40). However, he later shares that "...something went wrong. The correlations vanished...the sun moved; the people didn't" (ibid.). With a team of researchers, Whyte documents common spatial features that appeared to coincide with situations of liveliness based on observations carried out in New York.

As such, Whyte attributes street life to specific conditions, including the presence of 'choke points' such as subway stations that are often subjected to high levels of use (ibid., p. 12). However, Whyte goes on to record specific conditions and design configurations that play a role in how intensively used an urban plaza (urban space) is, where he documents the general attributes that are more likely to accommodate crowding.

Whyte first notes that some urban spaces are more likely to accommodate self-congestion based on a natural human inclination to socialise (ibid. pp. 19 – 21). As such, they prefer well-defined places that include steps or ledges to help facilitate conversations (ibid.). Specifically, Whyte correlates crowding to the following spatial attributes:

- Sunfacing seating locations (although not crucial)
- Integral sitting, where seating should be flexible enough to accommodate a range of sitting postures and thus a dynamic range of social activities (ibid. p. 28).
- Seating must be at comfortable heights, and not be designed with sadistic intent (ibid. pp. 29 – 30, 33; see Varna, 2014, p. 37)
- Ideally, seating will ideally be moveable allowing the flexible use of an urban space for social groupings and privacy, thus allowing the space to



become less 'awkward' to its users seeking rest (Whyte, 1980, pp. 33 – 37)

- Well-lit spaces. Spaces not in direct sunlight are still well used when benefitting from reflected sunlight (Whyte, 1980, p. 43).
- Spaces that aren't exposed to strong winds display a much richer street life because of their more favourable microclimates (Whyte, 1980, p. 44).
- Spaces with trees present offer a sense of enclosure, and protection. They also make way for cooler environments during the summer because of the shade they provide (Whyte, 1980, p. 47)
- Spaces with water features provide 'white noise' features that provide a more favourable soundscape to that of vehicular traffic and industrial sounds associated with urban environments. When it can be accessed, water also provides a tactically rich and soothing experience that can encourage the popularity of an urban space (ibid., p. 48)
- Spaces featuring food vendors are more-or-less guaranteed to seed a place with activity; according to Whyte "food attracts people who attract more people" (ibid., p. 52). He observes that when vendors are moved from a lively space, the life of the spaces leaves with them. (ibid., p. 51)

Gehl builds on Whyte's work in his study of 'life between buildings' describing this as "not merely pedestrian traffic or recreational or social activities" (1987, p. 14), but as "[comprising the entire] spectrum of activities which combine to make communal spaces in cities and residential areas meaningful and attractive" (ibid.). Building on the theme of *attractiveness*, Gehl points out that lively environments cause people to detour or pause because of their inviting nature; furthermore, such environments are able to engage users by holding the interest of both the actors (Stevens, 2007) and the passive observers who prefer to not become directly involved with the spontaneous activities present at the urban space (Gehl, 1987, pp. 17 – 18).

Citing Tibbalds (1992), Shaftoe views the causes of life in similar terms to Whyte and Gehl. He also suggests that 'people-friendly towns' can be achieved through "rich, vibrant, mixed-use [environments], that [do not] die at night or at weekends, and that [they are] visually stimulating and attractive to residents and visitors

alike” (Shaftoe, 2008, p. 71). Acknowledging the presence of social influencers, such as performances, he aligns the gradual development of urban spaces with their overall busyness. In many respects, Shaftoe’s work presented in ‘Convivial Urban Spaces’ echoes studies conducted by Whyte and reaches similar conclusions to Gehl, but with an emphasis on conviviality – social encounters. Like Whyte, he points out that people are likely to settle in areas that are *comfortable* (Shaftoe, 2008). Specifically, he identifies:

- The provision of the ‘correct type of seating’ (Shaftoe, 2008, p. 92). In this respect:
  - A range of seating should be provided to accommodate for the different street users
  - Orientated towards the sun
  - Orientated towards a spectacle (i.e. a street scene)
- A degree of shelter and protection
- Spaces to stand or lean
- The provision of food and drink outlets
  - Provision of tables, chairs, and adequate space for eating and drinking
  - Relaxed by-laws on the consumption of food and beverages.

However, Shaftoe goes beyond Whyte (1980, 1988) to suggest that physical attributes can also influence the conviviality of an urban space in addition to the presence of other people. He underpins his argument by identifying that urban spaces can be either ‘loose’ or ‘firm’. Looseness refers to spaces that have been designed with a “see what happens” approach, which he associates with the delivery of spaces that are much more attuned to user needs (Shaftoe, 2008, p. 50). He goes on to highlight the following physical qualities that theoretically influence the use of urban spaces:

- Shape
  - “People seem to like a bit of intrigue – Repetition and bland façades do not stimulate the eye” (ibid., p. 74)
  - Harmony can be achieved without symmetry – interesting ‘squares’ can be added through tree planting and the provision of intriguing links to the surrounding neighbourhood (ibid.).

- Provision of green spaces – can prove to be very popular oases in densely built-up areas. (Contd. P. 79).
- Prioritisation of pedestrian traffic over vehicular traffic (ibid).

Expanding on his identification of 'Shape', Shaftoe emphasises the importance good hard and soft landscaping alongside public art and entertainment. He states that "[as] well as being ends in themselves, they often provide the catalyst for an impromptu conversation between strangers" (Shaftoe, 2008, p. 111). He goes on to mention the single roles of colour, public art, and entertainment in promoting conviviality. He notes that:

- "When people are left to their own devices, one of the first things that they will do is brighten up their surroundings with paint and murals" (ibid. p. 113). He refers to Mahnke (1987) when stating that the **colour** brings joy, particularly in northern climates where grey skies and low light predominate for much of the year (ibid. p. 112).
- Some informal public art enhances the public realm. He gives various examples of how 'drab' concrete walls are enhanced by acts of graffiti or stencilling.
- He writes that entertainment is a cost-efficient method of bringing public spaces to life.

Shaftoe concludes his book by outlining urban features that constitute conviviality. He places these features into the categories of 'physical', 'geographical', 'managerial', and 'psychological and sensual'. He follows these categorisations with an instructive list of 'do's' and 'don'ts'. However, he fails to recommend changes at the micro-morphological level including colours, public art – he partially contradicts himself by stating that "the presence of graffiti tagging [a consequence of 'seeing what happens'], which is not swiftly removed, will encourage more; if rubbish is not cleared up promptly, users will not hesitate to dump more" (Shaftoe, 2008, p. 140). However, his recommendations are targeted at practitioners rather than street users, reinforcing top-down planning approaches. His recommendations are desirable when 'complex technical knowledge is needed during decision making processes' (Irvin and Stansbury, 2004, p. 62) towards avoiding lengthy and costly plans (Irvin and Stansbury,

2004). They become a rule-based approach targeted at the continuous development of the Machine, evidenced in the book's citation in strategic approaches towards refining existing approaches to planning (Bryne and Sipe, 2010; Barton et al, 2015). Regardless, his early points are intriguing and support the notion that informal changes to urban environments can boost or influence conviviality (Varna and Tiesdell, 2010; Salama and Azzali, 2015). Shaftoe mostly achieves this by linking past academic studies and observations of conviviality to past experiments conducted in controlled environments and presents little evidence himself other than through the use of photographs. Like Alexander and Jacobs, the presentation of his work carries subjective overtones and provokes the need for the ideas presented to be further tested.

Quentin Stevens takes on a more academic approach when discussing concept of loose space in the promotion of play activities. In his book 'The Ludic City', Stevens conveys empirical evidence that correlates the impact of physical features on occurrences of play in urban environments (2007). Stevens notes that public art can act as a prop that encourages playful behaviour and discussions because of their ability to allow for an escape from predictable behaviours (ibid.). The latter essentially translates to a pause, or a stationary pedestrian, in a public space.

Through various examples, Stevens also demonstrates ways users influence the role of an urban space through his own exploration and reactions towards purposively built urban spaces, mainly through how they are interpreted and adapted as play areas by subcultures (Stevens, 2007). He discusses activities that temporarily change the function of an urban space and its perception by exploring a variety of activities that occur within settings including protests, street artists, and skateboarding (Stevens, 2007, pp. 73, 90). His arguments mainly revolve around the role physical urban forms intentionally or unintentionally play in encouraging deviant behaviours (Stevens, 2007, pp. 178, 185). Stevens' observations abstractly build on the in-depth study of the relationships between architecture, cities, and the skateboarding subculture by Iain Borden (2001).

Borden demonstrates that the free-culture associated with the skateboarding movement, coupled with it being a generally enjoyable activity, resulted in skateboarders illicitly using private plazas not only to enjoy the sport, but partly to demonstrate their disdain towards the restrictions associated with private land ownership (Borden, 2001, p. 210). Frequently when given a standardised product, the end user may become inclined to add their own modifications in order for it to better suit their needs, preferences, or ideologies. In the case of Borden's observations, the standardised civic spaces became suitable settings for skateboarders to demonstrate their values of freedom or pleasure-over-work ideals (Borden, 2001, p. 173), where skateboarding does not attempt to modify city forms, but rather is a negation of the space in which it is found (Borden, 2001, p. 211). According to Stevens (2007) Skateboarding provides a spectacle that draws crowds as it is a performance. Yet, skateboarding in most desirable settings that are rigid and not designed to accommodate the activity is what skateboarders view as a challenge. To an extent, rigid spaces can initiate responses that purposively inject life into a setting. The phenomenon is somewhat acknowledged by environmental psychologists. When discussing the impact of blank surfaces on human behaviours, Mahnke reveals that physiological responses towards bland or blank facades are heightened and cannot be controlled (Mahnke, 1996, p. 163). Referring to studies in the influence of colour and light on the well-being of psychiatric hospital patients, Mahnke draws parallels between distressing episodes within patients' lives and the aesthetic qualities of their surroundings (ibid; Shine et al, 2014). Mahnke writes:

“Patients housed in mental hospitals are prone to experience hallucinations. Their environment must not generate, or be supportive of, the continuation of hallucinations...A monotonous environment, one that is low in stimulus, may well produce hallucinations. Sterile and uninteresting surroundings deprived of sensory stimulation and offering few opportunities for human interaction, fail to stimulate conscious brain activity in the patient. In the absence of stimulation, the mind tends to seek some source, any source, of stimulus. Subsequently, it begins to seek greater meaning in the flow of thoughts and inner images.” (Mahnke, 1996, pp. 163 – 164)

In 2011, Colin Ellard led small groups of pedestrians through two sites with contrasting land use configurations (Ellard, 2015). One site was dominated by a single long blank façade, while the other site comprised of historic façades and varied land uses. Ellard recorded the physiological response of pedestrians by using a specialised bracelet that provided data on skin conductance – indicative of alertness, readiness to act, pay attention or respond to a threat (ibid.). After noting typical behavioural responses to physical configurations, such as the awkward standing positions of pedestrians when situated in the site with blank façade –symptomatic of ‘boredom’ – and people feeling ‘lively’ in the mixed used setting, Ellard explores the effects of boredom. The fact the boredom is associated with ‘sadness, addiction and disease related stress’ is the main finding of his research. However, he associates the feeling with restless behaviours such as “fidgeting; postural adjustment; a restless gaze; [and] perhaps yawning” and later *risky behaviours* (ibid.). Risky behaviours that directly influence public urban spaces include activities such as graffiti, yarn bombing/urban knitting, or to an extent, modes of play (see Borden, 2001; Stevens, 2007; Turner, 2013).

In the majority of cases, the purpose of granting an end-user of a product the ability to tweak its design is not to change the purpose of design, but rather to enhance it in ways that can allow it to be better appreciated by an individual or positively received by an emerging dominant culture (Buechley et al, 2009; Piroozfar and Piller, 2013; Rofè, 2004).

The quality of attributes found within urban spaces influence how people interact with them. However, people are also free to change or interpret urban spaces. This has an impact on influencing behaviours beyond specific moments that are tied solely to other street users or events.

Literature shows us that props (Stevens, 2007, p. 90) do not always have to be already present within an end design but can be installed by end users in order to enhance the experience of an urban environment. Wunderlich, using three modes of walking - purposive, discursive, and conceptual (Wunderlich, 2008, pp.

132 – 133), demonstrates how each is induced owing to changes in design rhythms (see Kostof, 1991) by public non-design interventions. For example, discursive walking, described as ‘urban roaming’ (Wunderlich, 2008, p. 132), can become a conceptual practice, specifically, when the rhythm of urban spaces is injected with artistic interventions leading to walking styles that deliberately acknowledge the content of an urban environment (Wunderlich, 2008, p. 133). Shaftoe, along with an acknowledgment of the social influencers present, aligns the gradual development of urban spaces to the impact of the quality of the designed environments where, referring to Mahnke (1996), he points out that the correct use of colour can bring ‘joy’ to urban environments (Shaftoe, 2008, p. 112). Acknowledging the mixed views surrounding informal public art which he highlights as appearing primarily in the form of graffiti and stencilling, Shaftoe suggests that responses vary according the quality of the piece, where well executed art pieces can brighten up ‘drab’ concrete walls (Shaftoe, 2008, p. 116 – 117).

Stevens (2007) and Shaftoe (2008) point out the importance of cities being convivial. According to both researchers, conviviality can be achieved through the hosting of public events, or the installation of meaningful props that draw interest to the space.

Another aspect that is known to influence the liveliness of urban space is the presence of vehicular traffic. A year before his death, Donald Appleyard published ‘Livable Streets’ the summary of findings that sought to determine the influence of traffic on the conviviality of a street, also considered an indicator of ‘life’ in a public realm setting (Appleyard, 1981). Based on a 1969 study of three streets, all with similar characteristics with the exception of vehicular traffic volumes and speeds, he presents evidence that busier streets are less likely to foster social ties than quiet settings (Appleyard and Lintell, 1972). When compared to quieter roads, busy streets are undesirable because of the threat of death (Appleyard and Lintell, 1972; 1981). The study was replicated sometime later in Bristol with almost identical results (Hart and Parkhurst, 2011), and is built upon by various streetscape improvement initiatives such Transport for London’s ‘Healthy Streets’ strategy (Layman, 2017) designed to encourage people to ‘feel

relaxed' and 'safe' and to perceive the urban environment as one with 'things to see and do' with 'places to stop' (Saunders et al, 2017) resulting in a social cohesion and appealing public spaces (ibid.)

In the present day, the use of an urban space is influenced by these identified factors; but others must be considered as well, including the introduction of Wi-Fi hotspots and 4G network availability to urban spaces, and the general influence of social media in physical social interactions within urban spaces.

Acknowledging that urban spaces play host to encounters with existing acquaintances, and serendipitous encounters with strangers, Hampton et al (2010) discuss the impact of media technology advances in urban space interactions. They, for example, acknowledge Hoflich's study (2006) that highlights the precedence users give to phone / smartphone interactions over interactions with those others around them. Within the comfort of their bubble-like microcosm (see Hampton et al, 2010, p. 705), people become silent spectators rather than potential participants in events hosted by urban spaces, changing the character of the public space (ibid., p. 706). The findings of Hampton et al, from an experiment involving in part the installation of Wi-Fi hotspots and the observation of their impact on urban space popularity, found that while the popularity of an urban space is dependent on reputation, there is also a strong correlation between the duration of the Wi-Fi hotspot and the number of observed wireless internet users at each site (ibid. p. 708). While those engaged in wireless networks are technically expanding their social networks and keeping informed of the latest news and events, leading to "unanticipated and diverse social engagement – beyond what could have previously been afforded by urban public spaces that are free of internet connectivity" (Hampton et al, 2010, p. 719; Hampton et al, 2015), it must be questioned as to whether Wi-Fi access is truly contributing to the liveliness of urban spaces beyond its increased number of users. Hatuka and Toch (2014) note, in their study covering the use of smartphones and social media conducted within urban spaces, recognise that smartphone users are twice as likely not to engage in resting/reading while in a public space, when compared with users of basic phones (p. 2198). Rather, they are almost as likely to speak with their friends when in a group setting (ibid.).



In basic terms, the presence of a strong phone signal strength and/or Wi-Fi are acknowledged as contributing factors to the increased use of urban spaces, although these technologies do not result in the same immersion observed in urban spaces before the growth in popularity of Wi-Fi and social medias.

The practice of urban design possesses parallels to mass production and inherits criticisms in more obvious ways because its product, urban space, is universally experienced. While there are studies that align specific physical and social conditions to the perception of urban spaces, these studies are mostly applied to towards improve the urban design Machine rather than to explore alternative approaches. Since the late 20<sup>th</sup> century, mass production has transitioned towards continuous improvement, and opted to further devolve design powers to customers notably through the approaches described as *mass customisation*. However, it is still unclear as to how similar transitions occur in urban design processes and what the potential responses to customised urban spaces will look like in terms of the distribution of various pedestrian activities.

## **2.2 From Mass-Production to Mass-Customisation**

Like a car, an urban space is a product of a design process. However, unlike a car of today, their development is largely inflexible and often do not directly address the specific needs of their users over time. Unlike an urban space, cars are often built to last comparatively short times. Cars exhibit degrees of personalisation that cannot be predicted by the manufacturer; the placement of a magic tree, the addition of cushions. Although manufacturers allow for the adjustment of features within a car, such as the height of a steering wheel, or the angle of a seat, the car is interpreted as a final product, however, it is subject to post-construction modifications. On one hand it can be said that manufacturers do not plan for such additions but compensate for them by providing a flexible design; on the other hand, the addition of features to a car can be an indication of unhindered expression, where a user customises their vehicle to fit their specific needs/requirements.

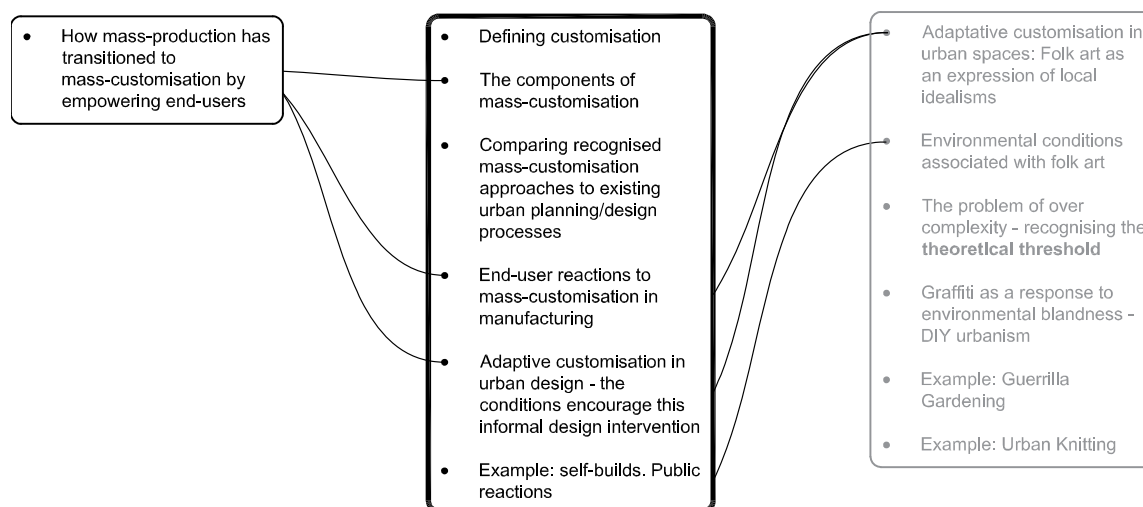
Mass production is typically associated with the Henry Ford's Model T. The practicality and functionality drove its demand albeit with limited variations. As time progressed, customers sought to have more autonomy in the production process, leading to the diversification of processes. In the car industry, the first major shift from mass production was noted with the production in Japanese companies who adopted strategies of continuous improvement in order to compete with western manufacturers by presenting quality assurance (Pine, 1993). According to Pine (1993), applied tools are teams, total quality programmes, benchmarking, and customer satisfaction measures (*ibid.*, p. 364). In response to earlier criticism, urban planners incorporated participation into urban design processes in the form of consultation events. However, these processes can be described as tokenistic. In the context of Arnstein's Ladder of Participation (1969), tokenism refers to placation, consultation, and/or informing (Harris and White, 2013). Arguably, these processes are not fully inclusive as they fall between non-participation (informing, therapy, and manipulation) and citizen power (citizen control, delegated power, and partnership). An indirect response adopted by manufacturers is 'mass-customisation' which addresses the lack of variety associated with continuous improvement. According to Pine, mass-customisation presents a "flexible and responsive" process which permits

maximum variety whilst remaining viable, with each customer receiving a product that fits their needs (see Pine, p. 364).

The term 'mass customisation', which can be described as the "effective postponing of a task of differentiating a product for a specific customer until the latest possible point in the supply network" (Reichwald et al, 2005, p. 420), or from an application perspective, as "a production strategy focused on the broad provision of [personalised] products and services" (Fogliatto et al, 2012, p. 15). The term first appears in Davis's book 'Future Perfect' (1987), where he theorises the process by contrasting it against the already existent 'mass production' process. Mass customisation presents a viable solution to the inflexibilities of the standardisation-centred mass production systems by addressing broader market influences 'changing demographics, changing wants and needs, and uncertainties' (Pine, 1993, p. 32)

As urban designs are continually being altered and maintained, the customer, or street user's, input will be ever present if such a system were to be applied. While urban designs are still broadly criticised as being inflexible and associated with dead/dull/uninteresting urban spaces, lessons observed in shifts in manufacturing processes from mass-production to mass-customisation can be applied to the production of comparatively lively urban spaces.

### 3 The phenomenon of customisation



*According to the Oxford dictionary (2014), ‘customisation’ is defined as the “action or result of [customising]; creation or adaptation (of something) according to the customer’s requirements”. The latter part of the definition can be applied to subsequent modifications to an existing design or product in line with the process of adaptation. Adaptation, according to definitions found within the same dictionary, refers to the process of altering, amending, or modifying something in such a way that it becomes suitable for another use or purpose (Oxford Dictionary, 2014). Within the context of art, customisation moves away from its functional definitions. Instead it is viewed from a formalist perspective which places emphasis on the roles played by both the form and style of the concerned product, and the impact of aesthetics and emotion in end-user satisfaction (Wertz, 2013, p. 524); the goal of product design becomes the modification or enhancement of an existing design (Brinkman and Fine, 2005). The application of product design’s context of customisation leads to definitions associated with do-it-yourself practices (DIY), which can roughly translate into the ‘tinkering, hacking, fixing, reusing, and assembling of materials in creative and unexpected ways’ (Buechley et al, 2009, p. 4823).*

*In this chapter, customisation is defined in its simplest occurrence, and discussed in light of its typical integration with design and manufacturing processes. Its method of application in these settings are contrasted with its occurrence in architectural practice (Pirzoofer et al, 2012; 2013). Subsequently, this chapter*

*attempts to compare current applications of customisation processes to methods used during and after the development of urban spaces.*

*The key points from this discussion will form the basis for a new typology of urban spaces based on the extent to which urban spaces have been altered informally by their street users. The typology will open a debate on how effective the application of customisation is in the creation of lively spaces. This chapter establishes a framework that enhances observations made by Gehl, Whyte, and Shaftoe, who identify attributes that influence the use of urban spaces, by suggesting that end-user (street user) contributions catalyse signs of life in an urban space – its busyness and/or conviviality.*

*The shortcomings of conventional methods of customisation, apparent when customisation fails to reflect or engage the collective views of street users, broadens the adaption of the phenomenon when applied to an urban space setting - customisation becomes the street user's modification of urban spaces both during and after their construction.*

*This broadened definition will be explored within the context of urban morphology, and then studied within the context of its relationship to varied design freedoms and flexibilities associated with formats and implementations of art and form movements. Following this discussion is an exploration into the conditions that spawn customisation. This exploration references studies conducted in the parallel academic fields of environmental psychology and physiology. Clear design attributes are identified which can be aligned to emotional responses towards urban environments that have a similar effect on levels of attraction to those associated with biophilic design (Salingaros, 1997; Kellert et al, 2010). The application of Product Design's context of customisation leads to definitions associated with do-it-yourself practices (DIY), which can roughly translate into the 'tinkering, hacking, fixing, reusing, and assembling of materials in creative and unexpected ways' (Buechley et al, 2009, p. 4823). Theoretically, DIY practices are applicable to urban design.*

### **3.1 The integration of customisation in mass-production processes**

The inflexibilities of mass-production are highlighted by its inability to respond to 'changing demographics, changing wants and needs, and uncertainties' with homogenous markets rapidly becoming a thing of the past; these have long been acknowledged within manufacturing (Pine II, 1993, p. 32; Hart, 1995, p. 38, Garbie, 2016). Consequently, manufacturing has responded to these conditions by enabling their customers to play an active role in the development of their end products through customisation, by way of processes embodied in the process of mass-customisation.

Mass-customisation can be described as "effectively postponing the task of differentiating a product for a specific customer until the latest possible point in the supply network" (Chase et al, 2006, p. 419). When applied to actual production processes, it is described as "a production strategy focused on the broad provision of [personalised] products and services" (Fogliatto et al, 2012, p. 15). The term first appears in Davis's book 'Future Perfect' (1987), where he theorises the process by contrasting it against the already existent 'mass production' process. It is argued that Mass-customisation presents a viable solution to the inflexibilities of the standardisation-centred mass production systems by addressing broader market influences that include 'changing demographics, changing wants and needs, and uncertainties' (Pine, 1993, p. 32). Here, mass customisation becomes individual production with a high degree of variety in small quantities and at high costs (Davis, 1989, p. 16). Since Davis' discussions, mass customisation gradually became a largely unchallenged revolutionary industrial practice in the production of architectural design (Piroozfar et al, 2012). The process has faced very little scrutiny due largely to the increase of its improving output efficiency in parallel with advancements in information technology (Fogliatto et al, 2012, pp. 17, 21; Peng et al, 2011, p. 1036 – 1037).

By 2002, the popular shoe company, Adidas Salomon AG, had begun the wider scale introduction of a mass customisation service called 'mi Adidas' in order to operate more effectively in competitive market places, by creating more desirable and varied products through direct interactions with their customer base (Berger

& Piller, 2003, p. 42). The purpose of this service was not to repurpose the core function of their shoes outside the sports market, but to instead offer customers an opportunity to enhance existing designs in order to increase their aesthetic and functional appeal – the ‘perfect shoe’ (Seifert, 2002, p. 2 – 3). The intended consequence increases the product’s emotional value, ensuring that customer needs are more effectively addressed (Berger & Piller, 2003, p. 45). Marketing author, Pine, explains the process in more detail by stating that standardised products can be customised prior to being sent out to the customers as an end product by allowing flexibility throughout the design process (Pine, 1993, p. 172). In the same publication, Pine later stresses the importance of creating customisable products by providing the philosophical approach of “there is only one way to know *exactly* what customers want” (ibid, p. 184) – an open statement that leaves the answer already obvious to the reader. Pine goes on to emphasise the role played by communications between manufacturers and customers throughout successful design and delivery processes from a commercial product-design perspective (ibid), a sentiment also shared by manufacturers who aren’t engaged in customisation (Gruner & Homburg, 2000). Within the marketing context, customisation’s role broadly becomes an enhancer of an existing standard design instead of an inventor or innovator of a new/repurposed design (see The Economist, 2009); however, this approach is not without its own problems, and these must be considered when later applied to urban space settings.

In principle, mass-customisation cannot be applied to the development of urban spaces mainly for the following reasons:

1. Urban spaces have multiple users with different views, and
2. Urban spaces are not expendable and cannot be completely replaced in the same respect as a product.

However, the principles of mass-customisation can be applied to progress processes of continuous improvement that feature in the participatory planning arm of urban design practices.

The applicable principles of mass-customisation are as follows:

1. The ability to modify and refine a design once it has been created, and

2. The devolution of design powers to end-users.

Criticisms of the manufacturing industry's approach to mass-customisation relate to prolonged production processes. Pine (1993, 2011) outlines the following flaws:

1. There is a likelihood that the finalised product quickly becomes obsolete due to the extra dialogues associated with the process,
2. 'Information overload', where options presented by a manufacturer may become overwhelming to the customer and detract from the original intent of their product – customer interest is lost,
3. A product's life cycle may be so short that the resources needed to support innovation may be limited or become unavailable,
4. A product may fail to evolve into a new dominant design leading to its eventual invalidity, and
5. The exploitation of Information Communication Technology still has not perfected the seamless interfacing between customers and manufacturers.

Although these criticisms are directed at mass-customisation's application to the manufacturing industry, they pose considerations for the implementation of similar customisation strategies into practical urban design, including who has the right to customise, and how customisation typically occurs.

### **3.2 The typology of mass-customisation**

When describing the process of mass-customisation, Pine identifies four manifestations in the manufacturing industry (1993; Gilmore and Pine, 1997) which are broadly described as:

1. Collaborative customisation, where firms communicate with the product's end-user to produce a product that best serves the customer's needs. An example of this process can be observed in web-based software tools like mi-Adidas.
2. Adaptive customisation, where the manufacturer produces a standardised product which is customisable in the hands of the end-user. An example of this can be any of the Windows Graphical User Interfaces since 1995,



where the end-user is able to move icons, adjust start menus, change the desktop wallpaper, and the thematic colours.

3. Transparent customisation, where the firms provide individual customers with a product that the end-user is unaware of being customised. This works in situations like YouTube which provides a video service that recommends channels based on those you have previously watched.
4. Cosmetic customisation, where firms produce a standardised product, but presents it to different customers in specific ways. For example, a 'one-size fits all' t-shirt produced by Nike but the graphic design emblazoned on the front may vary according to the cultural niche markets targeted.

These four 'faces' of mass-customisation crucially identify approaches that can be used by a manufacturer to respond to a growing diversity of customer needs (see Gilmore and Pine, 1997). Essentially, these classifications establish a framework that helps to determine the type of customisation a manufacturer should pursue, based on their targeted customer-base; helping to identify the dimensions along which their customers differ in their needs.

In terms of what a spatial plan provides, the needs of a street users are equally diverse to those of customers of a product. The people dimension of both urban design and manufacturing essentially face the challenge of addressing individual needs, interests, and preferences. However, while manufacturing has managed to stay relevant with methods of 'mass-customisation', urban design is still relies heavily on "expert opinions", harming the process creating appreciated street environments because the varied views of stakeholders, on what makes a good street/urban space, are not fully acknowledged (Carmona et al, 2018; Carmona et al, 2002).

The typical response of urban designers is conduct spatial analysis that takes into consideration urban morphological features that are synonymous with certain pedestrian movements and/or behaviours. A notable example of this is the work carried out by Space Syntax (Hillier et al, 1993). While Space Syntax is capable of aligning urban features and characteristics to specific pedestrian behaviours,

the methodology isn't immune to the criticisms of insensitivity and expressions of dissatisfaction from the general public. The redevelopment of Brixton, based on guidance offered by Space Syntax in 2000 (Stonor, 2017a), resulted ultimately in the unappreciated remodelling of the area, gentrification – local businesses were forced out changing the base culture of the place (Marsh, 2016; Schulkind, 2017, Evans, 2018).

Specific to 'insensitivity' leading to a 'lack of interest', an example is the development of St Botolph's, Colchester. This development is based on a analysis commissioned by Space Syntax between 2002 and 2005 (Stonor, 2017b). Upon the completion of the first development phase, reactions to Firstsite – termed by the BBC as the 'Golden Banana', have been negative (BBC news, 2015). Anthony Rogers who manages the site notes that "[it] hasn't really managed to connect" in reference to low visitor numbers (ibid.). At the time of his interview, Rogers described himself as 'working at his hardest to rattle turnstiles, to bring people in, to put a smile on [their] faces, to make Colchester proud and happy and comfortable' (ibid.).

Considering the diversity of pedestrian users of public urban spaces and their preferences, urban designers typically advocate participatory planning, which attempts to involve 'end-users' in the development process. However, past studies have found that participatory planning is often relegated to specific parts of design processes in the interest of time and money and, being typically in the form of consultation, often only involve a small representation of an urban spaces' user base (Timmerman et al, 2019). Aligning this approach to Gilmore and Pine's four faces, participatory planning falls into 'collaborative customisation', while spatial analysis approaches can be considered 'transparent'. Therefore, further implementations of end-user involvement can be considered towards the production of a satisfactory urban space within the same parameters of Gilmore and Pine's 'four faces of mass-customisation' (1997).

### **3.3 Mass-customisation in Planning**

When applied to context of planning, mass customisation is discussed within the context of residential properties that have been modified to address institutional, cultural, or environmental factors (Barlow and Ozaki, 2005). According to Barlow and Ozaki (2005), it was during 1990s that mass customisation arose as a phenomenon in [Japanese] house building where, for cultural reasons, developers constructed houses to commission instead of relying on speculative development approaches. Speculative development here involves the purchasing of land and mass filling it with generic housing units to meet housing demand. The broad cultural circumstances of Japanese society made a reliance on generic housing a non-explicit requirement (ibid.) due to factors such as:

- 'Life-time employment', where reliance on a single employer would typically result in a reduced demand for relocation amongst economic active age groups (ibid.).
- Historically strong cultural attachments to a specific land plots/parcels. This manifests in families occupying the same land for generations in connection to property-rights, enforced during the 1950s – 1980s (ibid.).

Essentially, Barlow and Ozaki's take on mass-customisation is independent of Pine's (and Gilmore's). While they do not present a clear definition of 'mass-customisation', it is inferred that it alludes to a process where a developer produces housing units based on direct interactions with their end-users/future-residents. Like Pine (and Gilmore), Mass-customisation, in housing, concerns the ability for units to be essentially fine-tuned, by their occupants. Approaches to mass-customisation in this respect are not singular (Barlow et al, 2003).

When comparing the mass-production of housing in the UK to those of Japan, they generate a typology of production processes that range from 'pure standardisation' to 'pure customisation' (see Barlow et al, 2003, p. 137). The key difference being the frequency of consultation with the customer/end-user. However, the production of urban space is unique in that it involves inputs from not only a variety of users at a specific time, but also from prospective users and future generations. A daunting task that echoes, Alexander's early assertion that

it is impossible to conceive the complexity of a city (or urban form) in a single mental act (Alexander, 1965).

An approximation of mass-customisation in planning is largely the production of a variety of designs within a scheme that collectively achieve an end result closer to the requirements of their various users. However, the interaction between 'customer' and 'designer' is further reduced owing largely to the complex social dynamics of the planning practice that forfeits holistic design in favour of time and expense. It primarily responds to trends and delegates community representatives when seeking a solution (Barlow and Ozaki, 2005). Following this logic, the four faces of mass customisation described for the manufacturing industry in this section are translated into the following when applied to a planning context:

1. Collaborative customisation. From the perspective of the manufacturing industry, a product typically has a single user – the specification of a product addresses a sole user. However, an urban space has many users so that customisation has to meet a plethora of demands. Therefore, a translation of collaborative customisation within a planning context describes a situation where an urban designer works with the users of a space towards the production of a satisfactory outcome. This process is comparable to participatory planning approaches already apparent in the urban design that have been previously criticised as Tokenistic (Arnstein, 1969).
2. Adaptive customisation. When applied to urban design, it describes processes resulting in subsequent alterations made to urban spaces. Under these conditions, a designed space can be informally modified after its construction. An example is the dynamic placement of moveable seating as described by Whyte (1980, 1988) or, on a more permanent level, the re-rendering of a space's colour scheme and/or décor as described by Jacobs (1961). In more recent literature, this can be observed in seed-bombing/guerrilla gardening activities, where people throw seeds into municipal planters in order boost the sensorial quality of a particular environment; an example is Bonnington Square Gardens in South London.

3. **Transparent Customisation.** Transparent customisation describes the process of a product being developed for a customer, based on observed trends and behavioural patterns. When applied to urban planning, this translates into the process of analysis prior to master planning. Typically, master plans form the basis of community consultations, however, the analysis identifies problem areas to be addressed and establishes the basis for a remedy. Such exercises are executed with a top-down emphasis, where end-users feel that their true needs are being overlooked/marginalised. An example of transparent customisation is the regeneration of Brixton High Street based on the observations made by Space Syntax whose pedestrian modelling studies redistributed the high volumes of pedestrian traffic from the high street through the creation of new pedestrian linkages to under used businesses behind the high street (Stonor, 2017a) thus catalysing its gentrification.
4. **Cosmetic customisation.** The rebranding of a product to specific markets is comparable to the installation of successful prefabrications or strategies in urban design. A successful seating arrangement in one setting, might be repeated in a similar urban space elsewhere but within the context of the implemented masterplan – the idea is the same but its implementation differs. Often the plugging of a successful design solution into a new urban space isn't always met with the same level of success (see Shaftoe, 2008, pp. 118 – 119). An example of cosmetic customisation in an urban space is the reinstallation or reconceptualisation of a public art piece based on its success in previous settings such as yarn bombing or urban knitting.

The aspect of mass customisation that is currently taken forward in planning incorporates elements of transparent and collaborative approaches to customisation. For example, a direct implementation of mass customisation is introduced by the 'ABC design system' documented by Benros and Duarte (2009), used for the production of multiple housing units. This system built on an earlier approach for the mass customisation of housing that operated on the codification of housing types based on Habraken (1988) who defined 'type' as the synthesis of three systems:

1. Spatial and functional system

2. Structural and construction system
3. Stylistic system

The initial approach by Duarte (2001, 2005) was a computer system that generated designs based on inputted social values and technical know-how in order to produce a range of designs – description grammars and shape grammars represented the rules for design used by the system (Benros and Duarte, 2009). The outcome of this approach was a variety of selectable designs each addressing a single brief; however, the variety of designs proved both costly in terms of the production of unique housing components and time taken in the production of construction plans (see Benros and Duarte, 2009, p. 312). The ABC system improved on these flaws by limiting rules (ibid., pp. 315, 319) concerning the distribution of rooms of specific types into specific functional zones; for example, ‘outer zones’ were primarily for living rooms, dining rooms, offices, and bedrooms, while ‘inner zones’ were suitable for circulation, storage, or services – entrance halls, closets, kitchens (ibid.). Although Benros and Duarte state that the building industry is gradually transitioning towards mass-customisation by incorporating individuality into development processes, where the ABC system is an attempt to optimise such process, they claim that the take-up is slow. Further to this observation, throughout their publication, Benros and Duarte do not detail the involvement of ‘customers’ as understood within the context of an end-user. Their model is applied only to the production of private residential spaces so doesn’t take into consideration possible scenarios arising from multiple user inputs, crucial in the design of public spaces.

However, processes that possess the broad methodical traits of traditional mass customisation are less technical. The customer or end user actively or passively interacts with a designer/manufacture in the formulation of the end design or product, comparable to participatory design practices of urban planning. Observations of interpretations of mass customisation processes are apparent in urban planning systems. They are readily noted in community participation or observation, where the objective is typically towards educating people and “[getting] things done”, where spatial plans are significantly more responsive to the end user needs (Wheeler, 2004, p. 55 – 57). However, such forms of participatory design receive the most criticism because they are generally

considered to still give disproportionate power to governments with too much of an emphasis on future instead of current problems (Harris, 2011). Today, participation by local communities in a planning scheme are often relegated to set phases of development's implementation where, in essence, the masterplan for the development usually already exists (Magnami et al, 2015). Furthermore, the consultation exercises are considered exclusionary as they are often normally pitched at 'community groups' or representatives that do not reflect the full demographic of a community (ibid.).

Such instances are often considered a way of addressing the inflexibilities of a one-size-fits-all packaged approach when dealing with a range of community members or actors (Hudson and Goodwin, 2014). To reduce the variety of feedback, community actors are split into two broad categories: formal and informal (Groth and Corijn, 2005). Formal actors are those who are recognisable entities in a community – an organised group; while informal actors are the individual members hoping to become involved in consultation exercises (Magnami et al, 2015). Often informal actors are excluded because of the timing of consultations or are disinterested because their participation occurs at a minor phase of the project's development such as picking the colour of a garage door (Timmerman et al, 2019).

The Incubators of Public Spaces project (Incubators), managed by the Politecnico de Torino, involved the trialling of a web platform approach to, alongside providing an ergonomic modelling user interface that enabled users to place objects within planning policy rule constraints, address the problem of time constraints (Timmerman et al, 2019). The MOAT housing association group showed an interest in using the platform during consultation of the redesign of housing development courtyards at Pollards Hill, London (ibid.). They considered the Incubators approach as a refreshing take to participatory planning as it, being online and accessible to members of the communities affected, will attract a wider range of users. Prior to Incubators, MOAT expressed their struggles with:

- Scheduling of consultation events
- Proposed ideas falling outside of the scope of community interests

- Consultation outcomes not reflecting the broad spectrum of feedback from the communities affected (ibid.).

Consequently, unsatisfactory spaces are produced with a sustained disdain towards a perceptively dysfunctional planning process.

When exploring the topic of the construction of public spaces, through public participation, Chapman echoes criticisms associated with typical methods of street user engagement throughout the various stages of the design process. He considers approaches as failing to address increased vocal responses of local people communities and businesses during the development and planning stages of urban design. 'Engagement', as defined by Chapman (2011), is integral to planning's gradual transition from a perceptively mass-production orientated model to one comparable to the process of mass-customisation. Chapman's suggestions echo those tethered to Alexander's earlier semi-lattice and wholeness arguments (Alexander, 1965; 1979; 1986). In contrast to the top-down Machine implementation of public participation, he suggests that urban designs should ultimately attempt to mimic the diversity found in successful 'traditional' designs (Chapman, 2011, pp. 511 – 512) – a notion that is commonly found in classic critiques of modernist planning approaches (Cullen, 1971; Jacobs, 1961). Chapman subsequently calls for renewed approaches towards local level community engagement and participation that acknowledge the existing cultural systems present at project sites, thus ensuring that subsequent designs are sustainable in the long term (Chapman, 2011, p. 527). As noted in the traditional format of mass customisation, Chapman does not subsequently evaluate the impact of finished designs on their local communities. He essentially fails to present clear evidence that supports his observed preferences towards traditional designs over planned environments. Specifically, Chapman does not benchmark attitudes and responses towards environments that have formed through traditional community engagement practices, so that they can be contrasted against responses towards modern/planned environments.

A possible benchmarking approach, towards measuring the success of community engagement and mass customisation approaches in urban



environments, is presented by Rofé in terms of analysing responses towards the quality of neighbourhood-scale environments through the application of 'feeling maps' (Rofé, 2004). Recording the opinions of residents of a neighbourhood in a Likert-scale fashion, along with their geographic locations, Rofé was able to generate maps which displayed satisfaction levels attributed to varied urban morphologies and forms that he subsequently refers to as 'feeling maps' (ibid, Figure 8). However, Rofé did not apply his technique to assess attitudes towards environments that are the product of customisations. Like Chapman, Rofé did not discuss the impact of subsequent alterations to environments, where any such analysis can be usefully adapted to address the gaps apparent in both his and Chapman's work (2011).

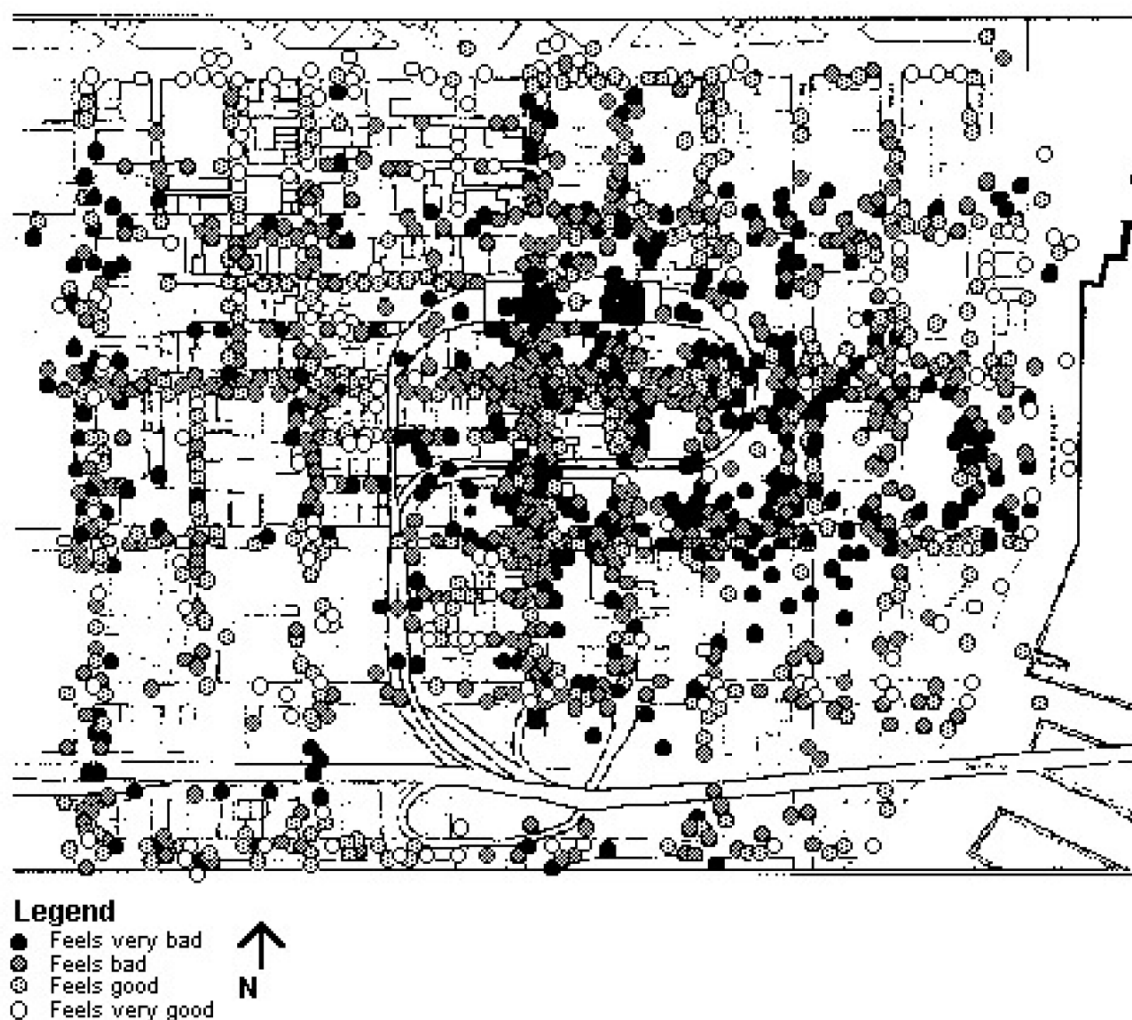


Figure 8. Yodan Rofé's feeling map for the San Francisco Trans-bay Terminal area (Rofé, 2004, p. 8)

Clearly noted throughout the identified literature discussing customisation, is that customisation largely concerns changes made to a new or existing product during its reproduction or initial construction. The incorporation of documented mass customisation strategies is limited in urban design. It is discussed in terms of the relatively quick provision of marginally more successful designs through direct collaborations with the customer. The customer is a predefined representation often comprising of a small sample of end users in order to reduce variety. The conventional application of mass customisation is principally applied to controlled environments – houses. It doesn't account for multiple and continuous contributions to a design. Finally, mass customisation is rule-based and limited to computer software platforms when applied to planning. This results in that variety of designs being potentially controlled through cybernetics (Magnani et al, 2016), leading to misrepresentations of end-user ideals and possible failure of a fabricated design solution. When the basic components of mass customisation are translated into a planning context, its characteristics are identified in community engagement strategies throughout the effective conception of a design solution to a planning problem. The intention is to increase levels of appreciation, use, and the overall success of public urban spaces. Arguably, the discussed applications of customisation/principles to planning processes consider cosmetic, collaborative and transparent modes of customisation but fail to incorporate adaptive approaches that devolve design powers to users as highlighted by Pine (1993). In each instance, discussions aren't readily apparent, highlighting subsequent modifications and additions to the completed product, building, or urban space. Furthermore, discussions that consider the emotional impact of environments created through mass customisation approaches versus those that are visionary aren't discernible in planning and urban design literature. To pinpoint a specific approach to urban design, the concept of mass customisation will be further broken down into its core concept, customisation. This is because of the non-product nature of an urban design that is ultimately influenced by a variety informal user inputs and informal interventions.

### **3.4 Customisation in Urban Design**

More often than a single product or a building, urban spaces are inevitably subject to modifications after they have been built. Also, urban spaces

conceptually incorporate customisations as they naturally present designs that fit a specific site in a specific way. However, the context of customisation in this research concerns the impacts of additions made to a design following its construction, by the users of that design – local business owners and local residents; once a product has been built, subsequent modifications are made to it by the end-user. It is this later portion of the definition that relates to the ‘phenomenon of customisation’ taken forward throughout the remainder of this thesis. Although types of customisation can have both negative and positive effects on a design, this thesis focuses on those that enhance the quality of urban spaces.

Although spaces are often modified post-construction, street user expression can be controlled or suppressed through the introduction of rules and regulations. Similar to discussions concerning cybernetics (Magnani et al, 2016), Shaftoe highlights that rules are embedded in the function of urban spaces to ensure the safety of their users. However, he also states that these rules can unintentionally reduce the opportunities for convivial encounters among their users (2008). It can be argued that spatial problems can be theoretically managed through norms understood as socially expected modes of behaviour (Welch, 2013). This perspective is reinforced by authors who compare group situations without rules of supervision to panicked people running through the same door and trampling each other without considering a means of escape (see Degen, 2009; Gillin and Moore, 2009). Although they acknowledge that complex systems can self-organise, they go on to suggest that the behaviour of crowds can be unpredictable and prone to collapse (ibid, Magnani et al, 2015). According to Marshall, both planned and unplanned urban forms incorporate rules, which are “distinguished by the scale at which they are designed”. Kostof points out that formalised rules, like building codes, have specifically contributed to the appearance and functionality of urban spaces (Kostof 1992; Magnani et al, 2015, p. 30). Rules play a role in how an urban space is developed and/or how it is used. However, when rules are lax, a space becomes looser and more pliable to informal interventions that potentially optimise it and allow it to live. It can be said that “self-organisation has nothing to do with chaos; it is in fact a higher level of order that. And that most if not all the most lively and successful parts of our

cities are in fact those less planned...” (Porta and Romice, 2014, p. 86).

Subsequent discussions within this thesis concerning rules concern the impact of freely designed environments on perceptions and actual levels of liveliness in urban spaces.

Although a clear gridiron was installed by the French colonial rule in the early 20<sup>th</sup> century, Ouagadougou in Burkina Faso represents extreme urban forms that are clearly informally influenced by the cultural ideals of their users within the established grid. Hence, they deviate from the template of uniformity and order associated with grid designs (see Figure 9) – every quadrant is unique, each configured to optimise accessibility for those served within. When discussing the current growth and development of Bedouin settlements in Israel, Rosner-Manor and Rofè note that while on one hand traditional laws/regulations are accepted by communities in the layout of new spaces, “day-to-day decisions are made gradually and in accordance with changing needs – a dynamic and organic process of creating places” (Rosner-Manor and Rofé, 2015, p. 333).



*Figure 9. An aerial view of Ouagadougou in the 1930s (Mittelhozer, 1932)*

A similar situation is described in Jacob’s depiction of North End in Boston (Figure 10). Jacobs describes the region in planning terms as a megalopolis

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which, according to planners, is “badly cut up with wasteful streets”, essentially dysfunctional. However, over the course of time, the region transformed from squalor into scenes of “venetian blinds and glimpses of fresh paint...neatly repointed brickwork, new blinds” (Jacobs, 1961, pp. 18 – 19). In a study that sought to test the testable principles of architecture and planning, Hollander and Foster used Electroencephalography (EEG), a process involving the measuring of neurological activity, to determine the level of attention and meditation of walkers through Boston’s North End and West End. The North End still bears the informal interventions noted by Jacobs in its narrow streets and dense blocks, and the West End is a renewal project that occurred during the 1960s (2016).

The principles accounted for:

1. Edges – activity/stimulating scenes along the edges
2. Patterns – appearance of face-like facades
3. Shapes – Bilateral symmetry in building design and layout, curves, and fractals
4. Narrative – sense of story, clear sequencing...(purposeful shift in experience)

Each principle is scored between 1 and 3 based on the frequency and presence; a score of three results in a principle being present throughout a route, while a score of 1 translates to a principle being rarely seen along a route (Hollander and Foster, 2016). Their study shows that higher scores are associated across the principles tested in North End, while the West End low scores along walked routes (ibid.). Although the samples presented by this study are small, and the characters of the case studies non-comparable (residential vs. commercial), it offers insights into the Jacob’s idea that life is synonymous with unhindered informal interventions, and also gives credibility to arguments for giving a space a chance to self-organise through small acts of street user customisation.



*Figure 10. A romanticised view of North End, Boston (Cain, 2017)*

In London, Bonnington Square Gardens (Figure 11) is a neighbourhood that was flagged for redevelopment following heavy damage sustained during the Second World War. The council pulled away and residents, transformed the dwellings into self-help housing and, through place shaping, transformed the condemned area in South London into a highly sought-after neighbourhood for young professionals. (Mullings, 2010).



*Figure 11. A view of Bonnington Square, Vauxhall (Source: Author)*

Examples of customisation within the context of this research cover informal interventions by street users ranging from the unexpected to the expected. Within this research, the term ‘street user’, not only covers pedestrians visiting a site, but also residents who occupy buildings which immediately surround a respective urban space. Expected interventions are coupled with the residents (businesses or home-owners), and cover informal interventions such as the

- Repainting of walls
- Alterations to facades.
- Guerrilla Gardening

Unexpected informal interventions are those whose source cannot be categorically traced; these include:

- Informal public art, street art, graffiti, pavement art
- Performing arts
- Street vendors

- Yarn bombing/urban knitting

Within the literature of both the architectural and planning disciplines, very few studies discuss the 'phenomenon of customisation' within the context of a final design's enhancement, in ways comparable to observations made by product design studies. Typical applications of customisation within these disciplines are usually in the form of alterations to the known analytical and methodical approaches utilised by the urban planner or architect, in order to deliver a development with an increased chance of successful use by their end-users. Principally applied to the production of prefabricated construction materials during the design processes (Piroozfar et al, 2012), the term 'customisation' is normally discussed within the context of 'mass customisation' (Pine II, 1993), where it is discussed in relation to the functionality of delivery processes within the context of product manufacturing.

Although we have a working definition for customisation, to understand how customisation presently occurs in the urban planning system, it is worth understanding the popular methods of 'mass customisation' process that are reminiscent of parts of established urban design process. In a study that tested the viability of master planning in respects to persistent failures in the planning system, Romice et al conclude that, to be successful, master plans must be completed 'in pursuit of resilience over time', where optimal approaches will prove to be flexible and able are able to 'self-adapt' over time and in response to the changing requirements of the communities they serve (see Romice et al, 2017, p. 205; also see Barbour et al, 2016).



### **3.5 Catalysts for customisation in urban spaces**

From the literature discussed so far, it can be determined that customisation broadly occurs when customers feel the need to modify or enhance a product. In an urban context, this translates to a situation where a street user feels the need to modify or enhance an urban space to best suit their individual needs, where self-organising principals explains how multiple interventions can harmoniously co-exist in most situations. These informal interventions cumulate to form a customised urban space or setting.

Writing in 1869, Charles Garnier states:

“[Big] streets that, although beautiful, are as cold as a stiff dowager...a man will be able to build his house as he pleases, without worrying about whether or not it fits with his [neighbour’s]. Cornices will shine with [colours] of eternity; gold friezes will sparkle on façades...” (Kostof quoting Garnier, 1991, p. 262).

Kostof considers Garnier’s work as part of the 20<sup>th</sup> century’s “new building code that condoned, indeed incited, surface novelty, and sculptural and picturesque effects” (ibid.). However, Garnier also impresses a sentiment that bland or monotonous fabrics result in an urge for creatively driven by frustration. Molstad looks at the effects of bland office environments and subsequent boredom. He notes that, when placed in a situation considered as boring, people engage in mentally stimulating activities (1986). Mason et al, build on this study by exploring the effects of ‘mind-wandering’ where they note that when people are engaged in ‘boring’ tasks or are situated in a boring environment, their minds wander as a means of providing emotional respite (Mason et al, 2013).

Building on the earlier works of Faber Birren (1978), colour theorist Frank Mahnke records that physiological responses can be manipulated through environmental colour renderings (1996). For example, red leads to heightened physiological response and blue leads to more passive levels (ibid.). Mahnke readily supports Garnier’s philosophy by broadly stating that people are happier in a ‘living environment’ instead of a ‘dull one’ (1986). However, Mahnke’s research reveals that physiological responses towards bland or blank facades are heightened and cannot be controlled (Mahnke, 1996, p. 163).

Referring to the earlier work of Epstein et al (2002), psychologists Shine et al acknowledge that hallucinations are partly attributed to the surrounding environments, echoing the sentiments of Mahnke by affirming that the absence of stimuli in an environment can lead to illusions or misperceptions (Shine et al, 2009, p. 58). In contrast, too much colour may lead to situations of overstimulation on both physiological and psychological levels, where too much sensory information results in stress and discomfort at least when applied to interior settings (Mahnke, 1996, p. 164; Kalia, 2013, p. 107).

When describing the atmosphere of a county jail, art therapist Hanes explains observed artistic responses to the 'cramped and gloomy' conditions typically found in such institutions where he emphasises the colours used as being a key factor that contributes towards this perception – the shades of grey found on the walls and doors (Hanes, 2005, p. 44). Hanes goes on to describe his primary experiences of behavioural responses towards these oppressive conditions. Readily identified in Hanes's paper is that prison cell art, or jail art, is typically found on the bland walls and doors that play the same role as a canvas in fine art (see Hanes, 2005, p. 46); an expected response within the context of Mahnke's own observations (Mahnke, 1996). Although not measured quantifiably, a great portion of the art apparent in the cells allude to escapism and, even though mostly monochrome due to the limited availability of tools, often depict colourful scenes that sometimes allude to the cultural background of the prisoner(s) who occupy the cells (Hanes, 2005, p. 45 – 47). This example validates Mahnke's findings in practice and determines that a typical human response to blandly themed environments is to actively decorate them to create interest and relatability. Arguably, increases in appliance of post-design cyclical colour hues, clear distinctions between colours, in a bland urban environment are symptomatic of blandly coloured environments. Indeed, Mahnke's theories are still valid in studies concerning the 'look and feel' of a place, where aesthetics – shapes, textures, and colours – are connected to specific psychological responses (Al Horr et al, 2016).

Similar attitudes to those observed in the microcosm of prison cells are witnessed in the rise of Art Nouveau architecture in the shaping of urban morphologies as BBC's Stephen Smith states: "smog filled cities were splashed with colour and vitality; as idealistic architects put nature at the heart of the metropolis" (Sex and Sensibility - The Allure of Art Nouveau, 2012). Witnessed throughout the rest of the Smith's documentary is gradual growth in the over decoration and over stimulation associated with the Art Nouveau movement that succeeded the Arts and crafts movement, where eventually a strong emotional response is noted in its demise – a return to the practicality over decoration. Early criticism of Art Nouveau is instigated by Loos, a champion of modernist thinking, who sums up the extravagance of the form as being degenerate; the crime that Art Nouveau was guilty being the wasted effort as witnessed in the extravagant ornamentation, where Loos was keen to create buildings that were primarily 'functional and simple' (Loos and Opel, 1998). Such attitudes from Loos, and eventually those of the former Art Nouveau critic, Otto Wagner, inspired the creation of modernist architectural and design schools including the Bauhaus (Sex and Sensibility - The Allure of Art Nouveau, 2012). The overall goal of the modern art was to simplify complexity and over stimulation with practicality.



*Figure 12. Mural at Brondesbury Station, Kilburn (Source: Author)*

When seeking to determine why graffiti appears where it does, Dovey and colleagues provide evidence that the rogue form of this artistic expression is principally observed on blank walls and facades and are often attempts to transform that façade into something more exciting (Dovey et al, 2012, p. 32) – attempts at creating place identity (ibid, pp. 35 – 36). When commissioned to create a mural at Brondesbury station in Kilburn, the artist group ‘Signal Project’ sought to transform a local eyesore into a ‘welcoming landmark’ (Signal Project, 2004) a feature that still draws public interest today (Figure 12). Dovey and colleagues also note that deliberate attempts to promote or protect such artistic interventions, lead to further urban problems concerning the placement and purpose of the murals. This observation is echoed on a larger-scale by Chapman who claims that deliberate interventions or “small acts and omissions” (Chapman, 2011, p. 511) to a design by urban planners are more likely to diminish the quality of an urban environment (ibid), due mainly to the failure of urban planners or designers to fully grasp the social or physical complexities of how localities actually function (Chapman, 2011, p. 528).

Alexander in his ‘nature of order’ essays provides what can be regarded as a justification of Chapman’s own conclusions. Within the last volume of his ‘nature of order’ essays Alexander subjectively explores the possible inspirations behind the creation of meaningful design by aligning to the spiritual states observed throughout the creation of successful architectural and urban environments. Alexander acknowledges mutual human feelings towards design attributes including colour, light manipulation and patterns as apparent in design (Alexander, 2005, pp. 231, 247).

Focusing on the goal to create life in architectural outputs, Salingaros attempts to quantify Alexander’s approaches towards creating harmonious design that in turn holds high emotional values by applying an analogy of physics’ model of thermodynamics in order to create optimal architectural environments, where classic thermodynamic models are tasked with creating optimal work and energy outputs frequently referred to as ‘exergy’ (Perrot, 1998, p. 107). Applied to architecture, the goal is the entropy of architectural element arrangements in

order to produce an optimal design – one that solicits a desirable emotional response, and effectively causes the design to ‘live’. Salingaros translates the traditional thermodynamic term of temperature (T) into architectural temperature that denotes the degrees of detail, curvature, and colour; and heat (H) into harmony that refers to the coherence and internal symmetry or patterns. He formulates life (L) by multiplying harmony against architectural temperature – where life is measured by the emotional connection of a building to its users (Salingaros, 1997, pp. 1 – 2). In essence the higher the architectural temperature, the more complicated and intricate a design element becomes as evident in its curvature of lines, intensity of colour hue, and contrast amongst colour hues (Salingaros, 2006, p. 108). The higher the harmony, the more symmetrical and coordinated a building’s applied colours schemes are (Salingaros, 2006, p. 111). Using these measures to determine life, Salingaros scores and ranks buildings based on their architectural features as pointed out by Alexander (2004), where he is able to demonstrate that some modern buildings can potentially achieve the same level of emotional response as their traditional predecessors whilst not being a direct mimic (Salingaros, 2006, p. 109). Salingaros goes on to suggest that buildings constructed using traditional design methods are therefore likely to capture the same levels of emotional responses and concludes by emphasising the ‘basic human need to raise the architectural life of their environment’ (Salingaros, 1997, p. 16).

Although Salingaros’ work can be argued as being based on subjective ideals and subject to inconsistent results (Tucker et al, 2005, p. 523; Gero and Kazakov, 2003, p. 3), where his own inclination towards traditional design approaches can be highlighted in the overall assessment and scoring system for the buildings, his conclusion is consistent with Mahnke’s observations to patient responses in psychiatric hospitals (1996, p. 163 – 164). Salingaros’ conclusion of ‘a human need to raise the architectural life’ of an environment is apparent in Stevens’ (2007) and Shaftoe’s (2008) who independently note the creative use of public spaces in order to generate or heighten levels of interest. Wunderlich records this empirically by noting the changes in walking rhythms as based on the presence of street art inventions that raise curiosity (Wunderlich, 2008, p. 133).

Similarly, Kellert et al note that in spaces devoid of greenery or other natural elements, people are inclined to add this informally as part of a phenomena associated with the biophilic hypothesis (2010). The biophilic hypothesis assumes that people are attracted to nature and natural forms (ibid.). In the case of 'guerrilla gardening' or 'seed bombing', where people informally create gardens of varying sizes in public settings, are spawned as a response to the lack of inaction of bureaucrats in dealing with pressing landscaping problems (Finn, 2014, p. 390). The perception of a lack of greenery or landscaping creates the need for people to customise an existing design to incorporate such features.

In each of the highlighted instances community engagement, as a procedural step in the planning process, is considered as an embodiment of adaptive customisation in an urban design context. This form of customisation is engaged when conventional participatory planning approaches are not able to result in the development of a successful or vibrant setting. Evidence suggests that collective individual works of customisation such as street art, guerrilla gardening, even urban knitting, can potentially lead to environments that street users find interesting. Urban spaces are subsequently subject to customisation in the DIY sense, where a deeper acknowledgement of emotional responses towards unaltered and modified environments will be able to predict potential responses to spaces that deliberately incorporate or allow for adaptive customisation.

### **3.6 Customisation in the built environment: Self-builds**

The nature of participation in urban design does not currently rely on Information Communication Technology to embed end-user input into the production of a space – this process can be spontaneous. Further, an urban space is unlikely to become obsolete in the same ways that a product does, they are long lasting. Exceptions to this are meanwhile-uses that are intentionally temporary. The top-down nature of urban design that 'insert' participation at specific points of the process addresses problems associated with information overload. Therefore, the incorporation of customisation into the design process occurs both during and after formal urban design processes. When customisation occurs after the construction and completion of an urban design, and rules allow for the freedom of expression, then vernacular variance – localised expression and

reinterpretation of a design – through informal interventions become apparent. A notable form of this is observed in instances of self-build constructs.

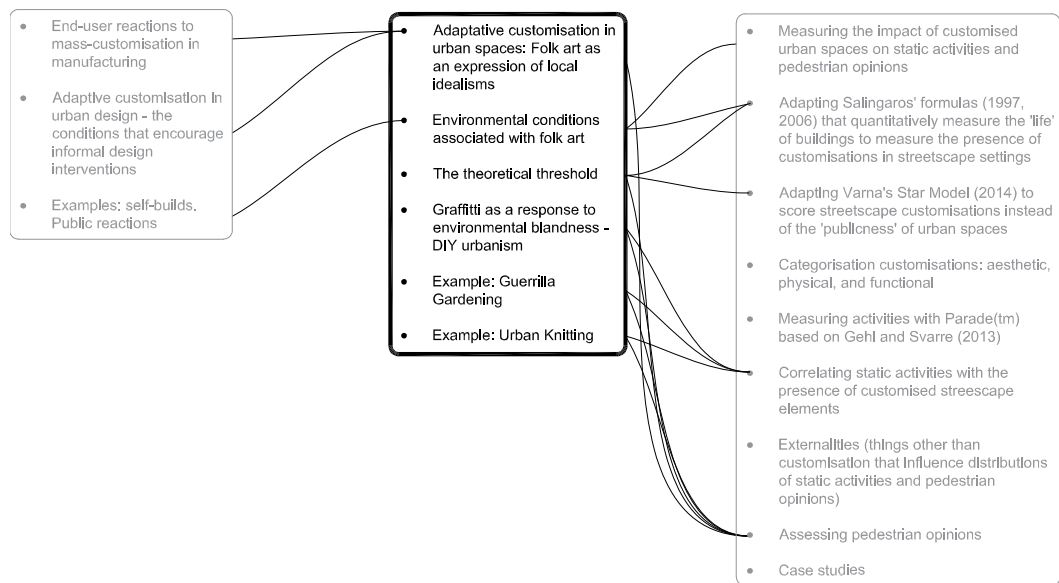
On closely examining the process of self-build properties in Almere, Netherlands, similarities can be made between adapted models of architecture's variant of mass customisation from a residential perspective. In theory, residential self-build refers to the practice of acquiring land to develop a home set to personal specifications, a practice carried out in developing countries under the label 'self-help' which enables the 'freedom to build' (Bangdome-Dery et al, 2014, p. 80). In this context, three main variants are noted: 1) aided self-help housing, 2) unaided self-help housing, and 3) institutional self-help housing. According to Pugh (2001), the first variant describes situations where the government provides site-and-services, where the household takes responsibility for the construction of their own housing units (Bangdome-Dery et al, 2014, p. 81); the second category involves no intervention from a government body and is preferred by those in middle to high income groups in countries like Ghana, particularly in informal settlements with limited state control (ibid.). Institutional self-help housing (Ntema, 2011; Bangome-Dery, 2014) is described as the implementation of self-help housing through community-based institutions or groups known as housing cooperatives.

The model best applied to the Netherlands is the first variant, where plots were allocated according to the Almere Poort master plan for a settlement with a projected population of 350,000 by 2030. Here the government installed the basic infrastructure, where the tenants, not willing to take financial risks, worked with the suppliers of affordable housing providers of the Almere municipality to ensure the retention of sale value by advising on green technology implementations (Hall and Falk, 2014). Typically, architects in this instance normally use designs already approved by the municipality, where households are allowed to design parts of their homes to their satisfaction. The analysis provided by Hall and Falk (2014) states that the distinctiveness of the development has developed positive publicity for Almere, where the unique designs have been described as reinforcing the city's reputation for innovative design, where the features attract a wider mix of people. The customised

features of Almere create an interest that pulls people in towards the development to explore further in ways similar to the incorporation of biophilic design. However, studies into whether urban spaces created in the same manner can yield comparable results are yet to be conducted. A step towards addressing this gap is in the form of studies that quantify the impact of environmental/microclimatic change on subsequent behavioural responses and expressed opinions and attributes.



## 4 Responses to customisation in public spaces



*Discussions on informal interventions to planned interventions are limited to either subjective accounts or observation exercises constrained by small sample sizes within the planning and architecture literature. However, other academic literature discussing the impact of environmental conditions on human behaviour offers insight into expected approaches associated with informal additions. The breadth of literature affords more quantitative and empirical analysis studies covering physiological and psychological evaluations, alongside ethnographic explorations found in the field of anthropology. To bridge the gap between studies concerning the built environment and such literature, this chapter will attempt to establish a connection between the academic foundations of the planning field, and studies conducted in parallel academic fields.*

#### **4.1 Emotional responses in an urban design context**

Noted in the previous chapter are some of the conditions that lead to creative responses that can be classified as *customisations*. In summary, the identified catalysts are:

- Blandness – frustrated users feel the need to decorate or enhance uninteresting spaces
- Ornateness/Convolution – frustrated users feel that an over-decorated environment is unattractive and prefer to move towards bland environments

An exploration into the inadequacies of current applications of customisation, in planning and urban design, reveal its acknowledged manifestation as the presentation of a variety of design concepts that can be enabled by a limited pool of end-users. Informal implementation of customisations is noted in public urban spaces; their variety and complexity are determined by the presence or non-presence of rules and regulations that either suppress or enable informal post-construction modifications.

The purpose of this chapter is to adapt the observations made by Mahnke (1996), and Hanes (2005) by exploring generic emotional responses towards unaltered planned environments, and those that have been modified through acts of customisation by individuals as they occur in the built environment. Emotional responses are connected to sensory perceptions that essentially help people to assess or determine the aesthetic quality of an environment, typically manifesting in their emotional responses towards them (see Shaftoe, 2008, pp. 56 – 57). However, vision is arguably the richest human sense (see Mahnke, 1996, p. 94; Shaftoe, 2008, p. 57; Zhou et al citing Ackerman (1991), 2010, p. 1356). Subsequently it is the most discussed sense in the majority of urban literature covering perceptions of liveliness in public spaces. Stevens discusses the impressionistic state of urban spaces being aligned to the perceived activities of urban spaces (Stevens, 2007). Similarly, Wunderlich discusses the impact of visual arts in determining walking modes and practices through urban spaces (see Wunderlich, 2008, p. 133). Finally, Shaftoe attributes conviviality and the enjoyment of urban environments primarily to their visual aesthetics followed by olfactory, tactile, and audible perceptions (see Shaftoe, 2008, p. 63).

According to Baumeister et al, behaviour drives emotions (2010, p. 128), where emotions are introspective and subjective reflection of behaviour (ibid), and where behaviour is driven primarily by social and environmental conditions (Riggle, 2010; Gubbels, 2011; Lottrup et al, 2013). Therefore, as pointed out earlier by Mahnke, the physical composition of an environment plays a significant role in how urban spaces are ultimately perceived (Mahnke, 1996). Emotional responses towards urban spaces, within the context of this research, refer to the feelings emitted by an urban space as determined by its varied uses that are ultimately driven by its physical composition. Measuring emotional response will therefore be achieved through physiological analytical methods that will be explored in detail in the methodology.

Emotional responses towards urban design and planning intervention bare similar traits to emotional responses towards controlled environments; however, as determined in early chapters, people have the ability to modify environments in order to meet their preferences. In planning, responses are often to address a cultural or psychological need that enhances the comfort and the enjoyment of the previously disfavoured urban space or environment.

## 4.2 Folk art in urban design

Perceptions of a public space by its users are often paralleled to its permanent urban form or built environment characteristics. Logically, urban spaces can be designed in a particular way; however, previous studies have shown that urban spaces can be used in ways that transcend their intended purpose (Borden, 2001; Stevens, 2007). As discussed in section 3.3, the variance of use or interpretation within an urban space can be determined by levels of regulation (also see Shaftoe, 2008, pp. 19 – 24). Permanent occurrences of variance in the use of urban spaces can be noted in its subsequent informal interventions by its end users; therefore, in contrast, unaltered spaces are those that are planned and heavily regulated by an authority that suppresses informality in this guise.

Within the context of this research, a manifestation of informal customisation can refer principally to ‘folk art’. Folk art is described by West as both formal and informal installations that typically reflect the utilitarian ideals of the artist’s homogenous micro-society (1996). Alternatively, informal customisation within the context of public art can fall within Lowe’s definition of ‘community art’ that purposively seeks to foster community cohesion and conviviality (2000).

When ethnographically exploring the relationships between community art and community development within an anthropological context, Lowe seeks to empirically test a mid-20<sup>th</sup> century conjecture presented by Fromm who writes:

“...collective art is shared; it permits man [sic] to feel one with others in a meaningful, rich, productive way” (Fromm, 1955, p. 302 as cited in Lowe, 2000, p. 360).

Within an emphasis on ‘community’, Lowe incorporates Hillery’s definition of communities being a ‘social group inhabiting a community territory and having one or more common ties’ (Hillery, 1982, p. 31 cited Lowe, 2000, p. 360). When observed in neighbourhood settings, it has been noted that additional social ties become apparent through the practice of community art. Community art, according to Lowe, is characterised by its “experimental and inclusive nature” (Lowe, 2000, p. 364), where “artists work in grassroots settings, creating art in

the public interest” (ibid). By observing the life cycle of community art projects, Lowe suggests that community art creates strengthened social cohesions (Lowe, 2000, p. 379). Communities are notably provided with: a shared interest and an opportunity to socialise (Lowe, 2000, p. 366); the means to build meaningful relationships that transcended social boundaries (Lowe, 2000, p. 367); an opportunity to communicate concerns including isolation (Lowe, 2000, p. 371). Lowe also observes that, through community art, individuals of a community are able to benefit from collective identities, where social interaction helps individuals to enhance and expand their definitions of self (Lowe, 2000, p. 371). Although the later section of Lowe’s work is more valid to ethnography, positive occurrences are associated with community art in terms of the production of rich and meaningful relations within communities, supporting the notion of community empowerment (Lowe, 2000, p. 382). To an extent this form of art intervention presents an alternative more hands-on approach to collaborative design/customisation but shares the method’s limitations by only engaging a set of individuals identified as a ‘community’ – some urban space users might be marginalised.

The concept of ‘urban cracks’ is explored by Verschelden et al (2012). They are described as ‘urban interspace, playing fields, transit zones, wasteland, remnant spaces, indeterminate spaces, or ignored urban spaces’ (ibid., p. 282).

Verschelden et al highlight the importance of grassroots community art in transforming an urban space (2012). Verschelden record typical urban responses to derelict or dysfunctional landscapes as expressive community art that indirectly carries the praxis kit towards enhancing the public function of the urban space concerned within the context of urban regeneration (Carey and Sutton, 2004; Verschelden, 2012, pp. 278 – 279). Their findings suggest that a prerequisite of community art and its community’s positive development is a blank canvas – a canvas that can be potentially provided by an insensitive yet flexible urban design.

Similar findings to Verschelden’s study are made in studies concerning Consumer Culture Theory. Cachinho explores urban retail resilience, or the “ability for stores and shopping districts to tolerate and adapt to changing

environments that challenge the retail system's equilibrium [without comprising their sustainability]" (2014) within the context of consumerism. He draws parallels between the morphological characteristics, consumerscapes, and subsequent consumer behaviour. Cachino highlights a general shift from the provision of 'retail spaces' to the provision of 'consumer spaces' – spaces that exploit design cues that purposively lure consumers into a shopping experience by incorporating the life experiences of the consumer – their dreams and desires (ibid.). Cachino cites Goss's earlier study as an approach to how this can be achieved, where the study recommends that mall developers immerse themselves in the local culture in order to understand the needs of their potential consumer base (1993). Essentially, the developer theoretically starts off with a stock design and then populates it by acknowledging community cultures. The success of such approaches is highlighted in the growth of Birmingham's Muslim neighbourhoods, where it is acknowledged that the most popular high street shop fronts and uses are those that are led or mimic the cultural ideals of the end-user communities (Nasser, 2005). For example, the adaptation of parts of its high streets into informal street markets that encroach on retail units, common within Muslim and South Asian communities, has been paralleled with high concentrations of people synonymous with its perceived busyness (see ibid., p. 69). The residents of the neighbourhood felt the need to re-appropriate the existing industrial street patterns and uses in order to make a meaningful place.



Figure 13. *Frame in control, Chandigarh - photography by Ar. Aditya Prakash, c. mid 1950s [source: Bahl, 2008]. An exemplary stretch of live/work units in Sector 20.*



Figure 14. *The same stretch of buildings as shown in Figure 13, Sector 20, Chandigarh – 2018. Note the placement and nature of signage, and the informal extension of retail operations unto the paved walkway [source: Sehaj Singh, 2018]*

Looking again at Chandigarh, a well-preserved example of Le Corbusier's distinctive architectural design and autocratic urban planning that was constructed mostly during the 1950s and 1960s, its present-day transformation reveals informal acts that optimise and personalise the public realm for local residents and businesses. Chandigarh is not a physical manifestation of Le Corbusier's Radiant city in a strict definition; for example, it does not segregate vehicular traffic from pedestrian views through dedicated road systems. Instead its segregation is the form of self-sufficient sectors, each having their own markets, schools, and recreational facilities. Like Ouagadougou, these sectors or neighbourhood units are arranged in a tidy grid layout. Today, the original architecture is intact, and the plan largely unchanged. The model of 'frame in control' established by one of Le Corbusier's associate architect, Aditya Prakash, is used as a model to regulate the development control in the city (Prakash, 2018). Nonetheless, evidence of informality is prevalent throughout the city (compare Figure 13 with Figure 14). In Figure 15, showing Sector 26, informal modifications not only depict extensive street markets, but also bold signage and colour variance, some of which covers the balcony level lattices.



Figure 15. Chandigarh street today, Sector 26 [Source: Smith, 2010 - *Aging Modernism*]



A more direct response to the inflexible nature of Le Corbusier's vision at Chandigarh is in the form of Nek Chand's 'Rock Garden'. Speaking after encountering Nek Chand (see Figure 15), Doss et al talk of a profound spiritual impact associated with Chand's work (Umberger et al, 2007, p. 23). Although not trained as a landscape architect or artist, Chand felt a desire to beautify Le Corbusier's concrete city of Chandigarh – a city also described by Christopher Alexander as artificial and effectively dead (Alexander, 1965, p. 2), unable to reflect the cultural ideas of the citizens who later went to modify aesthetics of the realm to meet their vernacular needs.

Using recycled materials, Chand secretly and illegally attempted to create his vision, 'the divine kingdom of Surkani' in an 18-acre section of protected forestland (Maizels, 2009). Chand himself stresses that his reasons for creating the 'Rock Garden' was in direct response to Le Corbusier's Stark, or 'blank' (Oxford Dictionary, 2017), Chandigarh city (Maizels, 2009, also see Figure 16).



*Figure 16. Colonnade at Chandigarh Rock Garden (Virolaud, 2010). Note the overall asymmetry between the columns and the rounded arches, where the latter does not feature in Le Corbusier's work. Also note the subtle inclusion of swings in the arches, informally infusing a playful dynamic.*

Although not community art in the fullness of the definition (see Lowe, 2000, p. 364), Chand's Rock Garden does embody an informal architectural vernacular, in terms of the materials used and conveyed themes in its construction within protected woodlands within Chandigarh. However, this contribution is best regarded as a folk-art response that customises both the recycled materials and the setting to create a desirable environment. This environment consequently represents an extreme and direct response to the blandness of nearby Chandigarh's Brutalist design qualities that inadequately reflect indigenous cultural ideals. This inspiration seemingly supports the findings of Mahnke (1996) in that spaces void of decoration, often result in creative responses – the human desire to decorate and colour space; similarly, this also supports Salingaros's conclusions to his 1997 paper, that humans have a desire to create interesting urban environments by raising and enhancing their 'life' (Salingaros, 1997, p. 16). It can be argued that blandness is a necessary prerequisite in the creative informalities that have led to Chandigarh perceived liveliness and well used spaces. The colours, signage, and shopfronts shown in Figure 15 demonstrate how the underlying art-deco design has been gradually modified to reflect the local vernacular of Chandigarh's local businesses and residents.

In London, the environmental quality of Camden High Street is in some ways comparable to Chandigarh. Upon its conception, the street served as a conventional high street and part of a crucial link between Charing Cross, where distance is measured in London, to Archway North London (A400). Camden High Street intersects Regent's Canal that was once an essential means of transporting freight. As the railways became more economically and technically efficient, Regent's Locks fell out of use, leaving many of the connected dock yards and wharf infrastructure abandoned. By the 1970s the buildings were occupied by artists and artisans who advertised their profession by infusing colour and informal design alterations to the upper portion of the high street. The bohemian art was synonymous with various youth cultures including Punk culture and its variants. Today the influence and exhibition of Steam Punk and Cyber Punk sub-cultures is still apparent in the urban fabric today.

According to the Londonist, the large street signs at Camden first appeared during the 1990s as part of the market's transformation "from a haven of countercultures into a major tourist attraction" (Brown, 2017). Here, the independent artists and craftsmen compete to attract sales through extravagant signage, made possible through lax planning regulations. In this instance, the conventional shop frontages, awnings, and renders are not enough to convey the individualities of the building occupiers.

In various volumes, Alexander stresses the need for community involvement in design towards a *timeless way of building* (2004; 1979). Carmona argues that urban spaces should be flexibly designed with flexibility to allow for community inputs to design, where he stresses the need for "environments that users can modify and adapt" (Carmona, 2010, 121). However, the noted examples of responses are discrete and codified. The most obvious responses to urban planning are often discussed in terms of inspirations behind the occurrence of graffiti murals in the UK.

### **4.3 Visual Complexity**

According to Xing and Manning (2005) the various definitions of complexity all share the following concerns: size, variety, and rules (p. 9), where the optimal rationalisation of the combination of these elements only makes sense to the individual observer (ibid., Edmunds, 1999). As such, complexity involves the integration of the system and the observer (Xing and Manning, 2005).

Acknowledging the near impossibility to define complexity, Tuch et al. (2012) adopt the logic of Edmunds (1995), who suggests that complexity only makes sense when considered relative to the observer. They go on to discuss aesthetic perception under the synonymous terms of visual appeal, attractiveness, beauty and aesthetics to assess human emotional response towards various website designs. Using the studies of Lindgaard et al. (2006) that determined consistent and unwavering opinions of website designs by a select user group, Tuch et al (2012), conclude that visual websites with high visual complexity score lower 'perceived beauty' scores. The scores are constantly lower than websites with

low visual complexity as pleasure is related to the arousal potential of a stimulus (2012, pp. 278 – 802).

Nadal et al (2010) define visual complexity on the premise of beauty appreciation, and stimuli features including degrees of abstraction and artistry. It relates to initial distinction among elements based on their heterogeneity, irregularity of shapes, and the irregularity of their disposition, the degree with which the different elements are collectively perceived, asymmetry, or incongruence. Research covering the impact of perceived complexity is unsubstantial in-built environment settings. Nonetheless, Nadal et al.'s findings mirror that of Tuch et al. (2012) and acknowledge progress made in research concerning the influence of website aesthetics on people's behaviour and perception, Reinecke and Gajos (2014, p. 11).

Salingaros's discussions on life and complexity somewhat quantify Nadal's definition and do this within the context of the built environment. Here Salingaros ascertains that complexity can be measured by assigning scores to architectural attributes using a thermodynamic theoretical approach (Salingaros, 1997; 2006). The key attributes are divided into architectural harmony and temperature. Harmony describes the relationship between shapes and details, while temperature refers to the degree of detail and small-scale contrast in a design (Salingaros, 1997, pp. 2, 5). Their rough-guide components are summarised in Table 1.

Table 1. Salingaros's criteria towards measuring complexity (1997)

<b>Architectural Temperature</b>	<b>Architectural Harmony</b>
$T_1$ = intensity and smallness of perceivable detail	$H_1$ = vertical reflectional symmetries on all scales
$T_2$ = density of differentiations	$H_2$ = translational and rotational symmetries on all scales
$T_3$ = curvature of lines	$H_3$ = degree to which distinct forms have similar shapes
$T_4$ = intensity of color hue	$H_4$ = degree to which forms are connected piecewise
$T_5$ = contrast among color hues	$H_5$ = degree to which colours harmonize

Scores ranging between 0 and 2 are assigned based on subjective observations of variances within each harmony or temperature attribute. For example, a straight line noted in T3 will have a score of 0, while a line with a high degree of curvature will score 2. The sum total of both T and H multiply to measure 'life'.

$$L = TH$$

The higher the score, the more life apparent within a building's design. Complexity (C) is measured by Salingaros using the following formula:

$$C = T(10 - H), 0 \leq C < 100$$

The value T is essentially the summation of values T1 to T5, while H is the summation of values H1 to H5. Complexity is the product of multiplying the T score by 10 minus the overall score for H. Scores cannot exceed 100 and same understanding applied to measuring life applies here – the higher the score the more visually complex a design is.

A major finding from Salingaros' study is that buildings with higher complexity scores are more likely to possess higher life scores. He compares the aesthetics

of modern buildings (scoring low complexity scores) with traditional buildings that have inherently high complexity scores and finds that the traditional buildings are more likely to be appreciated by people because of their embodiment of natural form. According to Salingaros (1997), the higher complexity of buildings is synonymous with the complexity of systems evident in nature hence he suggests a parallel that expands on discussions concerning vernacular preferences by exploring mutual responses to aesthetic qualities, the attraction to complexity associated with biomimicry – a stem of the biophilic hypothesis (Kellert et al, 2010).

Based on this discussion, it is assumed that urban features exhibiting increased complexity will be considered more attractive than those with plain aesthetics. Therefore, subsequent modifications of bland designs are potentially connected to a natural inclination for visual interest as noted with Shine et al (2005) and Mahnke (1996). However, as per the literature covered in section 3.5, there is a potential threshold where the attractiveness of a visually complex design will taper off and eventually reverse. Such an occurrence challenges Salingaros's assertion that exponential increases in the visual complexity of a design will correlate with its exponential attractiveness. This theoretical threshold can partially be attributed to the quality of the design as argued by Shaftoe (2008, p. 140). Nonetheless, the premise of a correlation between visual complexity and attraction requires robust testing within the context of urban space that goes beyond ethnographic studies, subjective accounts, and limited mathematical testing.

To test the role of visual complexity, associated with the informal modifications of designs in public spaces, this research will further study the influence of informal interventions on the perceived quality of urban environments, towards ascertaining expected attraction responses to customised urban spaces.

#### 4.4 Graffiti as an emotional response to planning interventions

Graffiti occurs in urban environments for two main reasons: firstly, graffiti is placed to mark territory and to claim a space; secondly, graffiti may be placed to modify and challenge the meaning of an urban space in ways comparable to folk art (Allen, 2006, pp. 3 – 4).



*Figure 17. A mural by Dave the Chimp (Horwood, 2007)*

When discussing the installation of a commissioned mural in Berlin that depicted biophilic themes (see Figure 17), graffiti artist David Horwood also known as ‘Dave the Chimp’ stated that his intention was to make the building “disappear” (Horwood, 2007). When relating to the future of his project Horwood states that his hope is that Graffiti begins to grow up the wall again and, extremely, that “the human race dies out within the next thousand years and the plants and animals to take back this place again...” (Horwood, 2007)

Graffiti when discussed outside of the context of gangs and youth culture, and within the context of an artistic or creative response begins to reveal attitudes and subsequent responses towards urban environments. Whilst acknowledging that the street art practice of graffiti garners most of its attention from its commercial

success, Burnham acknowledged that, in recent times, graffiti now acts as a direct response to urban form (Burnham, 2010), where he refers to practice as a “nascent form of DIY urban design” (Burnham, 2010, p. 137). By interviewing those engaged in urban graffiti, Burnham determines that urban form, as found in the ‘fixed visuals’, structures, and objects, acts as a catalyst towards the practice of urban graffiti – specifically the seemingly ‘anonymous bits’ (Burnham, 2010, 138; Verschelden et al, 2012). Burnham then goes on to reveal creative responses to bland infrastructural design, conveying themes of escapism, the results of ‘visual urban play’, where creative expression challenges the rules of engagement between individuals and their cities (Burnham, 2010, pp. 138 – 139; also see Stevens, 2007; and Wunderlich, 2008).

Iveson considers the practice of graffiti as a form of ‘DIY urbanism’ (2013, p. 946). Such practices embody the theoretical concepts of Burnham’s ‘DIY urban design’ (2010). According to Iveson, DIY urbanism explains the physical and process changes made to environments without permission and in instantaneous fashions (Iveson, 2013, p. 946). He builds on Burnham’s work by suggesting that interventions such as these are attributed to autocratic design principles that subsequently fail to embody democracy. In doing so, he infers that people generally feel the need to further adapt or customise designs to suit their needs in ways that are vernacular or reflect their cultural ideals as embodied in the origins of the BUGA UP movement (Iveson, 2013, pp. 947 – 949). Based on this, this research assumes that people are inclined to customised their environments in order reflect their cultures, where such interventions potentially communicate disdain towards the quality of design as implemented by urban planners and civic bodies.



## **4.5 Responses towards Customised Urban Environments**

A customised environment is one that has been subjected to informal interventions that ultimately optimise an aspect of its design. The distinguishing characteristic between informal and commercial interventions is marked by the former being randomly distributed and exhibiting more visual complexity – an accumulation of styles. Furthermore, customisation intentionally exhibits the vernacular cultures of their communities that improve spaces considered dull, drab, or boring. In this section, studies that discuss subsequent attitudes towards modified urban environments will be explored in order to further explore the causes of customisation, justifying creative responses towards bland urban design.

In answering the question ‘does public art enrich landscapes’, psychologists Motoyama and Hanyu place students into two distinct settings; an urban environment with public art and an environment without public art and recorded subsequent responses (Motoyama and Hanyu, 2014). According to Motoyama and Hanyu, public art refers to works of art put into public places such as city squares with the goal to create cultural atmospheres (ibid, p. 14), where they subsequently assess responses to the public art installation according to fundamental elements of art (Piro, 2002, p. 128; Withrow, 2004, p. 33). Motoyama and Hanyu aligned their findings to Russell’s two bi-polar dimensions of art and response that essentially gauge emotional response according to the broad categories of valence, mix of arousal/active and positive valence, and relaxation (Motoyama and Hanyu, 2014, p. 16). The essence of the findings from Motoyama and Hanyu are that the presence of public art makes a space more arousing/active due to its novelty that leads to increased excitement and activation qualities of environments (ibid, p. 19). Their findings also suggest that the installation of public art also results in improved wayfinding and legibility of urban spaces (ibid). The role of public art with highly incongruous elements stimulates behaviours of curiosity and demand attention, where this is further enhanced by the quality of the art installation (Motoyama and Hanyu, 2014, pp. 19, 23). While the observations of Motoyama and Hanyu empirically cover the impact of art elements on the perception of urban spaces, they do not cover the impact of informal art on behavioural responses to urban environment aesthetics.

However, this study can be used to justify the assumption that art does play a contributory role in the how people respond to public urban spaces.

In an earlier study, Hanyu explores emotional responses towards the physical elements found in urban environments during daylight hours (Hanyu, 2000) to contrast with previous work that explored responses to urban environments during the night time, where perceptions of fear and uncertainty correlated with the quality of lighting present in selected case study sites (Hanyu, 1997). Hanyu (2000, p. 276) determines average ratings for elements that constitute an experience of an urban space; these elements are:

- complexity
- legibility
- coherence
- mystery
- openness
- typicality
- naturalness
- brightness
- uniform lighting
- nuisance elements
- vehicles
- and familiarity

Through the use of a Likert scale formatted questionnaire, which also records a general rating towards how people actually feel within the urban space (ibid.), Hanyu was able to determine that natural and open urban scenes generate strong emotional responses alongside observations conveying arousal (ibid., p. 281). However, he also noted that emotional responses towards an urban environment were also affected by other factors such as socio-economic conditions and crime (ibid., p. 282).

In a bid to eliminate the 'expert-user' gap between urban planners/designers and the residents they serve, Zhang and Lin (2011) appraise the effects of aesthetics elements on the quality of urban environments at a neighbourhood scale. They

argue for community inclusion during the planning and design process when deciding the physical appearance of an urban development (Zhang and Lin, 2011, p. 11). Within their article Zhang and Lin provide a useful definition for 'aesthetic response' as a "[favourable] emotional appraisal of evaluation" (ibid, p. 12) activated by environmental stimulus such as the visual attributes of an urban space (ibid). By studying contrasting urban fabrics in Pa-an in Taiwan, exploring variations in visual aesthetics and complexity, Zhang and Lin determined that enhanced legibility of open spaces, buildings, and trees (vegetation) are influential in terms of creating 'pleasant' urban spaces as they induced feelings and/or emotional responses of both pleasure and arousal (Zhang and Lin, 2011, p. 17).

The connection between culture and the popularity of a space or setting is noted in a study by Hannigan (1998). Here he realises that office and retail development is not enough to keep workers in cities outside of working hours or over the weekend (Dicks, 2004). Instead he finds that retailers, restaurateurs, stadium managers and traditional cultural institutions acknowledging the role of spectacular cultural display are viewed as a part of a friendly and convivial setting – contrast to the mundane (Dicks, 2004, p. 70). For just over 100 years, retailers purveying comparable gifts have competed most fiercely during the Christmas season (Robinson, 2013). When Macy's started to promote and benefit from increased sales on the basis of its Christmas themed window displays, other retailers began to compete by creating elaborate windows displays (Belk, 2001). Similar situations are observed today, where retails compete to entice potential customers by promoting an image that is anything other than mundane. Such retail strategies exploit our inert desire to escape the norm of life or to connect strongly with a familiar culture. This research assumes that similar cultural interventions, evident in informal customisations of urban spaces will lead to a similar effect, where the presence of a cultural vernacular will act as catalyst in the subsequent popularity and recorded affection towards these occurrences.

#### **4.6 Customisation as art and its impact on street user perceptions**

As determined in previous sections of this literature review, customisation by end users can take the form of folk art installations in urban environments, where the inspiration behind these acts has been discussed at length. A common occurrence of customisation in urban environments is evident in the presence of street art, frequently referred to as guerrilla art; described by Visconti et al as being “at the forefront of...spirited confrontation” (Visconti et al, 2010, p. 512), where spirited confrontations take the form of “agency and inter-mutual behaviours” towards established practices and hegemonic ideals (ibid). However, street art has recently become increasingly popular, with names like Banksy and Shepard Fairey becoming well-known in arts communities. According to Riggle, street art is antithetical to the art world, where he argues that formalist principles cannot be used to address its occurrence (Riggle, 2010, pp. 250 – 251). Riggle writes:

“...street art embodies a response to modernism that is interestingly different to postmodern, or post-historical, response. Modernism separated art and life...such art [retains] artistically distinguishing visual properties” (Riggle, 2010, p. 251)

At a superficial level, graffiti can be linked to criminality and feelings of fear and danger (Lachmann, 1988; Jackson, 2011). However, research by Rowe and Hutton has revealed that even graffiti is not simply a nihilistic and destructive behaviour, but one in which perceptions of criminality were leavened by aesthetic judgements (Rowe and Hutton, 2012, p. 66). Acknowledging the earlier work of Halsey and Young (2006), who state that the presence of graffiti, usually occurring in dysfunctional urban settings, plays a crucial role in the alternative reading of urban spaces (Rowe and Hutton, 2012, p. 67). Rowe and Hutton present quantifiable evidence that suggests that, despite its negative portrayals and consequences, graffiti can be considered a creative art form that bears favourable aesthetic traits (ibid, p. 81). However, graffiti acts as a catalyst towards further acts of other types of anti-social behaviour (ibid).

Expanding further on Rowe and Hutton's work, Riggle (2010) goes on to discuss the properties of graffiti, and responses towards it from more of a sociological perspective. Riggle presents examples of graffiti that embody a response towards the modernist ideals that influence the permanent urban aesthetic of many towns and cities. Discussing the use of projectors, 'throwies' (magnetic objects similar to fridge magnets), manipulation of civil structures such as road signage, and the more conventional means of paint and chalk, Riggle explores the attitudes and responses towards these types of intervention. He draws parallels between the perceptive qualities and behavioural responses towards public art with the visual qualities of graffiti, where he acknowledges that not all graffiti is categorically 'street art', as per his earlier definitions.

After describing the circumstances that lead to 'do-it-yourself urban design', Gordon Douglas highlights attitudes towards the activity of 'guerrilla gardening' – the effects of seeding neglected 'tree pits' (Douglas, 2011, p. 10), and similar interventions of users of urban designs in influencing how an urban space is perceived by other users of urban spaces. Douglas firstly acknowledges the popularity behind such design interventions because they coincide with imminent transformations of undesirable urban features into things which enrich the urban experiences. Douglas records the subsequent gentrifications of areas resulting from their increased aesthetic appeal that can destroy communities instead of bringing them together (Douglas, 2011, p. 11).

During the 2000's, street artist Banksy, became a notoriously sought-after artist. His primary medium are the non-descript walls of buildings. His art work involving the use of stencils that have the ability to transform boring features into value urban attributes, sought after by celebrity art collectors who spend copious amounts of money on his ironic stencil art pieces, often extracting bricks of entire walls. The nature of Banksy's pieces is to provoke thought and convey messages (Gough, 2012). However, according to Tim Cresswell, reactions towards graffiti are usually aligned to where it can be found (Cresswell, 1992):

“Graffiti on the street and the subway takes on the meaning of dirt, disease, and insanity, whereas in a gallery it becomes ‘creativity and insight’...in one place it is bad, and in another it is good” (Creswell, 1992, pp. 342 – 343).

With the acceptance that micro-spatial urban practices such as: “guerrilla and community gardening; housing and retail cooperatives; flash mobbing and other shock tactics; social economies and bartering schemes; ‘empty spaces’ movements to occupy abandoned buildings for a range of purposes; subcultural practices like graffiti/street art, skateboarding and [Parkour]; [and so on]” (Iveson, 2013, p. 941) can change the perception of an urban space (ibid), Iveson mainly focuses on the impact of these interventions on urban politics. Urban politics, in Iveson’s case is essentially referring to democratic ideals that drive the development of an urban space, where he focuses on DIY urban practices (ibid, p. 945). Building on the ideologies of the ‘BUGA UP’ case study, Iveson discusses the objectives of the NYSAT (New York Street Advertising Takeover) – a project that carried many similarities to BUGA UP, but with the major difference being that their outputs were carried out in daylight settings (Iveson, 2013, p. 953). The objectives of NYSAT included the engaging of the public, and the visibility of the regulatory responses of civil societies, where the art works of NYSAT participants are washed out in broad daylight with the canvas reset that in turn inspire public response. Therefore, Iveson argues that responses to street art are the establishment of urban democratic politics that ultimately shape the growth of urban spaces, the allowed and encouraged modification of municipal urban spaces and their features (Iveson, 2013, p. 955).

Discussions into the impact and influences of street art chiefly target the social properties associated with the art installation, such as the message conveyed by the piece. As discussed earlier on in this chapter, the physiological properties of art installations can also play a significant role in how they are perceived by the general public, and how they ultimately impact on the use of urban environments. Briefly discussed is the fact that street art intervention can transform dysfunctional urban spaces into useful urban fabrics (Verschelden, 2012; Rowe and Hutton, 2012), however, the question is asked: can urban space transformation be achieved with enhanced visual aesthetics alone?

Lee notes that street art, in its graffiti form, can carry political messages or objectives that speak out against societal ideals or the 'establishment', where it can be considered as a 'vernacular lexicon of power and resistance' (Lee, 2013, p. 308); however, it is the initial aesthetic that captures the attention of the general public (Lee, 2013, p 312). By way of example, Lee writes:

"...a homeless middle-aged man named Pak Nur. Pak Nur's art form consisted of brightly-coloured philosophical proverbs painted on highly visible walls...Note that artists conceive of the power of art as something universal and moreover, as inducing communication. The street artist's public is one that is aesthetically caught by the image..." (Lee, 2013, p. 312)

According to research carried out by Nasar, street art can be broadly described as symbolic aesthetics. This informal act often contains variables that "reflect the individual's internal representation of the building and meanings associated with that representation and building" (Nasar, 1994, p. 382) and contrasts against emotional detachment associated with formal aesthetics found in criticisms of urban design. Formal aesthetics refer to the composite structures of "shape, proportion, rhythm, scale, complexity, [colour], illumination, shadowing, order, hierarchy, spatial relations, incongruity, ambiguity, surprise, and novelty" (ibid). Focusing on the formal aesthetics, Nasar argues that the majority of urban designs have the objective of creating 'pleasantness' in urban environments where these are typically monotonous (Nasar, 1994, pp. 380, 397). For 'interest' and 'excitement', Nasar argues that it is those urban spaces that encourage high complexity and higher 'atypicality' (ibid, p. 397), where typically this can be achieved through the introduction of vernacular practices, where complexity is recognisable or appreciated in familiar designs (ibid, p. 394).

Kirillova et al highlight the importance of aesthetic judgement and differentiates it from art by stressing that aesthetics are observed through all of the senses (Kirillova et al, 2014, p. 284), where Pink argues that this is possible through the power of suggestion as witnessed in her ethnographic studies (Pink, 2009). Reflecting on Stoller's earlier theory on the relationship between sensory

aesthetics and memory that guides suggestion who writes “the human body is not principally a text; rather, it is consumed by a world filled with smells, textures, sights, sounds and tastes, all of which trigger cultural memories” (Stoller, 1997, p. 85). Pink concludes that sensory memories, described as “our experiences of place – and its social, physical and tangible component [that are] inextricable from the invocation, creation and reinvestment of memories” (Pink, 2009, p. 38), are achieved through the embodiment of practices that strengthen relationships between memory and place (ibid). In order for an aesthetic element to be appreciated by the community it serves, it must be able to relate to the positive experiences associated with the positive memories and resident cultures of its users. However, it remains unclear as to whether such an assumption can justify positive affections towards street art installations when applied to descriptively dysfunctional urban fabrics – those that are unable to attract pedestrians and have a reputation as being unpopular.

#### **4.7 Alternative forms of customisation: Guerrilla Gardening**

Responses towards Guerrilla gardening, considered as informal practices of “cultivating of land that does not belong to the gardener” (Swartwood, 2012), provide further insights into the responses to street art and its causes. So far, it has been acknowledged that street art garners positive responses due to their ability to transform a non-descript urban fabric into something that can be considered interesting and aesthetically pleasing; street art also presents messages that frequently address non-conformist ideals to which many are opposed – often they hold a certain political significance or promote escapism from the features of normal everyday life. However, the responses to guerrilla gardening are somewhat different due to their biophilic qualities that add a further dimension to the justification of responses to intuitive informal urban design interventions witnessed in street art. Biophilia is described by Kellert as “the inherent human inclination to affiliate with natural systems and processes, especially life-like features of the nonhuman environment” (Kellert, 2011, p. 3). According to Kellert, “this tendency became biologically encoded because it proved instrumental in enhancing human physical, emotional, and intellectual fitness during long course of human evolution” (ibid). Briefly mentioned earlier in section 3.5 of this thesis is the impact of Guerrilla Gardening on the overall



design aesthetic of an environment. Here, undesirable places are picturesquely transformed into environments that are sometimes forerunner to subsequent gentrification (Douglas, 2011).

Whilst acknowledging that studies into urban landscapes reveal the general public's preferences towards environments indicating "care, control and tidiness" (Nassauer, 1995; Ford, 2000), Weber et al explore responses and perceptions towards 'wild urban vegetation' amongst urban space users (Weber et al, 2014, p. 206). They partly draw inspiration from city dwellers preferences towards wild urban vegetation found in former wastelands, and urban parks (ibid; see also Özgüner and Kendle, 2006; see Hoffmann et al, 2012). Asking open questions in order to determine the modal preferences towards wild urban vegetation to mostly young male users of public urban spaces, Weber et al determined that wild roadside vegetation was, in general, highly regarded (Weber et al, 2014, p. 210), although landscaped vegetation was somewhat more popular (ibid). Regardless, Weber et al conclude that attitudes towards wild urban vegetation were largely of affection (ibid) as is consistent with positive emotional valence. However, Weber et al fail to provide clear evidence that helps to establish an understanding as to why, wild urban vegetation, even if untidy in appearance, is highly favoured by users of urban spaces.

Possible justifications are presented in Brook's publication that discussed 'the importance of nature, green spaces, and gardens in human well-being' (Brook, 2010). Establishing her research context on contrasting experiences between present-day urban children and the 'idyllic' experiences of author and naturalist, Gerald Durrell, Brook seeks to empirically uncover the components found in nature can be associated with wellbeing (Brook, 2010, p. 295 – 296). Isis Brook identifies four elements that can be tested against each other in both urban and rural scenarios. These are, as extracted from the Corfu Trilogy: "time, wonder, action, and freedom" (Brook, 2010, p. 296). In brief, Brook stresses the importance of 'time' spent amongst nature as it enables a person to not become caught up with his/herself. Brook discusses the wonder element noted in Gerald Durrell's trilogy, where he emphasises its role in the appreciation of nature, an action highlighted by Frumkin in Kellert et al as beneficial in physical and

psychological healing processes (Kellert et al, 2010, p. 111). Within the context of action, Brook highlights Durrell's attempts to replicate environments he encountered in his experiences of nature and claims that such engagement results in deeper appreciation of nature (Brook, 2010, p. 298). With 'freedom', Brook supports the notion "that a relationship with nature is not just a pleasant addition or preference one might choose to explore, but an essential component of human well-being" (ibid).

In various guises throughout the remainder of his paper Brook, like Kellert et al, acknowledges the benefits of human-nature relationships within the context of health, where he claims that we need not move into the rural areas to fully benefit from naturalistic relationships. After acknowledging that urban environments, that lack vegetation, access to water, and other natural scenery, Brook states that urban environments, inhabited by mostly the poor; people who are unable to move to richer areas, are indeed largely void of nature due to the prevalence of low maintenance 'safe' hard landscaping and strategies to improve policing of public urban spaces. For example, "the removal of trees or planting...because it obscures [CCTV] security monitoring" (Brook, 2010, p. 299). Citing previous studies, by Sullivan, Brook goes on to demonstrate that individuals living adjacent to green spaces engaged in more social activities, and displayed strong social cohesiveness (Brook, 2010, p. 300; see also Sullivan, 2005). When discussing the practice of Guerrilla Gardening, Brook acknowledges that not only does this informal intervention enhance the aesthetic of urban spaces, but its occurrence as a "resistance to the urban environments that we have been given and, as with the benefits of other nature experiences, involves a form of empowerment" (Brook, 2010, p. 308) as a way of connecting to something else. According to Brook, we can become more than we are owing to the natural incorporation of the four elements (see *ibid.*, p. 296) that, although discussed within the context of childhood experiences, can enhance experiences of adults (Ralston, 2012a, p. 58). Expanding on Brook's work, Shane Ralston suggests that Guerrilla Gardens offer spaces for adults and children to deliberate, socialise (Ralston, 2012a, p. 64), and become an active participant in the living environment when engaging in the activity of Guerrilla Gardening (*ibid.*, p. 65).

Described as the 'illegal beautification' of seemingly neglected urban spaces (Adams and Hardman, 2013, p. 2), Adams and Hardman, explore the trend of guerrilla gardening as a tool to enhance existing environments in ways similar to the analysis of the impact of street art on dysfunctional urban environments. Similar to the findings of Brook (2010) and Ralston (2012a), Adams and Huston conclude via ethnographic analysis that guerrilla gardening does enrich social interaction, but highlight the significant role played by 'display' (Adams and Hardman, 2013, p. 13). They draw the reader's attention to the fact the efforts of the 'guerrillas' are appreciated by passers-by (Adams and Hardman, 2013, p. 14), however, very little research has since occurred that explains exactly how people respond to the presence of guerrilla gardening from the perspective of its enhancing or conversely destructive impact on the busyness of public urban spaces. Trends become a little clearer when discussed within the context of the recent street art practice urban knitting. It would seem that the closest we get to fully understanding the responses towards guerrilla gardening is the acknowledgement of a genuine appreciation of, and even a scientific curiosity of an environment or nature itself (Ralston, 2012b, p.4). Fambro in any case states that Guerrilla Gardening is primarily carried out with the intent to highlight the wasted potential of a derelict or vacant plot of land (Fambro, 2014, p. 13), with the further intention to slow things down (Schreiner et al, 2013, p. 64). The overall benefit of guerrilla gardening is its attractiveness, both aesthetically and functionally, where the activity has been known to bring people together (Häkkinen et al, 2012, p. 12).

#### 4.8 Alternative forms of customisation: Urban Knitting

Urban knitting, or yarn bombing, is a female dominated illicit street art practice that gained international attention in 2008 with the installation of an art piece called 'The Knit Knot Tree' (see Figure 18) by the 'Jafagirls' (Norris, 2014) after being created by Magda Sayeg from Texas (Haveri, 2012, p. 9).



Figure 18: Knit Knot Tree (Miriam 'Shrewdcat', 2009)

Citing the textile artist, Virpi Vesanen-Laukkanen, who was responsible for the 'Crochet Line' project in 2008, Minna Haveri stresses the importance of this artistic intervention as to elucidate joy, colour and humour that is frequently lost on monotonous tasks, such as using public transport (Haveri, 2012, p. 8). Deliberating on the slow nature to develop these soft-art interventions, Haveri states that the purpose of the art is to transform bland objects in urban environments, into something that can be appreciated or generate positive emotional responses, where they can add a soft and warm element to the urban landscape. Haveri writes:

“...Traffic signs do not necessarily need leg warmers, but the knitted piece of art could warm the heart of someone passing by” (Haveri, 2012, p. 14). Actual responses to urban knitting are recorded by Farinosi and Fortunati (2012) in a qualitative fashion primarily through interviews that sought opinions that indicated emotional response from everyday users of urban spaces on the installation of the knitted artwork. An example of one such opinion is as follows:

“This is the only touch of [colour] in a city abandoned by the institutions. We cannot and must not remain indifferent” (Farinosi and Fortunati, 2012, p. 9). Farinosi and Fortunati later recognise that, through DIY cultures, people can increase their engagement and connection with their social and physical environment, which in turn gives rise to “personal growth and social learning practices” (ibid). The essence of Farinosi and Fortunati’s research was however to explore the effectiveness of internet technology in organising/facilitating ‘guerrilla’ events for urban knitting; their research does not delve deeper into the cultural significance and physiological impact of urban knitting within the communities within-which they are situated.

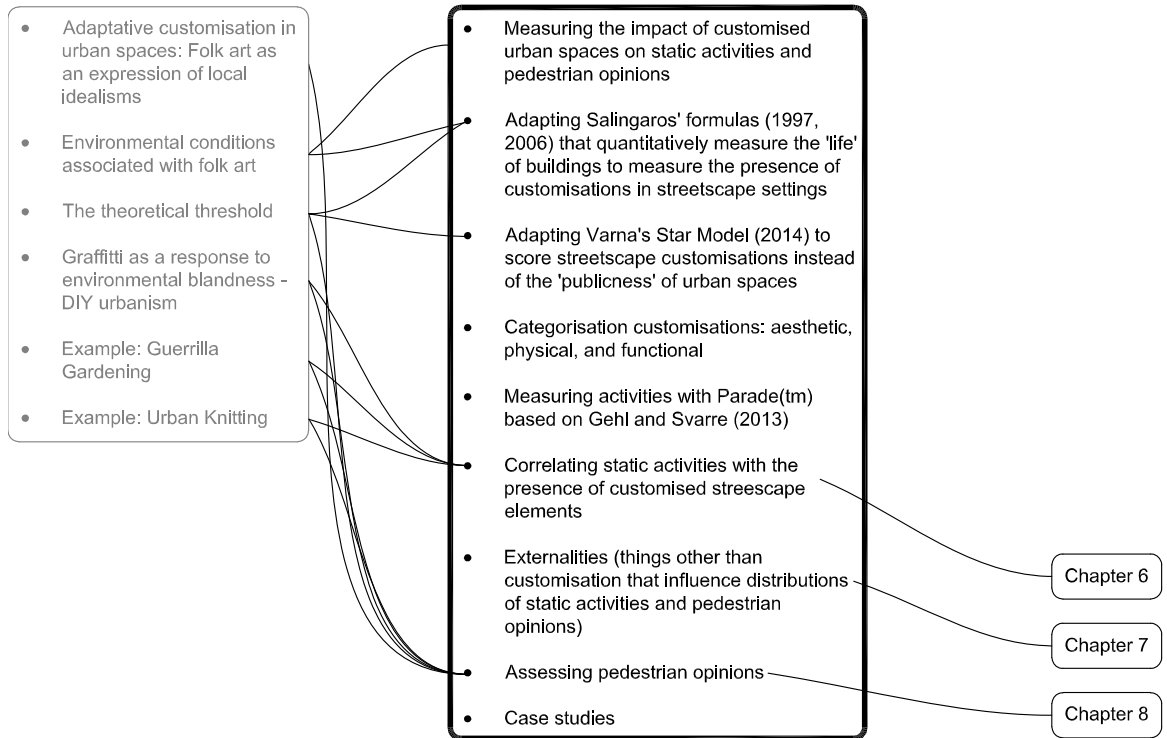
Exploring the matter further in a paper called ‘A New Fashion: Dressing up the Cities’ Farinosi and Fortunati, develop their framework further and seek to justify, through ethnographic study, the occurrence of urban knitting in Italy’s L’Aquila shortly after the 2009 earthquake (Farinosi and Fortunati, 2013, p. 283). The name of the project that facilitated urban knitting in this instance was called “Lets Patch It”, where the aim was to “dress up” the city (ibid). Here Farinosi and Fortunati, make it clear that the aim of urban knitting is to increase the attractiveness of urban landscapes in a gentler and less harsh way than its graffiti counterpart (Farinosi and Fortunati, 2013, p. 286). Decorating abandoned and inaccessible parts of the destroyed city, urban knitters managed to achieve emotion responses from passers-by that included ‘shock’ and ‘intrigue’ towards the “new, [colourful], [and] unexpected” (ibid, p. 292) as determined by the smiles on their faces, and their spoken words (ibid, p. 294). Here Farinosi and Fortunati record the verbal responses of passers with regards to the installation of the knit work:

“My first impression was joy: it was like a rainbow of [colours] on a grey background. Then this feeling was replaced by a sense of tenderness because it looked like someone wanted to cover a sleepy town with a warm blanket” – Silvia (Farinosi and Fortunati, 2013, p. 283)

Again, however, the intention of Farinosi and Fortunati’s work was to highlight the political agenda of urban knitting, where they focused primarily on giving ordinary people a voice through their participation in the activity through use of the internet. Thus the key impact of urban knitting’s effectiveness as a tool towards urban regeneration isn’t covered, where the art form remains detached from urban planning and design discussion.

This conclusion is also true of the dominant graffiti occurrence of street art in urban settings. Whilst graffiti or ‘street art’ is widely considered as transformative in the perception of dysfunctional urban spaces (see for example Verschelden, 2012; Rowe and Hutton, 2012), little discussion is made in terms of its relationship to actual urban regeneration practices. Similar conclusions can be noted with the occurrence of guerrilla gardening, where the mere fact that it is still considered an illicit activity is indicative of the lack of discussion within municipal authorities who act largely on empirical research findings. As such, DIY urbanism still warrants further academic study especially in terms of its impact on human physiological and emotional states when passing through urban spaces. Evidence uncovered by the literature review so far suggests that folk-art as witnessed in street art, guerrilla gardening, and urban knitting, can enrich urban user experiences, where aesthetics play a powerful role; however, at present no empirical studies have taken place that explore this occurrence in more detail. Theoretical discussions of collective efforts towards creating lively urban settings have been discussed throughout this literature review, where there is the conjecture that amassing customisations in urban space can possibly result in static pedestrian activities and interactions with the environment. There is also the assumption that too many acts of customisations may deter people from staying in a particular urban space. These are ideas that will be actively tested in the remainder of this thesis.

## 5 Methodology



The literature review partly addresses the research questions outlined in section 1.2 from the context of existing theories and related studies. However, these studies do not discuss the actual impact of informal interventions on the distribution of static activities and whether these correlate with actual overall impressions of an urban space. A number of studies present discussions that make it possible to predict responses towards customised public spaces, most notably, the theoretical threshold (see section 4.3). This threshold can be compared to a bell shaped curve distribution (see Figure 19), where a modal probability for an accumulation of activities spikes at a neutral position (red line); before this point, the expected correlation is that, as visual complexity increases, so does the attractiveness of the site (shaded yellow), but as complexity increases beyond the neutral position, the aesthetics become unattractive for the majority of users (blue dashed line).

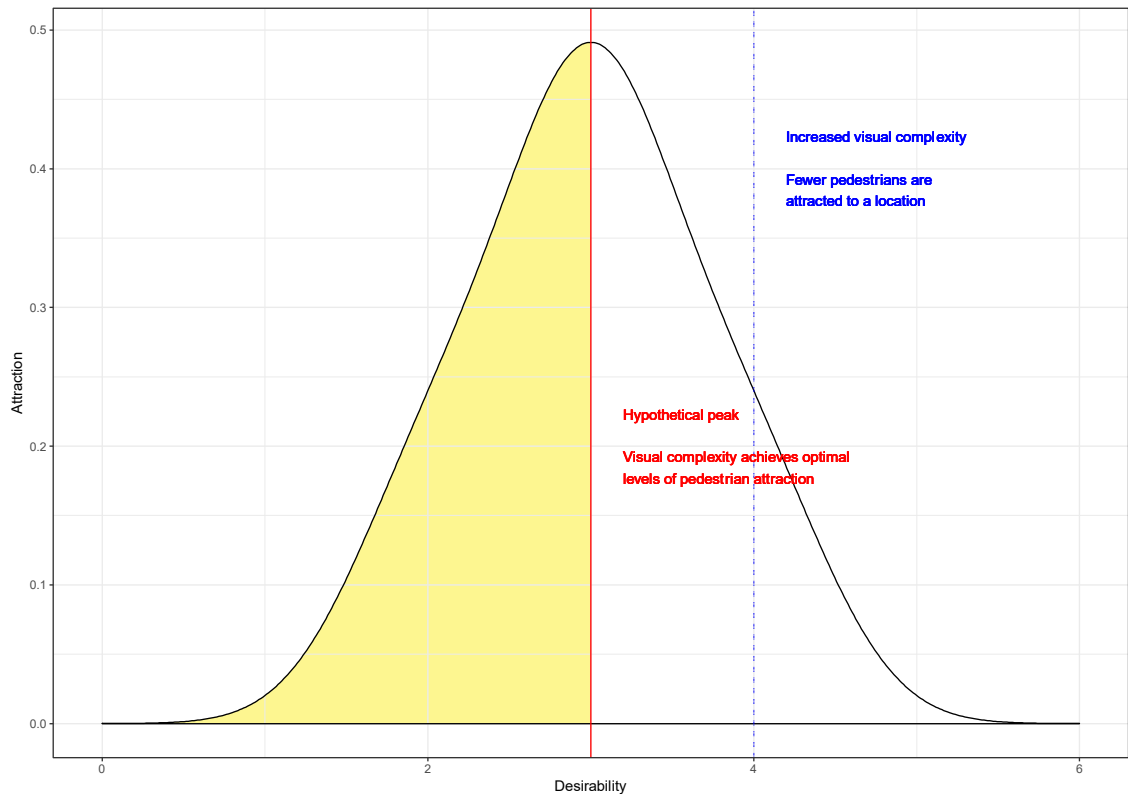


Figure 19. A bell-curve distribution representing theoretical attraction towards customised features. There is an expected slump in pedestrian densities when customisation (responsible for 'desirability') becomes overly complex.

This thesis tests the extent to which this is true by exploring levels of attraction in high streets with varying levels of visual complexity presented by forms of customisation.

To fully address the questions within an urban space context, the methods used deliberately acknowledge the shortcomings of previous similar studies which are either limited to small samples or convey subjectivity in their findings. The methods presented here are mostly empirical, relying on observational studies. As this research is essentially concerned with the impact of customised urban spaces on pedestrian behaviours, streetscapes acting as interconnected urban spaces were chosen because of their ability to convey variance in intensities of customisation presence, and their overall high usage by pedestrians. The variance in customisation is associated with the looseness of an urban space. Space Loose, or the looseness of space, is understood to be the ability of an urban space to be used in ways that fall outside of its primary function (Franck and Stevens, 2007). For example, public paths usually accommodate a variety



of activities and events; under certain circumstances such as curfews or law enforcement, the path becomes ‘tighter’ where limitations are placed on uses (ibid.). In this research, the presence of customisation is primarily determined by how regulated an urban space is – the looser the space, the less regulated it is. The findings of the empirical studies are confirmed with a quantification of pedestrian opinions correlated with variances in customisation.

Based on the findings of the literature review, the methods for this research aim to provide insights with regards to whether bland environments and those perceived as dysfunctional, are conducive to customisations where such conditions act as catalysts for informal design interventions.

The structure of this chapter discusses the fundamental approaches towards:

1. Mapping the occurrence and intensity of customisations in urban space settings – based on the looseness of space.
2. Testing the extent to which customisation intensity influences the distribution of static pedestrian activities, and whether these involve interactions with spatial surroundings.
3. Testing the extent to which street user opinions correlate with an increased presence of customisation.

## **5.1 Mapping customisation in urban spaces**

The first goal of this research is to determine the extent to which parts of an urban space has been customised by its end-users. This task requires the establishment of a typology of customisation, and a way of representing their distribution geographically for later comparisons with the distribution of pedestrian activities. Studies that categorise urban features into measurable typologies already exist (see Salingaros, 1997; Van Melik et al, 2007; Schmidt and Németh, 2010; Varna and Tiesdell, 2010); however, these studies either concern features affecting singular entities outside of their wider urban context – the quality of a building or architectural style, or aspects that do not directly address the impact of informal interventions on the urban space’s perceptibility.

'Customisation' within the context of this research takes the form of informal interventions made to a public space by local businesses and residents in an area. Customisation is picked over 'informality' because it describes a series of processes in which designers involve these communities in the end conceptualisation to a greater or lesser degree. In broad terms, a customised space is one that exhibits evidence of informal interventions after it has been physically built – post construction modifications/alterations. In specific terms, customisation describes a typology of interventions that range from instances of 'transparent customisation', where designers produce a space by observing the behaviours of their street users, to 'adaptive customisation', where designs are optimised by these communities (see section 3.3). Examples of adaptive customisations are noted in situations where the enforcement of spatial policies is lax or not rigidly enforced, these include:

- Bonnington Square and Gardens, South London. The accumulation of individual interventions by a predominantly artist occupied community that succeeded in revitalising a derelict neighbourhood into a sought after address in South London. Customisation here is largely in the form of guerrilla gardening intermingled with ad-hoc sculptures, tile art, and modifications to façade designs.
- Brick Lane, East London. This street and vicinity are historically bohemian where artistic expression is generally left alone on the demand of the owners of painted-on properties (Young, 2013). Therefore, street art is allowed to flourish along with a few occurrences of informal sculpting. The street is generally vibrant and considered a major tourist destination in East London (Pappalepore et al, 2010).
- Bear Pit, Bristol. This location is essentially a derelict space located at the centre of a roundabout and can be accessed through pedestrian passages. Its overdue improvement has been indefinitely stalled, thus, the locals frequently use it for artistic expression and informal street markets resulting in increased conviviality (Shaftoe, 2008). It features impromptu art exhibitions and operates flexibly around projected plans for the area.

The chosen method for measuring customisation in urban spaces adopts elements from Salingaros' application of thermodynamics to the measurement of 'life' in buildings ranging from traditional to modern architectural styles.

In 1981, Donald Appleyard published 'Livable Streets' in which he discloses the findings of a survey of three streets that possessed similar characteristics with the exception of volumes of vehicular traffic. The objective of his study was to assess the impact of increased traffic levels on social encounters/conviviality between residents in these settings. His experiment used the spatial mapping of routes taken by residents and the areas where they preferred to congregate (for conversations). His overall finding was essentially that neighbourhoods with higher levels of vehicular traffic are less likely to foster conviviality, with significantly fewer meeting points and fewer crossings made to connect with the other side of the street (see Figure 20).

Of particular validity to this thesis, is Appleyard's placement of activities on a map of a street as spatially discernible points. Also, the variance depends on one factor, traffic, which is a crucial element to the construction of his social study of public spaces. In this thesis, the distribution of conviviality and static activities are explored more generally in relation to the presence of customised features. Because of this, Appleyard's research as a template isn't directly applicable. The intensity of customisation concerns individual buildings and spatial features that can be scattered throughout the length of a streetscape. Therefore, a grid is applied to capture the occurrence of customisations and where pedestrians are located in relation to it.

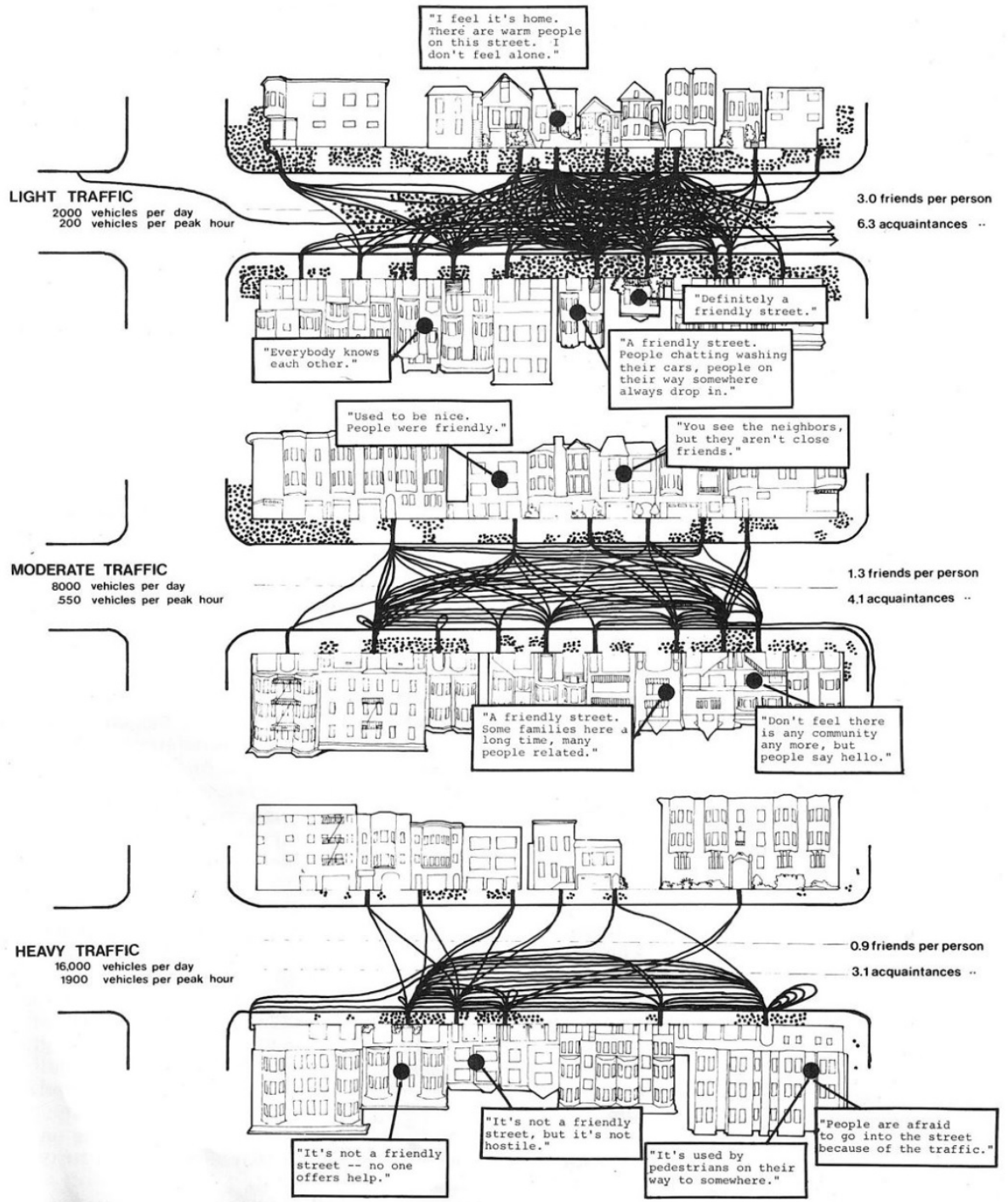


Figure 20. Appleyard's representation of meeting points and paths (Appleyard, 1981, p. 21. Source: Turner, 2015)

While Appleyard concludes that traffic is a key component in the distribution of static activities, this research goes further to suggest that distributions of static activities in urban spaces, specifically streetscapes, are also attributed to customisation.

Appleyard's work is regarded as a pivotal study with regards to producing lively street scenes (Turner, 2015; Francis, 2016; Appleyard, 2017; Layman, 2017). Although it is over 30 years old, its methodical approach is still applicable in many current studies. In this thesis, the comparison of similar streetscape settings with the main differences being their geographic locations and demographic compositions. It is expected that customisation will be present at each site but to varying degrees. Here, the overall customisation score of a site will also be treated as an independent form of analysis towards the assessment of the impact of customisation on the life of urban spaces. Attraction to customised features will expand on the detail of the observation by identifying key factors that people are attracted towards. In essence this will be the equivalent of Donald Appleyard identifying the characteristics of buildings that have many paths heading towards them, or a high number of convivial encounters.

In this research, Appleyard's core approach of comparing three similar sites with a distinctive variable is adopted. However, as customisation differs from traffic by comprising solely of built features. The analytical approach for this thesis is based on that used by Varna (2014).

### 5.1.1 The Salingaros Formula

Nikos Salingaros attempts to validate Christopher Alexander's theories on achieving the 'patina of life' (1965) by applying scores to discernible visual characteristics common in both traditional and modern buildings. His method quantitatively calculates 'life', "the degree that one connects with a building in the same way one connects emotionally to trees, animals, and people" (Salingaros, 1997, p. 2). He also calculates 'complexity' and associates it with the arousal of viewer interest in buildings (ibid., p. 10), in order to cement his findings on 'life' and to justify Alexander's perspectives on what makes a building (or an object) alive in non-subjective terms, comparable to those of environmental psychologists (see section 4.3).

Each attribute for temperature ( $T$ ) and harmony ( $H$ ) has a maximum score of 2 and minimum of 0 which are determined primarily through subjective observations informed by criteria set in Alexander's essays on the Nature of Order (Salingaros, 1997; 2001). The scoring system for  $T$  and  $H$  is noted in Table 2.

*Table 2. The scoring of architectural temperature and architectural harmony*

Scoring $T$ and $H$	
$T_i$	$H_i$
0 = very little	0 = very little
1 = some	1 = some
2 = considerable	2 = considerable

To calculate the scores, Salingaros applies the following formulas:

$$T = \sum_{i=1}^5 T_i, T_i \in [0, 2] \Rightarrow T \in [0, 10]$$

$$H = \sum_{i=1}^5 H_i, H_i \in [0, 2] \Rightarrow H \in [0, 10]$$

In each formula, the  $T$  or  $H$  value is the sum of scores ranging between 0 and 2 for 5 independent variables; the maximum score for either  $T$  or  $H$  is 10.

Therefore, the maximum score for life ( $L$ ) is 100.

Essentially, an increased presence of these attributes present in the design of a building are linked to perceptively living designs, determined by multiplying  $T$  and  $H$  with a maximum possible score of 100, where the resultant *architectural life* “connects emotionally to an observer” (Salingaros, 1977, p. 8). This is a distinctively different form of life from the measure of busyness used by Gehl and Whyte, but nonetheless potentially significant in explaining why some urban features are more attractive than others, simulating similar vibrancy and scenarios embodying Gehl and Whyte’s definitions of ‘life’.

Although Salingaros’ method is geared towards two dimensional, architectural, and purely aesthetic perceptions of visual space, his mathematical approach and summation of the visual attributes leads to a robust scoring system of typically subjectively perceived architectural attributes. Applied to urban spaces, this can be modified to focus on a range of urban design attributes that can potentially be assigned scores based on how much they exhibit evidence of being customised.

### **5.1.2 Varna’s Star Model**

In a similar way to Salingaros’ thermodynamic formulas, Varna’s Star model (2014) breaks down the elements of publicness into measurable components. These are then scored according to subjective observations which are informed through the analysis of historical accounts. Each point of her five-pointed star diagram comprises of quantitatively measurable attributes (18 in all) associated with publicness (Varna, 2014, p. 82):

1. Animation (2 attributes)
2. Physical Configuration (8 attributes)
3. Ownership (1 attribute)
4. Control (4 attributes)
5. Civility (3 attributes)

Each attribute is assigned a score between 1 and 5 based on how public each appeared to be (see Table 3):

Table 3: Varna’s score assignments for publicness (2014, p. 53)

More Public		Less Public
Publically owned space with public use	OWNERSHIP	Privately owned space with public use
Free use in a comforting police presence	CONTROL	Overt and oppressive control presence – human and electronic surveillance; highly visible security presence
Well-connected/located within the movement system (i.e. on-the-beaten-track); strong visual connection to external public realm beyond space; without obvious entrances and thresholds; a wide range of supports for a wide range of activities	PHYSICAL OWNERSHIP	Poorly connected/located within the movement system (i.e. off-the-beaten track); poor visual connection with external public realm; with explicit entrances and thresholds; narrow range of support creating a limited potential for activities
A large and diverse public engaged in a variety of activities	ANIMATION	Dead public space: few people engaged in few activities
Cared-for; well-kempt; inviting	CIVILITY	Untidy, vandalised, dirty and uninviting

With this system, Varna quantifiably measures publicness by measuring the presence of key descriptors. For example, Control comprised of 3 descriptors, each with a score between 1 and 5 based on specific assessment criterion (Table 4).

Sadistic street furniture includes the presence of spiked metal bars that prevent people from sitting on ledges, benches with multiple armrests so to prevent them from using the entire length to sleep, and sprinkler systems that deter people from inhabiting certain places (Varna, 2014, p. 37).

The number of variables is according to the nature of each variable – for example, ‘physical configuration has eight variables. The scores for each category are averaged and plotted into a ‘Star Model’ format that visualises the degree of publicness in an urban space (see Varna, 2014, p. 228). The averaging of scores consider the influence of external factors, where the attributes expand beyond aesthetics to include a wider array of aspects that are commonly found in urban spaces. The versatility presented by Varna’s model



makes it a viable successor to parts of Salingaros's method in the context of spatial analysis.

In its unaltered state, Varna's star model generates attributes typically found in most urban spaces and introduces an alternative approach to the summation of scores assigned to their intensity or presence. However, the model does not acknowledge the aesthetic, physical, or functional attributes that encourage staying behaviours; instead it relies on attributes relating to the 'publicness' of urban spaces. Regardless, the structure of this approach enables the replacement and the enhancement of variables possibly leading to a meaningful weighting of the attributes towards the overall customisation of an urban space which can be studied in relation to static activities.

Table 4: Varna's measurement criterion for Control (2014, p. 248)

<b>CONTROL</b>		
<b>Intervention</b>	<b>Allocated Score</b>	<b>Observation</b>
CCTV Cameras	5	No Cameras
	4	Few cameras, less than ½ of the site is under surveillance; covert type of surveillance – cameras are hard to see
	3	Few cameras, less than ½ of the site is under surveillance, overt type of surveillance – cameras are highly visible
	2	A large number of cameras – more than ½ of the site is under surveillance; cameras are hard to see
	1	A large number of cameras – more than ½ of the site is under surveillance; cameras are highly visible
Sadistic Street Furniture	5	No sadistic street furniture
	4	Presence of one element of sadistic street furniture and only in one or two places across the site
	3	Presence of one or two elements of sadistic street furniture in several places throughout the site (less than half of the area)
	2	Presence of one or two elements of sadistic street furniture in multiple places throughout the site (more than half of the area)
	1	Presence of multiple elements of sadistic street furniture (more than three) throughout the entire site
Signage	5	No signs deterring behaviours
	4	Sign(s) deterring one behaviour
	3	Sign(s) deterring two behaviours
	2	Sign(s) deterring three behaviours
	1	Sign(s) deterring more than three behaviours

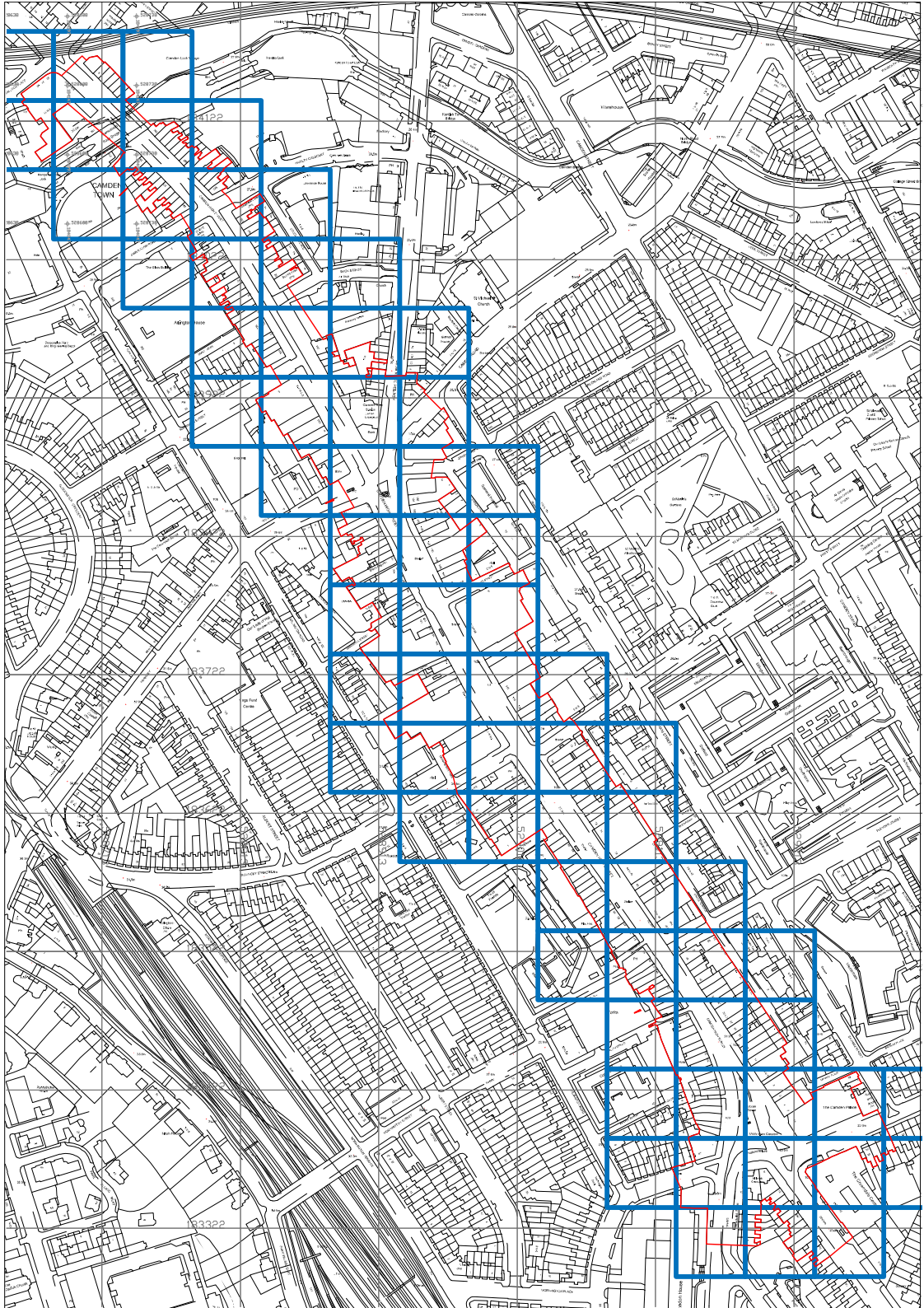
### **5.1.3 Heat Mapping Customisation: Instrument I**

Salingaros and Varna's methods solidly assess the aesthetic and social qualities of architecture and urban spaces respectively. However, their models do not extend to assess these qualities geographically.

The process of heat mapping is a popular method used by web analysts to determine the parts of a webpage most frequented by visitors (see Parsons, 2015). It is also a popular visualisation technique that enables one to perceive the density of points independently of a zoom factor – scatterplots / geographic heat maps (Perrot et al, 2015). Typically, a colour range will be applied to signify low through to high point densities; however, to measure the distribution and intensity of customisation throughout an urban space, a hybrid approach is necessary based on assignment of regional scores instead of densities.

The novel hybrid approach involves geographically splitting a case study into sub-regions that are compatible with a valid geographic projection. As this research takes place in the UK, the British National Grid is the chosen geographic projection which is based on metres. Initially, each case study was subdivided into an array of 50 metre quadrants drawn using AutoCAD's array function (see Figure 21). AutoCAD was chosen here because of the ability for its files to be edited in an ESRI ArcMap workspace which in turn can be analysed in an R environment.

Each quadrant is assigned a score based on the presence of customisation as metadata. This is essentially calculated through the assessment of a site's attributes against specific criteria. The result is a visualisation of an array with colours corresponding to assigned scores instead of counts. Essentially this end result is the equivalent of a choropleth thematic map based on gridiron instead of a region (see Figure 21). The advantage is that the regional subdivisions allow for easier comparisons, a transitional shift in customisation presence will be broadly apparent. This method is also useful as it captures instances where customisation attributes cannot be recorded as a precise geographic occurrence because of occurring over a large geographic expanse.



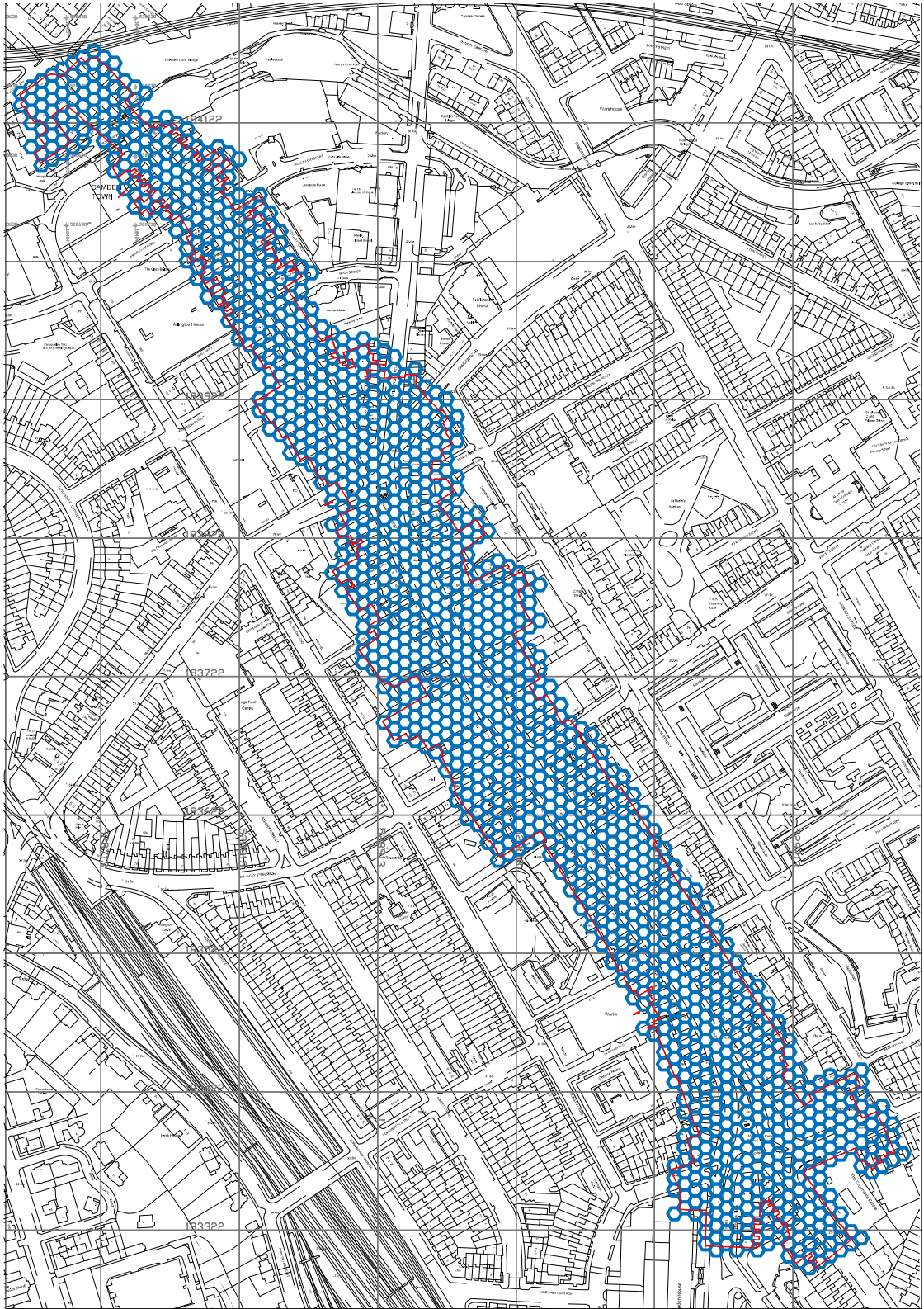
$$as = \frac{\sum_{i=1}^n a_i \in [1, 5]}{n} \Rightarrow as \in [1, 5]$$

Figure 21. 50 metre matrix (edged blue) of Camden High Street (edged red): produced in AutoCAD. The formula used to calculate cell values is shown immediately below the map.

Because of its ability to capture customisation over largely geographic expanses, this method will be referred to as the 'low-resolution array'. As indicated by the formula at the base of Figure 21, the scores ( $as$ ) are an average taken by the measure of a range of attributes ( $a$ ) which have a minimum score of 1 and maximum of 5, an average is opted for over the sum to avoid the over emphasise of one form of customisation over another. The  $n$  value refers to the number of measurable attributes. The maximum customisation score in this case is absolutely 5.

There are instances where customisations can be pinpointed to a specific location leading to results common with typical heat maps – an accumulation of point densities. Such occurrences result in the implementation of a finer-scaled array.

The resolution is enhanced by decreasing the dimensions of each quadrant to 10 x 10 metres and projecting them as polygons (hexagons). To precisely map the occurrence of customisations into this finer-scaled resolution, these were captured using Parade™. Parade™ is a purpose-built Android-based App for this research; in principal, it geotags the location of specific customisation interventions and their quality, and static pedestrian activities. The visual representation of the polygon mesh is as seen in Figure 22. The scores of single occurrences are based on the number of occurrences and are not restricted by a scoring system. In essence, this grid supersedes the 50-metre matrix for visual representations of customisation.



$$|C| = \left( LR = \frac{\sum_{i=1}^5 LR_1 \in [1, 5]}{5} \right) + \left( IR_1 = \sum_{i=1}^7 IR_1 \right) + \left( IR_2 = \sum_{i=1}^2 IR_2 \in [1, 5] \right)$$

Figure 22. 10 metre polygon mesh (edged blue) of Camden High Street (edged red): produced in AutoCAD. The calculation of polygon values is summarised in the formula expression below the map.

The resulting absolute customisation score ( $|C|$ ) is determined by summarising scores from the attributes of the low-resolution survey ( $LR$ ), an infinite resolution survey covering attributes based purely on their GPS location and quantity ( $IR_1$ ), and an infinite resolution survey covering attributes that are scored according to their qualitative attributes ( $IR_2$ ). The score for  $LR$  was calculated using the standard low-resolution survey scoring procedure, where the five applicable attributes were assigned scores by the surveyor, ranging between 1 and 5.  $IR_1$  was a cumulative score derived from a count of features falling within a polygon, where there were seven applicable fields in this instance.  $IR_2$  was also cumulative, however, owing to the qualitative nature of these two categories, a score ranging between 1 and 5 was assigned upon logging its geographic coordinate within the Parade™ application.

#### **5.1.4 Measuring Customisation: aesthetical, physical, and functional spatial attributes**

There are potentially numerous aspects of an urban space that can be customised. However, the literature review reveals that the customisation of products happens in three clear ways; as an analogy, a hat will be used:

- **Aesthetics:** the visual appeal of an urban space. For example, baseball caps can come in a variety of designs.
- **Physicality:** optimising, the ergonomics of a space. A baseball cap might be elasticated or have a head size adjuster that essentially optimises its design for its wearer
- **Functionality:** repurposing or reusing a produce in a way other than intended. The same baseball cap can be repurposed as a tray to collect money by a street performer

An urban environment can be customised in similar terms, as this thesis assessed the impact of a selection of aesthetic, physical and functional interventions made to an urban environment.

This research assesses the influence of 14 customisable attributes found in urban spaces on the distribution of static activities and orientation of pedestrian opinions. In an extended study, the number of attributes can be expanded to refine the understanding of how an urban environment can be customised, or to

explore in more detail the specificities of a broadly covered urban attribute. For example, additional attributes can cover auditory and olfactory customisations made to an urban space – the smell from street food vendors versus the smell from commercial fast food outlets like Kentucky Fried Chicken. The attributes concerning public art and its formation can be expanded to discuss the conveyed themes and messages to assess whether a political message is apparent and, if there is one, how it influences the placement of static activities. The methods presented in this section are constructed to be intentionally expandable in order to facilitate for future studies that intend to adopt a similar heat mapping approach as that introduced in 5.1.3, where indicators of customisation may vary according to the preferences of future researchers and the subject of their research.

The attributes covered in this study primarily address visual and tactile senses; they do not focus on the influence of olfactory (smell and taste) and auditory (hearing) – both of which are considered key influences in subsequent distributions of pedestrians (Shaftoe, 2008; Pink, 2008). Because of this limitation, there is the consideration that a section of users who might be visually or tactilely impaired – blind or immobile – will be marginalised, potentially distorting recorded correlations between the presented measures of customisation and the location of static activities as their responses are more closely aligned to auditory and olfactory senses.

The choice of these attributes relies on the assertion that the principle human sense is vision (Pink, 2008), not an isolated sense but one that interplays with the other senses (Grasseni, 2007) as, for example, Sakai et al present parallels between thematic images and anticipated odours (2005). Each of the 14 attributes directly operate in similar ways, with a high potential to determine perceptions and decisions made by street users in the spatial setting.



*Aesthetic Customisation*



*Figure 23. Aesthetic customisations – street art – at Hawley Street (and Hawley Mews), just off of Camden High Street*

Aesthetic customisations are the post-construction rendering of urban spaces made evident in the painting and other purely visual informal alterations with the intention of enhancing the perceptible qualities of the space (see Figure 23).

Measuring aesthetic customisation was achieved by scoring four environmental attributes in this research. Those attributes were:

- Colour
- Uniformity
- Public Art (Quality)
- Public Art (Quantity)

5.1.4.1.1 Colour

Measuring colour is based on studies that record latent desires in human subjects to decorate bland objects and environments as discussed by Mahnke (1996) and Hanes (2005); human responses to bland environments are theoretically manifested in the repainting of original colour schemes, or in portrayals that are reminiscent of scenes with rich colour variance (see Figure 24). Based on the findings of this previous research, colour customisation, in this thesis, was measured in terms of the number of dominant cyclic colour changes present on frontages and façades.



Figure 24. Various colour schemes applied to a row of houses close to Portobello Road. [source: author]

Variance in perceived colour is based primarily on its hue. Chroma in Standardised HSV (hue, saturation, and value) is determined by hue to which a value is assigned between 0 and 360. The maximum value of 360 can be divided to create intervals at which distinctive colours are noted. A colour system like RAL sets clear intervals, but also considers monochromes and doesn't differentiate between chromatics. This study divided maximum hues into six extract hue values from prevalent HEX colours. This division created clear

colour distinctions that were essentially reds, oranges, yellows, greens, blues, and purples.



*Figure 25. Six hue colour intervals based on hue (colours based on Adobe Illustrator Default Colour Swatch Palette)*

Based on the colours shown in Figure 25, consistent colour schemes are reflected in the presence of a single dominant colour, either 1, 2, 3, 4, 5, or 6, to a façade or streetscape frontage. Variance is introduced when colour schemes 1+2, for example, are noted in the urban setting resulting in the presence of two dominant colours; further combinations could be 3+6, or 4+5, and so on. In the examples shown thus far, a score of 2 was assigned to the appropriate quadrant cell. A combination of 2+3+4 acquired a score of 3; 1+2+3+4 achieved a score of 4; additional colour subsequently bumped up the allocated score to the optimal score of 5.

To determine the number of cyclical changes, a photograph representing the streetscape / façade quality was taken firstly and then broken down into its 12 most dominant colours.



*Figure 26. Sample photography from which 12 dominant colours are extracted*



*Figure 27. Colour palette of 12 dominant colours extracted from Figure 26*

Unlike the images used in this example, sky and landscape colours were omitted or cropped from this stage of analysis. Once the image had been posturized it was uploaded to an online image hosting website (Flickr). From its online hosting site, the image was read into R using the ‘readbitmap’ package, where its dominant colour was extracted using the ‘rplotter’ package from which the 12 dominant colours appearing in an image were extracted from an html (HEX) palette (Figure 27) and converted into HSV from which the Hue and Value settings were extracted and placed into a comma delimited file (CSV). The chosen tool for converting HEX to HSV was RapidTables (Table 5, <http://www.rapidtables.com/convert/color/rgb-to-hsv.htm>).

Table 5. The first 6 HEX values from an image with extracted Hue and Value data - CSV extract

RID	Hex	Hue	Val
1	#17429F	221	62.4
2	#212227	230	15.3
3	#413F41	300	25.5
4	#695B54	20	41.2
5	#7A7775	24	47.8
6	#8E8C89	36	55.7

The CSV was imported into r and plotted into a polar array using the ggplot2 package. The cyclical colour variance, determined by the application of the palette of dominant colours was shown by the 60 interval values along the x (hue) axis, where the understanding was that pure colours were located every 60 cycles; the use of the value here basically helped to determine the intensity of the colour in question and enables the stacking of hue values without overlapping. A cyclical colour change is confirmed when 2 or more values fall within a sector. Based on the values used in Figure 28, a recording of 3 cyclical colours was evident leading to the assignment of a customisation score of 3 for the colour attribute.

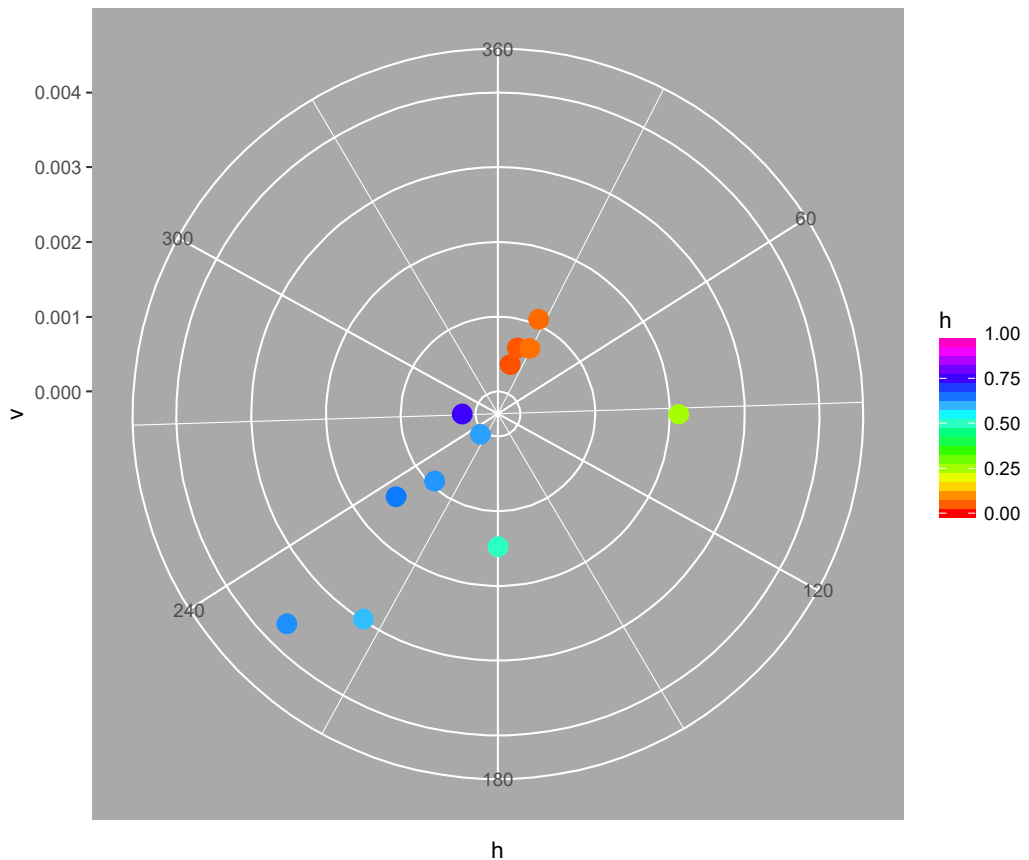


Figure 28. Distribution of colours based on Figure 27 – resulting score is 3. 'h' = Hue, 'v' = Value

5.1.4.1.2 Uniformity

This measure adopts Spiro Kostof's observation that uniform façades are associated with dreary perceptions of public space (1991), and Shaftoe's (2008) observations that varied fabrics lead to visually attractive streetscapes. From this evidence, it is determinable that greater degrees of façade variance are indicative of increasingly informal customisation occurrences ranging from collaborative through to adaptive. Taking these concepts further, this research scored customisation according to the number of observed variances between the aesthetic rhythms of façades. As such, the scoring of these sites was determined from observations made by onsite research.

A stock façade scoring '1' exhibited no sign of variance; there may have been some colour variance nevertheless the features of the façade remained consistent. The following figures help to explain the judgement process involved in the scoring of uniformity by the researcher out on site:

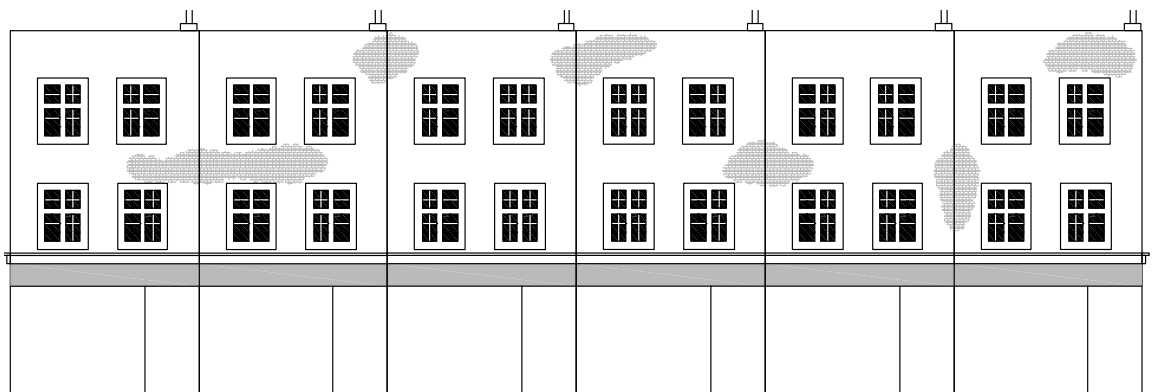


Figure 29: Façades achieving a score of 1 (no variance) - based hypothetically on Camden High Street



Figure 30: Façades achieving a score 2 – two styles of façade are clearly apparent



Figure 31: Façades achieving a score of 3 – three styles of façade apparent

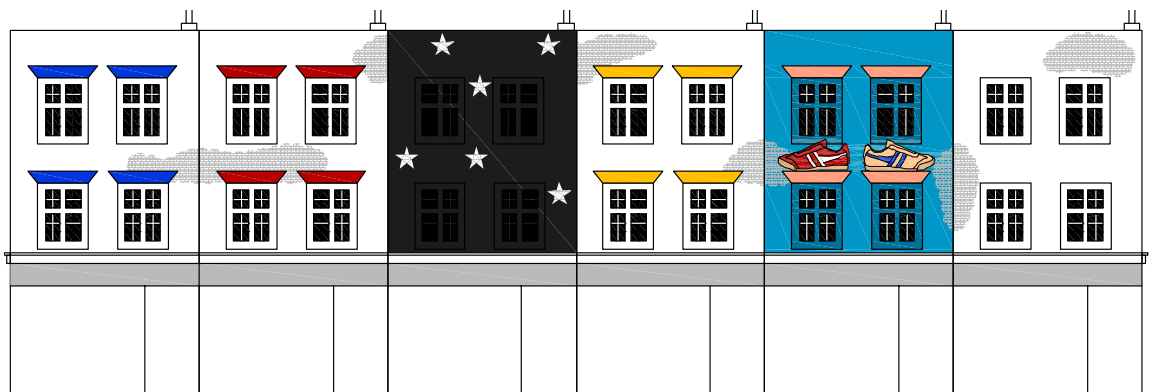


Figure 32: Façades achieving a score of 4 – four styles of façade present



Figure 33: Façades achieving a score of 5 will have at least 5 distinctive aesthetic styles.

The facades were assessed not only by their aesthetic rendering, but also by the configuration of windows, door styles and other such distinguishing characteristics.

### 5.1.4.1.3 Public Art - Content Analysis

Gough notes a natural attraction towards council approved public art pieces created by members of a local community as they typically embodied deeper connections to cultural preferences or exhibited attributes of local significance (2012). Findings from Wunderlich (2008) support the idea that unplanned artistic interventions influence how people move through urban spaces and as such, it was necessary to determine the origin of public art in order to determine whether it has an influence on staying behaviours.

The assignment of scores for public art customisation was achieved through the content analysis of historic documentation detailing the origins of the installation. Key terms such as 'professional artist' or 'commissioned by a local authority' achieved a score of '1'. Documents discussing the artwork with terms such as 'previously applied' or 'a sculpture by...' achieved a score of '2'. Documents containing terms such as 'on behalf of the local community' achieved a score of '3'. Documents containing phrases such as 'in collaboration with the local community', achieved a score of '4'. Documents containing terms such as 'unique contribution retained for community' or 'mural created by the community' achieved the maximum possible score of '5'. If public art was not apparent within a quadrant, a default score of '1' was applied.

Prior to the assignment of scores, a survey of the case study environment was conducted to determine the extent to which quadrants were affected by the installation of 'public art'.

### 5.1.4.1.4 Mural Graffiti / Street Art

Based on the findings of Gough (2012) and Douglas (2011), the occurrence of street art potentially has the power to enhance the quality of a streetscape (Cresswell, 1992; Shaftoe, 2008). However, there was also the chance that street art could detract from the quality of an area because of its stereotypical social connotations; nevertheless, it counts as a form of customisation which can be attributed to staying behaviours. As such, greater numbers of street art occurrences result in the assignment of higher customisation scores.



For the purposes of this research, customisation scores progressed from '1', where no mural graffiti / street art was present to '5' where there were four or more instances of individual street art pieces present at a particular quadrant. This was a quantitative measure.

### 5.1.4.2 *Physical customisation*

To measure physical customisation six components representing post-construction alterations to the physical layout of urban spaces are identified based on discussions within the literature review. These are as follows:

- Street interruptions (block / street alignment)
- Wayfinding / signage
- Reconfiguration
- Guerrilla Gardening
- Sculptures / Structures
- Urban Knitting (yarn bombing)



*Figure 34. Camden High Street - physical adaptive customisation*

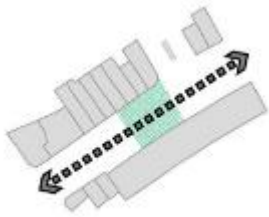
In essence, physical customisation occurs when modifications are made to an urban environment by end-users that notably change the way people might

navigate or move through an urban space. For example, the placement of a market stall (Figure 34) in the middle of a street will detour routes towards around or towards features that potentially optimise the efficiency of the streetscape. Hypothetically, post-construction customisations are associated with the placement of specific static engaged activities at a location and opinions of the space.

### 5.1.4.2.1 Street interruptions

This measure relates to the influence of informal customisations on the flow of bi-directional pedestrian traffic. As discussed in Wunderlich (2008), the presence of street art or sculptures results in non-linear / interrupted walking patterns; earlier studies by Whyte (1980) draw similar conclusions. Likewise, this thesis proposes that, customisations of the built environment in the form of market stalls or performance spaces can interrupt or divert the flows of otherwise linear pedestrian traffic.

In order to categorise levels of flow, subdivisions of traversed pedestrian paths through an urban space caused by informal physical interventions, were used to measure the degree to which an urban space had been categorised. Data was collected by onsite observations of how people moved around informal block and street alignment interventions. The assignment of scores was based on the following environmental conditions.



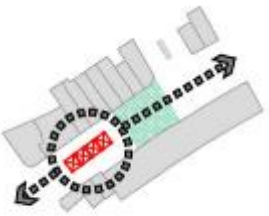
A path without end-user interruptions to the flow of a path was allocated a score of 1



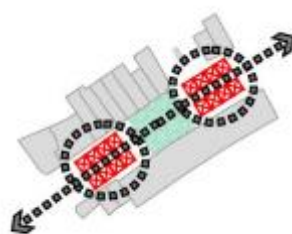
A path containing an end-user interruption that split the pedestrian traffic flow into two paths. However, this intervention was placed within a council designated pitch. Here, a score of 2 was allocated.



A path containing end-user interruptions that split pedestrian traffic into three or more paths. Again, falling within a designated council pitch purpose for this use. A score of 3 was allocated.



Pedestrian traffic was split into two clear directions by end-user interruptions placed informally outside of council designated pitches. Under these conditions a score of 4 was assigned to the quadrant



Pedestrian traffic was split into three or more paths by end-user interruptions falling outside council designated pitches. Here a score of 5 was assigned to the respective quadrant.

The hypothetical stance of this research suggests that interruptions and diversions created by grassroots interventions directly correlates with pedestrian staying behaviours; this was more so the case when these interventions were placed outside of council designated boundaries.

#### 5.1.4.2.2 Signs and Wayfinding

This measure relates to discussions initiated by West (1996), which suggests that art or creations by members of a local community are more likely to be appreciated or to hold cultural significance; a similar conclusion was reached by Mower et al (2012) when analysing responses to window displays in high street settings. The idea here is that the more community signs present, the more technically customised is the urban quadrant.

Scores were assigned on the basis of how often this art occurred within a quadrant. This approach perpetuates that the more signs installed by members of the end-user communities present, the more likely there is to be a positive correlation between this and pedestrian staying behaviours.





#### 5.1.4.2.3 Reconfiguration

Following the logic presented in William Whyte's 'social life of small urban spaces' (1980; 1988), this instrument considers flexibility in the arrangement of street furniture objects as an important practice in the customisation of urban spaces where, according to Whyte, and more recently Stevens (2007), inflexible arrangements lead to limited uses for a public space and can eventually lead to its demise.

The methodology of this research broadly categorises such end-user interventions as follows:

Obstacles / Street furniture original to the design of the site or none present	This includes planters or design features that were part of original master plan and, as such, were not later additions
---	---



<p>Obstacles / street furniture fixed and installed by the local authority</p>	<p>This includes the addition of street furniture to the streetscape by a local authority post-construction of the urban space</p>	
<p>Obstacles / street furniture moveable but within constraints put in place by the local authority</p>	<p>Street furniture take the form of moveable obstacles provided by local authorities, but with flexible constraints by highways guidance policies</p>	
<p>Obstacles / street furniture fixed having been installed by the local community</p>	<p>Obstacles provided by the end-user community, as determined by the variety of designs; however, placements are in keeping with highway codes enforced by the presiding council body</p>	
<p>Obstacles / street furniture moveable having been installed by the local community</p>	<p>In this instance, street furniture can be moved with or without the constraint of highways guidance by the presiding local authority.</p>	

### 5.1.4.2.4 Guerrilla Gardening

The act of Guerrilla Gardening is an act of customisation that is able to positively transform the perception of a built environment (Ralston, 2012; Häkkinen et al, 2012). For the purpose of this research, an occurrence includes the planting of attractive plants in tree pits or similar informal soil beds potentially found along the length of the high street. This measure reflects the findings of the literature review that concludes that, owing to biophilic tendencies, people are more inclined to gravitate towards garden installations, where Guerrilla Gardening is often associated with feelings of affection towards the built environment. Again, the allocation of a score is based on the frequency of the occurrence.

Based on the criteria outlined above, scores were allocated according to the assumption that the higher the frequency of guerrilla gardening, the more customised the urban realm was, where high frequencies result in greater levels of static pedestrian activities and/or staying behaviours.

### 5.1.4.2.5 Grassroots Sculpting

Again, with reference to outsider art, grassroots sculpting measures the presence of informal / illicit installation of sculptures under the same conditions as street art. Past research has shown levels of affection and staying behaviours to be associated with the presence of grassroots sculpting; because of this direct correlation, a separate score was assigned for such interventions.

As such, the more present these instances, the more customised by the community this site would appear to be. An example of a high scoring scheme is the interior of Philadelphia's Magic Gardens. Following the same convention used as a method of scoring the presence of Guerrilla Gardening, the score for Grassroots Sculpting increased with occurrences of the number of pieces sculpted by the end-users of the respective urban settings.

### 5.1.4.2.6 Urban Knitting

Similar to the calculation of grassroots sculpting, urban knitting seeks to count the number of instances of its occurrence in an urban environment. Urban knitting is a short-term intervention, where its appearance is indicative of the community's ownership and power to transform the perception of urban spaces (Farinosi and Fortunati, 2013).

Consequently, the occurrence of urban knitting in an urban space was assigned an independent score owing to its uniqueness and noted impact in the perceptibility of urban space. Scores were assigned to the number of individual pieces found within the respective quadrant being analysed.

### 5.1.4.3 Functional Customisation

Measuring functional customisation was achieved using a further four attributes that transform the function of a space from its intended purpose. In this research, these four attributes were:

- Performances
- Occupation / Possession
- Change of use from original plan
- Sui Generis – other forms of customisation that fall outside of recorded aesthetic, physical, and functional attributes that, nonetheless, transform either the function or the perception of the urban space.



*Figure 35. Southbank Skatepark - the result of functional customisation*

Functional customisation occurs when post-construction modifications by end-users alter the overall functionality of an urban space. For example, the gradual transformation of the Southbank undercroft (Waterloo) from an auxiliary/services space for the Hayward Gallery to a now popular Skatepark (Figure 35). It is hypothetical that post-construction modifications which alter the overall functionality of an urban space are associated with the transformation of an urban space's perception.

#### 5.1.4.3.1 Performances

This measure relates to Steven's findings which suggest that the presence of a street performers/artists at a location can change the function of an urban space from a thoroughfare into a gallery or interactive theatre (2007). As such, the higher the number or presence of these events, the greater the assigned score for customisation in this area. Based on this assertion, customisation was quantifiably scored according to the number of street performers or street artists present in a quadrant. The logic was such that the greater the number of these acts, the more customised the quadrant appeared to be in terms of its transformation through informal interventions.



### 5.1.4.3.2 Occupation / Possession

This measure refers to Cullen's premise that occupation and possession are associated with a sense of end-user ownership of the urban realm (1971). Alexander notes, that ownership is desirable in creation of lively urban spaces (Alexander, 2002). Therefore, an increased presence of occupation (and/or possession) is associated with increases in a space's adaptive customisation. For example, a street designed for vehicular traffic can be partly dominated by market stalls, as noted in Fulham's North End Road (London) that also has to be negotiated by vehicular traffic.

This measure uses the researcher's own discretion to approximate the extent to which an urban space has been customised purely in terms of its occupation or possession by its end users, effectively altering the function of the space from its original purpose. For example, occupation or possession can transform a thoroughfare into a distinctive retail hub.

### 5.1.4.3.3 Change of use from original intended purpose

This measure is based on the extent of the influence of the previous measure of occupation and possession, where it goes further to measure the extent of the change of use from a specific purpose.

Again, this research quantifies the extent of changed use based on rough approximations that essentially cover the influence of possession/occupation on the built environment, and not merely the extent of possession/occupation, as with the previous attributes measured.

### 5.1.4.3.4 Sui Generis (Other) Customisation

This category covers the presence of unexpected customisations occurring within the selected case studies. Theoretically, such occurrences of customisation span the three identified categories used in this thesis. An example of a sui generis customisation can be the conversion or reuse of an urban space into a virtual playground by skateboarders – unintentionally, the skateboarder becomes a street performer who may stop traffic. Another example can be the conducting of social experiments or pranks that may

momentarily cause staying behaviours in pedestrians. Given these conditions, any short-term form of ludic activities or spontaneous customisations that do not fit into the other recorded categories are acknowledged here.

Using the presence of skateboarders as an example, scores were based on the number of occurrences of unclassifiable customisation within an urban space. For example, two separate instances of skateboarding present in a quadrant, resulted in the assignment of a score of 2.

In the occurrence of the recording of a sui generis customisation instance, the researcher recorded the nature of the customisation for further scrutiny during the subsequent data analysis.

### 5.1.5 Summary of customisation attributes measuring criteria

The 14 attributes discussed in the previous section are used to measure the extent to which an urban space has been customised. They are summarised in Table 6. When combined and applied to the heat mapping exercise, their intention is to provide a geographic impression of the parts of a case study that have been subjected to varying degrees of customisation, where, based on assertions conveyed by the literature review, they potentially influence the distribution of static activities and the attitudes of end users.

Table 6. Summary of approach to measuring/scoring customisation

Customisation Classification	Score Category	Scoring Criteria	Baseline scoring (scores of 1)	Optimal Scoring (scores of 5)
Aesthetic Customisation (A)	Colour	Cyclical shifts based on dominant colours within a quadrant.	1 colour dominates a series of façades (monochromatic)	5 or more colours dominate a series of façades
	Uniformity	Recorded variance in façade informality ranging from altered colour schemes to distinctive architectural details.	Façades are repetitive	5 or more interruptions in the design of façades
	Public Art (quality)	Recorded variance in the conception of a public art piece.	Public art is installed by a local authority or land owner	Public art occurs spontaneously/illicitly
	Public Art (quantity)	The number of public art pieces apparent - independent of quality	No evidence of public art	4 or more occurrences of public art
Physical Customisation (PC)	Street interruptions	The number of perceived interruptions in linear pedestrian flows caused by the presence of informal physical interventions	No informal interruptions observed in pedestrian flows	Interruptions result in multi-directional pedestrian traffic that also ignore highways coding - mingling with street traffic
	Wayfinding / Signage	The informality of wayfinding and signage. The contrast is between corporate branding and signs contributed by local businesses and/or residents. Score increases with the number of local businesses/residents signs apparent within a quadrant	All signs provided by municipality	4 signs provided by the local community
	Reconfiguration	The quality of street furniture present at a locality.	Street furniture are original to the design of a quadrant	Street furniture is moveable and contributed by local residents/businesses
	Guerrilla Gardening	Based on the number of instances of informal planting with a quadrant.	No evidence of guerrilla gardening	4 or more occurrences of public art
	Sculptures / Structures	Based on the number of instances of informal installations of sculptures and structures	No evidence of informal sculptures/structures	4 or more occurrences of informal sculptures/structures
	Urban Knitting	Based on the number of recorded instances of urban knitting (also referred to as yarn bombing)	No evidence of urban knitting	4 or more occurrences of urban knitting
Functional Customisation (F)	Performances	Based on the number of street performers present with a quadrant	No street performers within a quadrant	4 or more street performers within a quadrant
	Occupation / Possession	Based on an approximate estimate of the geographic extent of the informality, or how much a space is dominated by local businesses and community activities within a quadrant - conveying a distinctive vernacular	0% of the quadrant is occupied by local resident/business activities	100% (the entirety) of the quadrant is occupied by local resident/business activities
	Change of use from original purpose	Based on an approximate estimate of the extent to which geographic informality results in a deviation in the change of use from the originally intended purpose. For example, a path intended purely for walking maybe become an impromptu art gallery.	0% of the quadrant deviates from its original intended purpose	100% (the entirety) of the quadrant deviates from its originally intended purpose
	Other Customisation	Based on the number of unclassifiable acts of customisation in an urban space	No evidence of unclassifiable acts of customisation	4 or more instances of unclassifiable acts of customisation

### 5.1.6 Calculating customisation

The overall score for customisation is an average rather than an aggregation.

The formula is therefore as follows:

$$C = \frac{A + PC + F}{3} \Rightarrow C \in [1, 5]$$

*C = Customisation*

*A = Aesthetics*

*PC = Physical Configuration*

*F = Function*

The maximum score for customisation per site is 5 with the lowest score being 1. The flexibility of this approach enables this research to calculate the composite elements of customisation independently or weight findings according to the scores achieved by each attribute – that is an average weighted on either aesthetic, physical, or functional customisations present in a respective case study.

In this approach aesthetic, physical, and functional customisation are treated as being equally influential in the distribution of static activities (*A*, *PC*, *F*).

However, it has been acknowledged that visual is the strongest of the five human senses (Shaftoe, 2008) meaning that a high physical customisation score might not necessarily result in a meaningful space alongside low aesthetic customisation scores (2, 5, 2). In theory, it potentially attracts similar numbers of static activities to a quadrant with a score of (2, 2, 2). Similarly, physical alterations change the morphology of a space in a way that might make aesthetic customisations inaccessible. For example, a quadrant with a score of (5, 5, 2) will likely perform as well as a quadrant with a score of (2, 5, 2). Therefore, when studied as averages, customisation scores are considered indicative, where non-hypothetical results will be explored in greater detail extracted from the composite attributes of the overall average score per site.

An example of the site survey data collection tool can be found in Appendix II.

## 5.2 Measuring Static Pedestrian Activities

The ‘static pedestrian activities’ of street users are explored in categorical terms. The categories are based on Gehl and Svarre’s list of *optional* and *necessary* activities as observed in sitting and standing individuals (2013). A key point from their categories is that static optional activities take place under good external conditions, while necessary ones can take place in ‘all conditions’ (see Figure 36). Increases in static activities are synonymous with increases in the liveliness of an urban space.

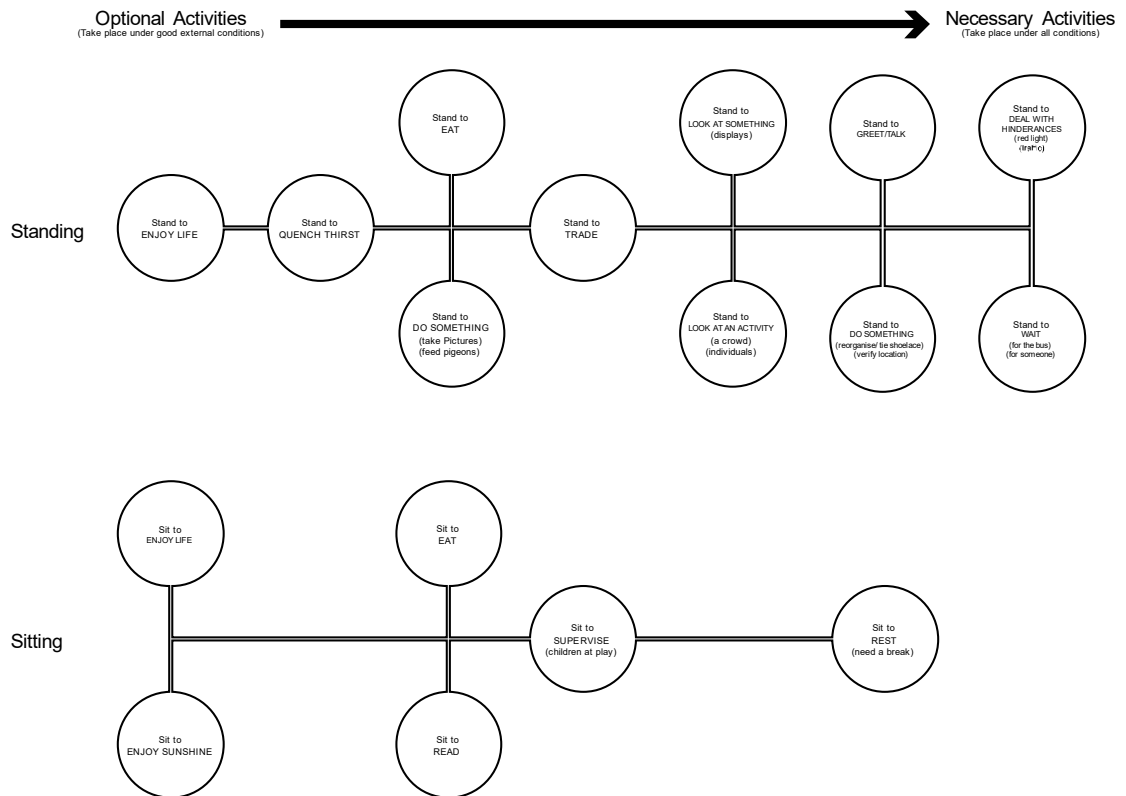


Figure 36. Optional and necessary sitting/standing activities (adapted from Gehl and Svarre, 2013, p. 16). This diagram includes all of the recorded static activities captured by Gehl and Svarre but excludes those associated with walking.

Optional activities are indicative of a conscious appreciation of the quality of an urban environment, while necessary activities are inconsequential and don't necessarily relate to the quality of an environment unless performances are included in that assessment. Given this understanding, optional activities indicate engagement with surroundings, while necessary activities indicate disengagement.

As noted in Figure 36, only activities that can be broadly described as standing or sitting are considered as static pedestrian activities.

Mapping behaviours describes the process of marking a map with the location of where people are standing and sitting (Gehl and Svarre, 2013). This technique is comparable to Appleyard and Lintell (1972) but not only attempts to record the accurate location of people along a street, but goes further by noting the specific activities being carried out by static street users that are then linked to specific urban conditions (customisations). When recorded over a period of time, patterns emerge that identify the parts of a plan that are popular with static pedestrian activities. Traditionally, this process is executed by marking a map with symbols that denote a particular pedestrian activity (see *ibid.* p. 26).

According to Gehl and Svarre, the technique of allocating a single point “answers several questions, and the qualitative aspects about where and what supplement the nature of the counting” central to this exercise (*ibid.*). While Gehl and Svarre’s work appears to link specific activities with microclimatic conditions such as ‘more people are likely to sit under canopies’, the nature of pedestrian activities will focus on the activities carried out by pedestrians in relation to the presence of customisation. For example, it might be found that more people will prefer to ‘stand and look at something’ in regions that possesses more evidence of customisation.

However, the process of marking a plan raises several issues that affect the time spent surveying and the accuracy of the results:

- Marking a map involves observing from a vantage point, or a series of vantage points, which introduces distorted perspectives resulting in misplaced pedestrian activities
- The process of marking a map from a series of vantage points is generally time consuming and all together not practical for capturing activities taking place along the length of a streetscape.
- If a map is marked from the ground, it is likely that the surveyor will be noticed by pedestrians who may change their usual behaviours providing erratic observational data.

To counter these issues, a standard approach to geotagging was adopted to record the coordinates of pedestrians for later digital mapping.

### **5.2.1 Geotagging pedestrian activities: Parade™**

The process of geotagging, a form of ‘georeferencing’, normally refers to the process of attaching geographic metadata to an object or item such as a photograph or a video (Welsh et al, 2012). Like global position systems (GPSs), geotagging software captures the coordinates of an item by triangulating the coordinates data received from an array of GPS satellites (see Kaplan and Hegarty, 2005, pp. 2 – 5). GPS takes two forms:

- Precise Positioning Systems (PPS) for military use
- Standard Positioning Systems (SPS) for civilian use.

SPS is free of direct charges and were accurate within at least 13 metres of the horizontal plane and 22 metres of the vertical plane in 2005 (Kaplan and Hegarty, 2005, p. 5). Civilian GPS today is notably used in movement tracking applications (Apps) developed on Android and Apple operating systems. For example, the Runtastic Running and Distance & Fitness Tracker phone apps exploit GPS data provided by Google commissioned satellites which enables app users to trace their journeys through an urban space. As of 2016, GPS data is accurate within 5 metres of a receiving device. Paths are traced based on the continuous updates provided by the satellite array every 100 milliseconds. Apps such as Runtastic are created in the freely available Android SDK (Software Development Kit) within which parameters, such as the size of the satellite array and frequency of returned coordinates, can be manually set. This flexibility was exploited in the development of a purpose-built App called ‘Parade™’, for the capturing of static pedestrian activities.

Parade™, which I, the researcher, developed with my brother, Roderick Timmerman, captures two surveys with regards to static pedestrian activities: low-resolution and high-resolution surveys (see Timmerman and Timmerman, 2018).

### *5.2.1.1 Low-resolution pedestrian survey*

The low-resolution survey monitors the occurrence of standing and sitting activities and whether they respectively engage or disengage with the urban fabric. The categories for the low-resolution survey are as follows:

- Standing Engaged
- Standing (Disengaged)
- Sitting Engaged
- Sitting (Disengaged)

Engaged activities broadly capture those that Gehl and Svarre (2013) refers to as being optional, but also indicative of street user assimilation or interaction with the environment. These include:

- Standing/Sitting to eat
- Standing/Sitting to enjoy life
- Standing to do something (i.e. feed pigeons or take pictures)
- Standing to trade
- Standing to look at something (window displays)
- Standing to look at an activity (i.e. watching a performance)
- Sitting to read

On the other hand, disengaged activities refer to those where the street user doesn't appear to be interacting with their environment despite being stationary.

These activities were:

- Standing to quench thirst
- Standing to greet/talk
- Sitting to supervise (i.e. children at play)

The objective of the low-resolution survey is to test whether a correlation is present between static activities and the increased presence of customisation. It provides a basic indicator as to whether apparent trends can be justified by the overall engagement (attachment) or disengagement (detachment) with the urban realm.

### *5.2.1.2 High-resolution pedestrian survey*

In the high-resolution survey observations are split directly into finer categories that describe a static pedestrian activity. This survey is more time consuming than its low-resolution counterpart and so is more likely to provide a distorted



distribution if used as a standalone dataset. The principle purpose of this survey is to further analyse any apparent correlations from the low-resolution survey with more qualitative detail. The specific categories were based on Gehl and Svarre, and were as follows:

<b>Standing</b>	<b>Sitting</b>
<ul style="list-style-type: none"><li>• Standing to enjoy life</li><li>• Standing to quench thirst</li><li>• Standing to eat</li><li>• Standing to do something (i.e. feed pigeons or take pictures)</li><li>• Standing to trade (buy / sell)</li><li>• Standing to look at something (window displays)</li><li>• Standing to look at an activity (a crowd / watching a performance)</li><li>• Standing to greet / talk</li></ul>	<ul style="list-style-type: none"><li>• Sitting to enjoy life</li><li>• Sitting to enjoy the sunshine</li><li>• Sitting to eat</li><li>• Sitting to read</li><li>• Sitting to supervise (i.e. children at play)</li><li>• Sitting to have a break</li></ul>

#### 5.2.1.3 *Parade™*

Parade™ is programmed to act more like a geotagger than a geotracker, however, it depends on the same continuous data used by trackers. Essentially the surveyor navigates through the pedestrianised portions of the case study and presses buttons that corresponded with an appropriate activity on the user interface to capture the current coordinate being received by Parade at that time, whilst standing next to the static activity. This process was repeated with other static pedestrian activities until the survey was completed. The coordinates and metadata concerning the activity are captured and recorded into a database log which is extractable as a comma separate values file (CSV). Because the app depends on GPS coordinates, the 'x' and 'y' coordinates are in the form of longitude and latitude. Once exported to an appropriate workspace, the data can be uploaded into R and plotted using ggplot2.

Because of the native latitude and longitude coordinates system favoured by Google, ESRI data imported into R, such as the heat mapping tiles, are

subsequently converted from the British National Grid system (OSGB 1936) to Latitude and Longitude (WGS 84) for later correlations.

### *5.2.1.4 Further functionality within Parade™*

In its present iteration, Parade™ is essentially a geo-tagging app. This enables it to additionally capture quantitative and qualitative counts of customisation specific to the 10-metre polygon mesh used in the heat mapping exercise (Section 5.1). The categories are found overleaf:

Table 7. Quantitative counts for customisation

<b>Aesthetic</b>	
Public Art / Mural	Single Count (default value = 1)
<b>Physical</b>	
Wayfinding / Signage	Single Count (default value = 1)
Guerrilla Gardening	
Sculptures / Structures	
Urban Knitting	
<b>Functional</b>	
Performances	Single Count (default value = 1)
Sui Generis	

Table 8. Qualitative counts for customisation

<b>Aesthetic</b>	
Public Art / Mural (quality)	User prompted to assign score between 1 & 5
<b>Physical</b>	
Reconfiguration (quality)	User prompted to assign score between 1 & 5

### 5.2.2 Correlating static pedestrian activities with customisation

The purpose of mapping static pedestrian activities is so that they can be correlated with the occurrence and intensity of customisations. Correlations are both visual and statistical.

#### 5.2.2.1 Visual correlations

Visual correlations give an immediate indication of whether there is a relationship with the presence of customisation and the clustering of static pedestrian activities. This was achieved by overlaying the mapping of static pedestrian activities over a 10-metre polygon mesh.

Both datasets are read into R using the ggplot2 R package, with the static activities points layered on top of the polygon mesh. To visualise the clustering

of static pedestrian activities, the 'stat\_density2D' command is used to carry out density plots in a mapping environment. To ensure that the mesh is still visible, contours are applied instead of conventional heat/density mapping.

### 5.2.2.2 Statistical correlations

Firstly, the polygon mesh containing customisation values was imported in ArcMap. Secondly, the static pedestrian activities were imported as an overlay. As the mesh is created in AutoCAD, its geographic projection is the British National Grid (Eastings and Northings); the static pedestrian activities are in longitude and latitude and are therefore converted in R and exported as points Shapefiles, native to ArcGIS environments. The conversion process within R is detailed below

```
install.packages("rgdal")
library(rgdal)

CHS_RGIS <- read.csv("CHS_HiResAct_all.csv")

class(CHS_RGIS)
coordinates(CHS_RGIS) <- ~LATITUDE+LONGITUDE

writeOGR(CHS_RGIS, "N:/Documents/Revised R Graphics/HiResAct",
"CHS_HiResAct_allb", driver = "ESRI Shapefile")
CHS_RGISb <- readOGR("N:/Documents/Revised R
Graphics/HiResAct/CHS_HiResAct_allb.shp")

latlong <- "+init=epsg:4326"
UKBNG <- "+init=epsg:27700"
proj4string(CHS_RGISb) <- CRS(latlong)
CHS_RGISc <- spTransform(CHS_RGISb, CRS(UKBNG))

plot(CHS_RGISc)
writeOGR(CHS_RGISc, "N:/Documents/Revised R Graphics/HiResAct",
"CHS_HiResAct_allc", driver = "ESRI Shapefile")
```

Once both datasets are in ArcGIS, they are joined using a 'spatial join' on a one-to-many basis resulting in a new combined layer. The mesh layer is joined to the points layer with a counting field so that the polygons take on the counts of pedestrian activities. In order to distinguish activity types, queries are performed prior to the joining of specific activity types so that counts only include a particular activity. The metadata behind the spatial-join new layer now contains the customisation score and pedestrian counts that can later be statistically correlated using regression. For this research, Pearson's R was the

preferred method of regression, where r-square was used to test the significance of an observed correlation (closeness).

Correlations are based on the hypothetical assumption that increased customisation results in an increase of static pedestrian activities, where this will result in a positive correlation. The expectation is that the correlation will reverse with more apparent visual complexity associated with increased occurrences of customisation – the theoretical threshold, refer to Figure 19. The closeness indicated with the r-square test indicates the certainty of the correlation, where a close fit will indicate that customisation is a key determining factor in the occurrence of static pedestrian activities. A loose fit will indicate that, while customisation does influence the occurrence of an activity, that occurrence could probably be attributed to another environmental factor – externalities.

### **5.2.3 Addressing Externalities**

Acknowledged in the literature review are several factors that influence the occurrence of static pedestrian activities – conditions that cause pedestrians to slow down or stop completely in a space (see section 2.1). These are related to:

- Aesthetics – the quality, rendering, and favourable visual complexity
- Ludicity – the occurrence of play activities – the presence of performances, and props that cause people to pause or act in sometime unpredictable ways
- Land uses
- Environmental composition – the location and quality of street furniture
- Augmented reality – the presence of Wi-Fi hotspots or 4G networks that enable people to stop to check their emails or social media under these conditions.

Customisation is considered a catalyst that primarily bolsters the influence of aesthetics, physical, and functional aspects of an urban space. However, in the case of weakened correlations between static pedestrian activities and customisation, other factors – environmental composition, land uses, and Wi-Fi/4G connectivity – are taken into consideration as potentially more influential in affecting the distribution of static activities.

### 5.2.3.1 *Assessing environmental composition*

Streetscape design features discussed in a study of New York by Ewing et al (2015) revealed that specific pedestrian activities are associated with specific types of street furniture. The overall premise is that more street furniture will result in an increased presence of pedestrian activities (see Whyte, 1980, p. 18; Gehl, 2013, pp. 134 – 147), however, this literature does consider customisation as a potential catalyst for static activities in regions with street furniture – a revised premise.

A study by Transport for London published the guidance document, Pedestrian Comfort Guidance for London (Finch et al, 2010). Within, the question is asked “what type of street furniture generates static pedestrian activity?” (Finch et al, 2010, p. 25). In answering this question several features are identified which are as follows:

1. Presence of guard rails. Pedestrians are noted to lean against these during pauses in their journeys.
2. Map based wayfinding signs. Pedestrian will briefly stop at these to plan or check their journey.
3. Market vendors. These are useful for encouraging static activities.
4. Café seating
5. Planned seating (benches, ledges)
6. Bus stands/shelters
7. ATMs

To determine the impact of these features, the same heat map matrix, used for identifying distributions of customisation, is employed to model the occurrence of one or more street furniture placements through spatial joins in ArcMap. When street furniture type intersects a polygon, a cumulative score ranging between 1 and 7 is assigned to reflect the number of street furniture types present at each polygon. A score of 0 is assigned to quadrants that do not feature any of the above interventions.

Like Ewing et al (2015), the Transport for London hypothesis is that an increased presence of identified street furniture installations leads to an

increased presence of static activities. The Transport for London survey suggests that the correlation between static activities and street furniture will have a notably close fit correlation. Therefore, regression analysis is carried out to test correlations between the distribution of street furniture and the presence of static pedestrian activities only in polygons where both static pedestrians and street furniture are located.

### *5.2.3.2 Assessing land uses*

Gehl suggest that cafés play a significant role in the encouraging static activities, specifically ‘staying activities’ (Gehl, 2010). Like libraries, parks, and shops, cafés are places where people socially interact (Kelly et al, 2012); additionally, cafés typically provide seating that facilitate social encounters, staying activities, and embody ‘café culture’ (ibid.; Gehl, 2010; Carmona, 2014). Therefore, it is possible that the provision of facilities can relate more strongly to static activities than customisation when present at a case study. Similarly, studies have demonstrated that restaurants are also associated with the production of attractive public spaces and are potentially attributed to static activities (Stadler, 2013; Ferguson and Ferguson, 2016).

Consequently, the roles played by land uses on the distribution, density, and frequency of static activities warrant further exploration alongside customisation. The exploration highlights the role of proximity and discusses the nature of activities that occur closest to specific land uses. To expand on previous research, the exploration of land uses will go beyond restaurants and cafés to include:

- Retail / shops
- Takeaways
- Offices
- Storage facilities
- Services
- Leisure facilities
- Institutions
- Residential

Ground floor land uses are aligned to building units as recognised by the Ordnance Survey, at a scale of 1:1250. Land uses are categorised using the same classifications presented in the Town and Country Planning (Use Classes) Order 1987 which are summarised in Table 9. Classifications are determined through a combination of desktop studies using Google Street View, Google Earth, and web directory searches for addresses falling within case study boundaries.

*Table 9. Use class classifications (see Appendix IV for the source)*

<b>Classification</b>	<b>Description</b>
A1	Public shop including post offices, hairdressers, convenience stores, florist, cold food vendors
A2	Professional services: Banks, clinics, betting shops, payday loan shops
A3	Restaurants and cafes
A4	Public House including wine bars
A5	Hot food and takeaways shops
B1	Business offices
B2	General industrial use
C1	Hotels
C2	Residential associated with hospitals, schools, care/nursing homes
C3	Dwelling house
C4	HMO/House in multiple occupation
D1	Public service including education, places of worship, hospitals, public halls and exhibitions
D2	Entertainment and leisure uses: Bingo halls, Cinemas, Swimming Pools etc.

Land uses are recorded electronically into an ESRI polygon shapefile, representing their geographic extents, from which static activities falling within 3.5 metres of the shapefile are analysed, using Pearson's R and r-square statistical tests. These correlations also factor in the presence of customisation,



shown as an overlaid scatter to test whether customisation plays any part in the potential draw of static pedestrians to particular land uses.

### *5.2.3.3 Addressing 4G Networks*

Section 1.1 highlighted the influence of 4G networks and Wi-Fi hotspots on the distribution of static pedestrian activities. Past studies have revealed a clear relationship between users of smart devices and Wi-Fi hotspots. However, this form of augmented reality is displaced by actual reality, where people are more likely to interact with other people when in a social setting. A more generic, easily accessible, way to connect to social media and the internet is through 4G networks that are more widespread.

This test evaluates the role of 4G signal strengths on the distribution of static pedestrians in direct comparison to customisation based on quantities and density distributions. To test this, the customisation heat map polygon mesh is repurposed to map average phone signal strengths across the 10 x 10-metre polygon mesh.

Data was sourced from Open Signal, a company specialising on mapping phone signal strengths across major cities. It focused solely on extremities of the three case studies and was supplied through the Centre of Advance Spatial Analysis (CASA, UCL).

To ensure fair comparisons, only data captured during May 2017 was used as that month saw the simultaneous surveying of all three case studies.

Subsequently, high resolution static activity data collected during May 2017 was matched against the phone signal strength heat map from the same month and statistically analysed.

The employed measure for phone signal strength is the Arbitrary Strength Unit (ASU) that indicates how often a phone is able to update its location from its nearest signal tower – this effectively determines how quickly data can be downloaded to a phone or smart device to watch a video, game, interact with

social media, and etc (Beritelli et al, 2016). The acceptable range is between 1 and 97, where a score of 97 signifies the best possible signal received by a handset or mobile device benefitting from a 4G LTE signal tower (ibid.).

Once the 4G heat map has been created it is joined with the customisation heat map creating a new 4G heat map with customisation values as metadata. The joining process can be conducted using either attribute (unique identifiers) or spatially within ESRI ArcMap. The static pedestrian observational data is then spatially joined in ArcMap to this new layer to create a hybrid dataset from which correlations can be tested between 4G network connectivity, customisation, and the numbers of pedestrians present at a site. The resulting output is a scatter plot showing static activity densities against phone signal strength and customisation, in order to confirm which is more influential in the distribution of static activities.

### **5.3 Pedestrian opinions: Geographically Weighted Regression and Choice-based Conjoint Analysis**

Emphasised in the literature review is a reliance on qualitative data to such an extent that quantitative studies that explore the impact of the quality of built environments on behaviour responses are limited in terms of coverage and sample sizes. The methods in 5.1 and 5.2 are exclusively quantitative in order to measure the impact of customisation on the distribution of static pedestrian activities. However, to contextualise this research with existing and well recognised studies, qualitative data is used to confirm the findings of the observational studies.

Qualitative data is obtained through questionnaire surveys where the pedestrians is asked for their opinions on their immediate surroundings while situated in customised through to stock settings. The questionnaire comprises two components:

1. An adapted form of feeling-mapping (Rofé, 2004)
2. Choice-based conjoint analysis

The analysis is principally regression-based and includes elements of geographically weighted regression.

### 5.3.1 Feeling maps

In 2004, Yodan Rofé introduced a method that involved the surveying and mapping of people's emotional responses to their environment as they walked through a particular urban area (Rofé, 2004, p. 1). With an emphasis on the tool's ability to improve research in neighbourhood planning and urban design pertaining to improving street user senses of wellbeing, notable outputs are 'feeling maps'; see Figure 37.

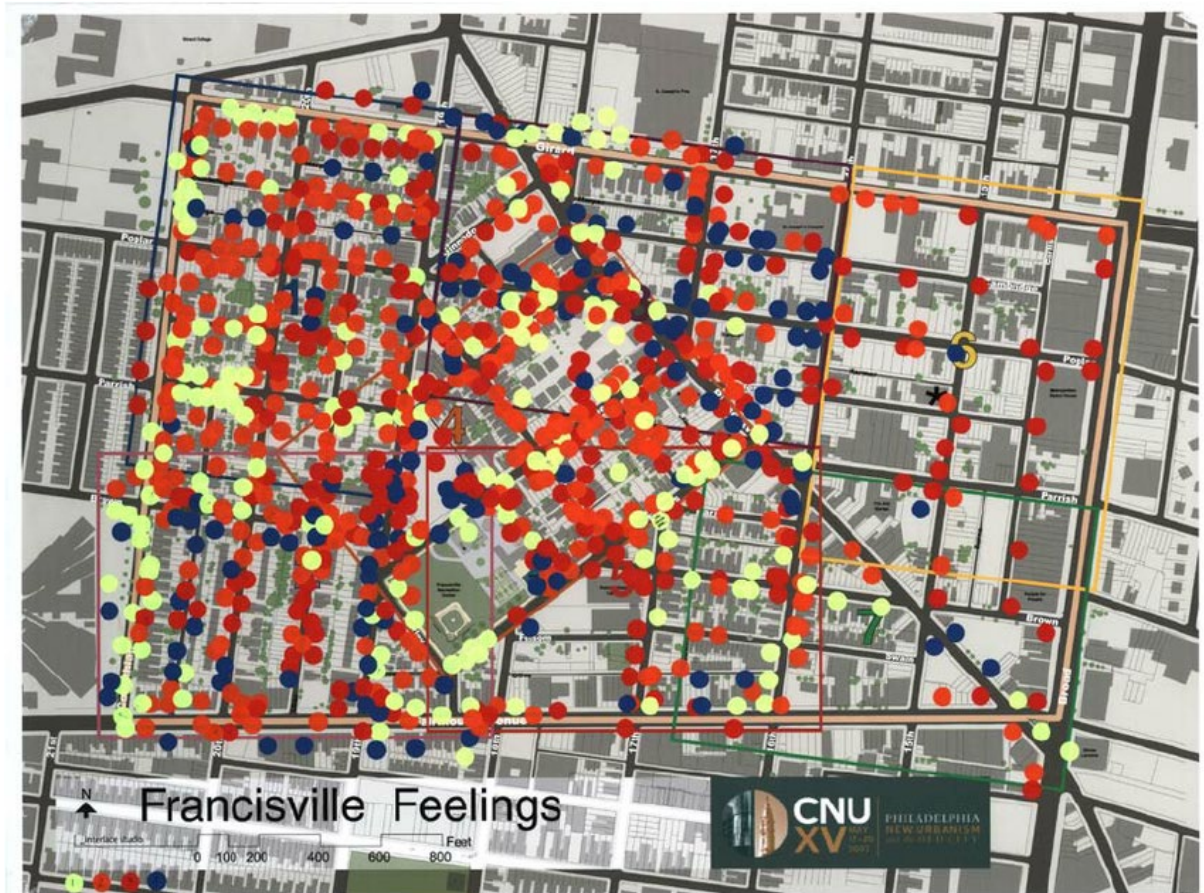


Figure 37. One of Rofé's feeling maps from a 2011 study. (Yellow = very good, orange = good, red = bad, blue = very bad).

The method involved a questionnaire survey capturing basic social information with a small section for participants to report their actual opinions. The questionnaire also included a small sample of their area, where the surveys were distributed to households. Rofé records a poor return of surveys and suggests that an alternative method would involve the surveyor walking with the subjects and filling out the maps on behalf of the subject (2004).

This suggested approach is used in this research but is further enhanced by randomly selecting participants from the general public – street-users. When a street user agrees to fill in a survey, their position is geotagged with Parade™ using an appropriate category (standing/sitting engaged) from the low-resolution survey.

The researcher navigates the length of each case study and randomly asks static street users for their opinions on their immediate surroundings. Their opinions fall into five categories that are assigned scores ranging from 1 (very poor) to 5 (very good) on a Likert scale. The question and categories are as follows:

1. How would you rate the following features of your immediate surroundings?
  - a. Visibility (easy to see what's going on) (choices of very good / good / average / poor / very poor)
  - b. Sound / noise (choices of very good / good / average / poor / very poor)
  - c. Smell (choices of very good / good / average / poor / very poor)
  - d. Décor / physical appearance (choices of very good / good / average / poor / very poor)
  - e. Air quality choices of (very good / good / average / poor / very poor)

This form of question follows a similar format to the quality assessment of interior settings such as restaurants known as serviscapes (Bhalti and Jelassi, 2016). In doing so it addresses the need to have similar experiments conducted in outdoor public settings (Jani and Han, 2013). For this research these adapted qualities will be collectively referred to as an 'Urbiscape'.

### **5.3.2 Choice-based conjoint analysis**

To test whether people's decisions are guided by their environments over their own cultural ideals and beliefs, choice-based conjoint analysis (CBC) is

conducted during the survey as a tool to help explain trends apparent from the feeling maps.

Based on a range of coexisting attributes, where participants are presented with sets of attributes that build profiles for comparable products (or urban spaces), CBC participants are tasked with simply choosing their favourite profile(s), (see Aspinall et al., 2005). In this thesis, survey participants will be asked to select two sites posing contrasting yet related profile characteristics. The profiles comprise of combinations of four characteristics selected from a possible pool of thirteen which corresponds with customisable features in urban environments; sui-generis customisation is omitted from this exercise because of its ambiguity. Two of the sites consist of stock characteristics while the remaining two consist of customised characteristics. The full set of characteristics are as follows:

(1) Colours / Rendering

- Applied by local residents
- Applied by the council without consulting the local authorities

(2) Uniformity

- Façades are the results of local artist / craftsman interventions
- Façades are created entirely by the local authority

(3) Public Art

- Art created by a local resident
- Art installed by a local authority

(4) Graffiti / Grassroots Street Art

- Art created anonymously and randomly by local guerrilla artists
- Art occurs in designated areas (such as graffiti walls) by professional artists

(5) Block / Street Alignment (Navigation)

- Paths / routes created by the users of the space
- Paths / routes created by the local authority

(6) Wayfinding / signage

- Prefer signs pointing to local attractions and features (farmers markets, local performances, etc.)

- Prefer signs pointing to destination features (landmark stores, facilities, etc.)

(7) Reconfiguration

- Obstacles / Street furniture can be moved by you the user so that you can optimise the space
- Obstacles / Street furniture is fixed in order to optimise the harmony of the space

(8) Gardening

- An impromptu wild garden maintained by the local communities
- A garden created and maintained by a local authority

(9) Sculptures / Structures

- Landmark created by a local resident
- Landmark created by the local authority

(10) Urban Knitting / Other

- The presence of softened urban features through end-user interventions
- Structures are to be kept as they are

(11) Performances

- Street performers are present at the site
- Street performers are banned from the site

(12) Occupation / Possession

- The community has complete control of the uses occurring within the site
- The council has complete control of the uses occurring within the site

(13) Change of use from the intended function

- The site is allowed to developed according to the changing requirements of the community
- The site is regulated in order to retain its current use

Participants in the survey are essentially asked ‘if you were given an opportunity to design your immediate spatial surroundings, which 2 fictitious configurations would you choose?’ This is the conjoint-based choice analysis core of the

research where the participant choices indicate whether people consciously prefer the freedom of designing their environments or would rather leave such a responsibility to authorities.

Examples of two potential configurations are observed overleaf:

<b>Colours</b> You would rather define these	<b>Performers</b> Street Performers are allowed
<b>Gardening</b> Plants are everywhere and left to grow wildly	<b>Façades</b> Walls and features vary considerably
<b>Colours</b> The council's choice is good enough	<b>Performers</b> Street performers are banned from the site
<b>Gardening</b> Planting is provided and maintained by the council	<b>Façades</b> Walls and features are identical to each other and orderly

As with the feeling maps, the results from this exercise are matched to GPS coordinates that correspond with an appropriate Parade™ activity captured from the low-resolution survey screen. The mappable results will ultimately be matched against customisation using regression analysis to test the likelihood of a participant selecting a configuration based on their being situated in a customised/stock environment.



### 5.3.3 Demographics

To account for demographic influence, questionnaires also include questions on the age and status of the participant. Status refers to whether the participant considers themselves a local or a visitor to the location.

1. How old are you? (choices of 18 – 25 / 26 – 45 / 46 – 65 / 65+)
2. Are you a local or a visitor? Participants are given a choice of two options to help contextualised the significance of a sense of ownership of the respective case studies (to be analysed later). A local is considered as someone who lives and/or works in close proximity to the case study.

### 5.3.4 Geographically Weighted Regression

According to the creator of the 'spgwr' R package, "Geographically weighted regression (GWR) is an exploratory technique mainly intended to indicate where non-stationarity is taking place on [a] map, that is, where locally weighted regression coefficients move away from their global values" (Bivand et al, 2017, p. 1). GWR is applied to this research to spatially test whether pedestrian opinion scores are influenced by the increased or decreased presence of customisation at the case study locations.

The bandwidth, or the range of coefficient value variation, is determined by calculating the correlation between customisation and the pedestrian satisfaction score for each geographical referenced survey. As the search window is moved from one point to the next, all of the other points around it are identified. A regression model is then fitted to that subset of the data, giving most weight to the points that are closest to the one at the centre (R. H., 2009). A dataset of 50 observations then fits 50 regression models, where the results are then compared to identify geographical variation.

In essence, the coefficient values are generated using Pearson's R and range between -1 and 1, where -1 indicates an absolute negative correlation and 1 an absolute positive correlation. Firstly, the covariance is calculated between the two variables. This is achieved by calculating the distance of a value from the its grouping's mean. For example, the difference of a pedestrian score of 5 from a group mean of 4.6 from a sample of 50 observations gives a result of 0.4. The same process is repeated for the remaining observations and for the

parallel observations (matched customisation scores) and the results added together within their groups. The resulting two sums are multiplied together and divided by the number of observations (50) minus 1. This result is then divided by the result of the multiplication of the standard deviations of the first (pedestrian opinion scores) and second observations (customisation scores) giving a respective correlation coefficient.

For each case study, GWR coefficient ranges are matched to a spectral colour scale. Higher correlation coefficients are red, while lower correlation coefficient values are blue. A high correlation indicates that both customisation and pedestrian opinion scores rise in tandem, or that they decrease in a similar way.

### **5.3.5 Sampling**

Pointed out in section 5.3.1 is that participants are essentially members of the general public who are stopped at random. These participants are intercepted by the surveyor along the path of the case studies high streets and are those who are stationary/static.

To incentivise the task, participants are given keyrings depicting a scene of their respective case study.

In general, high streets are busy settings with high levels of flowing pedestrian traffic. The strategy is to record the opinions of 50 participants per site.

A sample of the questionnaire can be found in Appendix VIII.

### 5.3.6 Summary of Methods

The purpose of the research methods is to answer the three research questions, outlined in section 1.2, with empirical evidence collected from field observations. Ultimately, these methods specifically aim to see whether there is a relationship between increased static activities and an increased presence of features that have been customised in urban spaces. They also test to see whether any emerging correlations are attributed to personal preferences and whether static pedestrians within the proximity of a customised feature are more satisfied with their surrounds than those who are not. The table below summarises the purpose, application, and relation to each research question for each method introduced in sections 5.1 to 5.3.

Table 10. Summary of introduced methods (continued overleaf)

Summary of Research Methods			Research Question		
Method	Purpose	Application	1	2	3
Grid Array I (50 x 50m)	Captures the general presence of customisation at a location	Heat mapping customisation – recording the spatial presence of customisation	■	■	■
Grid Array II (10 x 10m)	Captures specific occurrences of customisations using geotagging. <b>Uses Parade™</b>				
Scoring customisation	Allocates customisation scores based on aesthetic, physical and functional attributes that have(not) been informally modified by street users				
Geotagging Pedestrians	Captures the precise locations of where people have stopped to engage in a static activity and what this activity actually is. <b>Uses Parade™</b>	Spatially monitoring the occurrence of static activities in relation to customisation	■	■	■
Visual correlation exercise	Determine whether there is a spatial relationship between high customisation scores and high concentrations of static pedestrians and particular activity types				
Statistical correlations exercise	Tests the strength of any apparent visual correlations. Provides empirical evidence				

Summary of Research Methods

Method	Purpose	Application	Research Question		
			1	2	3
	as to whether customised environments are directly related to high levels of static activities				
Analysing the composition of an urban environment	Tests whether street furniture in itself is the key cause of static activities	Testing the significance of customisation in the distribution of static activities			
Analysing the distribution of land uses	Test whether dominant land uses are responsible for the distribution of static activities. This is achieved by measuring proximities to land uses against relative customisation tile scores				
Analysing 4G signal strengths against static activities	Tests to determine whether 4G signal strength is a significant cause of static activities in public spaces.				
Feeling maps	Maps the distribution of sampled pedestrian satisfaction relative to customisation scores – a precursor approach to geographically weighted regression. Uses <b>Parade™</b>	Gauging pedestrian satisfaction in relation to customised parts of a case study			
Choice-based Conjoint Analysis (CBCA)	Sense-checking. Tests the rationale behind satisfaction scores by examining the premise that people are naturally inclined to prefer customised features over comparatively stock ones				
Geographically weighted regression	This is applied to visualise the strength of correlations between positive/negative pedestrian opinions and increased/decreased customisation scores				

## 5.4 Case Study Selection

The case studies in this research are streetscapes as they possess regions with a perceptible range of customised through to stock characteristics. High streets are also selected because of their ability to take in heterogeneous designs and a diverse range of street users. Because of their lengths, they are also likely to intersect with a broader demographic than a plaza or single urban space, therefore the empirical evidence and survey data are more likely to divulge fair representations of general responses towards customisation.

Three case studies are presented here which differ primarily on their residential demographic compositions; however, they each have a market that operates in tandem with typical high street uses. This combination makes it possible to test customisation in both deliberately modified/modifiable settings and those that are rigid, where customisation is an unexpected occurrence. To test the impact of customisation across all three sites, markets with differing degrees of informality are selected in areas that are geographically distant from each other to avoid over lapping pedestrian uses. They are distinguished primarily by their popularity with tourists, by their baseline demographics, and finally, by the ages of their users. The case studies are listed below:

- Camden High Street
- Portobello Road
- Petticoat Lane

### 5.4.1 Assessing baseline demographics

In a 2013 study, the Greater London Authority (GLA) applied Simpson Diversity Index, normally used in biology, to determine the diversity of people living in the London Boroughs (GLA, 2013).

The process considered several indicators for diversity identified in Census data collected between 1991 and 2011, where the following formula – Simpson's D – was applied:

$$D = \frac{1}{\sum_{i=1}^s P(i)^2}$$

(GLA, 2005, p. 5)

In this instance,  $D$  is the SDI value, where  $S$  is the total number of ethnic groups, with  $P(i)$  being the portion of  $S$  being made of the number of species ' $i$ '. Essentially, the GLA have taken the original 10 ethnic minority bands appearing in the 1991 census and aggregated further categories appearing in subsequent 2001 and 2011 census surveys. The minimum value of the index is therefore 1 with a maximum value of 10 (GLA, 2013, pp. 2, 6).

The results of this exercise result in a ranking index for diversity in London's boroughs, as summarised in Figure 38.

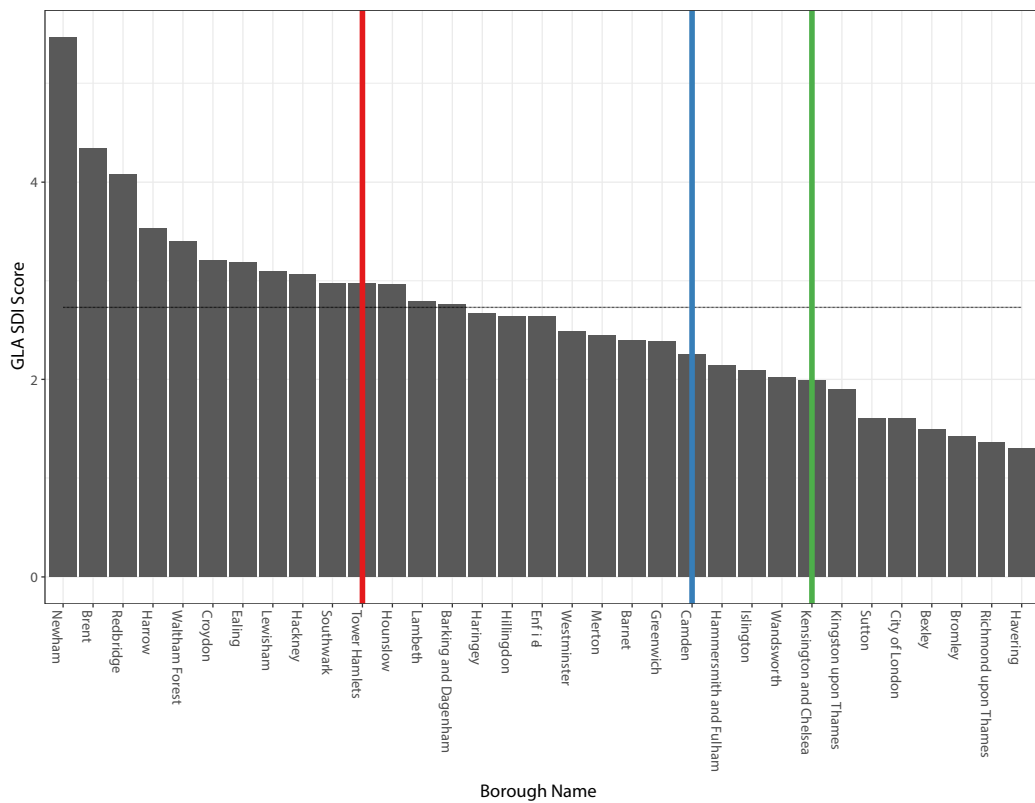


Figure 38. London Borough SDI Scores

In Figure 38, Kensington and Chelsea, the borough containing Portobello Road, is denoted with a green vertical line; Camden, the location for Camden High Street is blue; Tower Hamlets, the borough hosting Petticoat Lane, is shaded red. Each borough has a unique score indicating that the baseline demographics marginally differ (see Table 11 overleaf). The black dashed line represents the Mean SDI scores taken from the 50 most diverse boroughs in the UK.

Table 11. SDI Statistics for Kensington and Chelsea, Camden, and Tower Hamlets

<b>Borough Name</b>	<b>SDI Score</b>	<b>Rank out of 33 (including the City of London)</b>
Kensington and Chelsea	4.05	19
Camden	4.14	18
Tower Hamlets	4.53	16

Across the 50 top diverse boroughs in the UK, 30 are in London. The average SDI score is 4.49; only Tower Hamlets is above this average, where interactions with customisation are more likely to represent broad responses. The distinction between these sites is made clearer when borough rankings are based on 2011 census data aggregated into the 10 ethnic groups noted in the 1991 census (Table 12).

<b>Borough Name</b>	<b>SDI Score</b>	<b>Rank out of 33 (including the City of London)</b>
Kensington and Chelsea	1.9870882140826	26
Camden	2.24972292595129	22
Tower Hamlets	2.97528687232767	11

Table 12: Selected borough rankings based on 2011 census data ward averages aggregated into the 10 ethnic groups of the 1991 census

For spatial contextualising, a map displaying the geographic locations of the case studies and their relative diversity scores, based on the GLA's diversity exercises, can be viewed in Figure 39.

Based on previous discussions covered in Chapter 4, the hypothetical assumption is that responses to customisation will be similar across the case study sites despite marked differences in their baseline demographics. Responses are expected to be based on the quality of the composition of an environment including its perceptive complexity and ability to connect to the individuality of an urban spaces end-users.

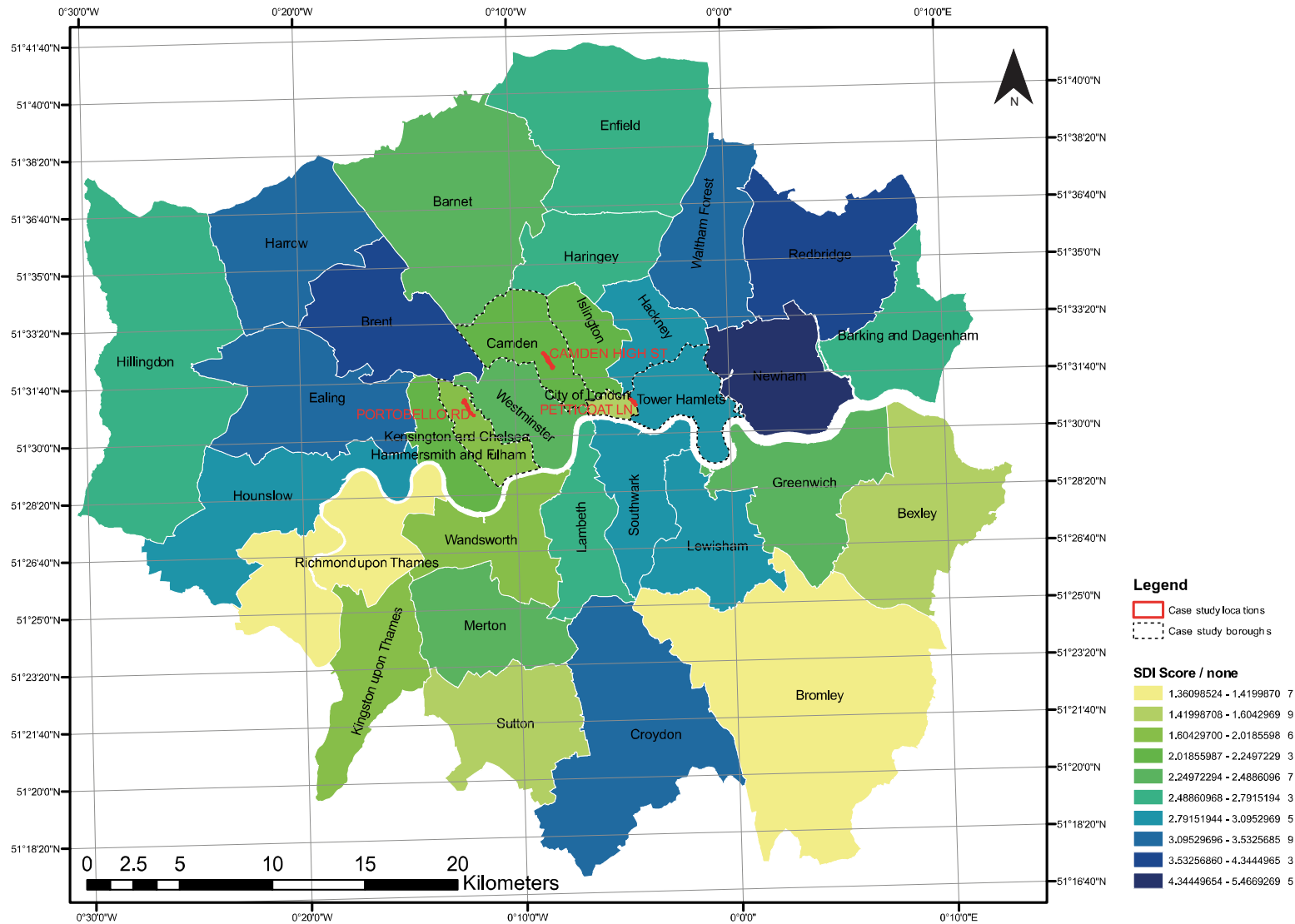


Figure 39. Case locations in a pan-London context. Boroughs are coloured according to GLA SDI scores (Data source: Greater London Authority, 2013)



### **5.4.2 Tourist Traffic**

Another characteristic which can potentially distinguish responses to customisation is whether high proportions of users are tourists. If a notable section of street users are tourists, this indicates that static pedestrian activities are most likely to occur in connection with the presence of tourist attractions which may override the impact of customisation as an independent influencer.

There is not a survey that takes stock of the numbers of tourist along a high street setting, so calculated estimates will be used instead. There are two ways that this can be achieved:

1. Assessing the overall popularity of a location
2. Assessing the oyster card usage

The popularity of a location can be deduced from public social media statistics such as the number of Facebook, Twitter, or Google ratings. However, these measures are location based and miscommunicate the popularity or unpopularity of a location. For example, it is difficult to be sure whether the 171K Facebook Likes for Camden Market, as of February 2018, refer to the actual Camden Market, or the high street between the market and Camden Town Station. Furthermore, it is difficult to discern whether the majority of likes are from non-UK based Facebook users. However, it's worth noting that Petticoat Lane only has 6.6K likes and no official page; Portobello Road has 50K likes, although these mainly seem to orientate around the antiques market.

A more reliable measure can be calculated using Rolling Origin and Destination Survey (RODS) data provided by TfL. This survey considers journey types and demographics of Oyster Card users, where the number of tourists arriving at London underground stations close to the case study areas can be used as a measure of how popular a site is with tourists.

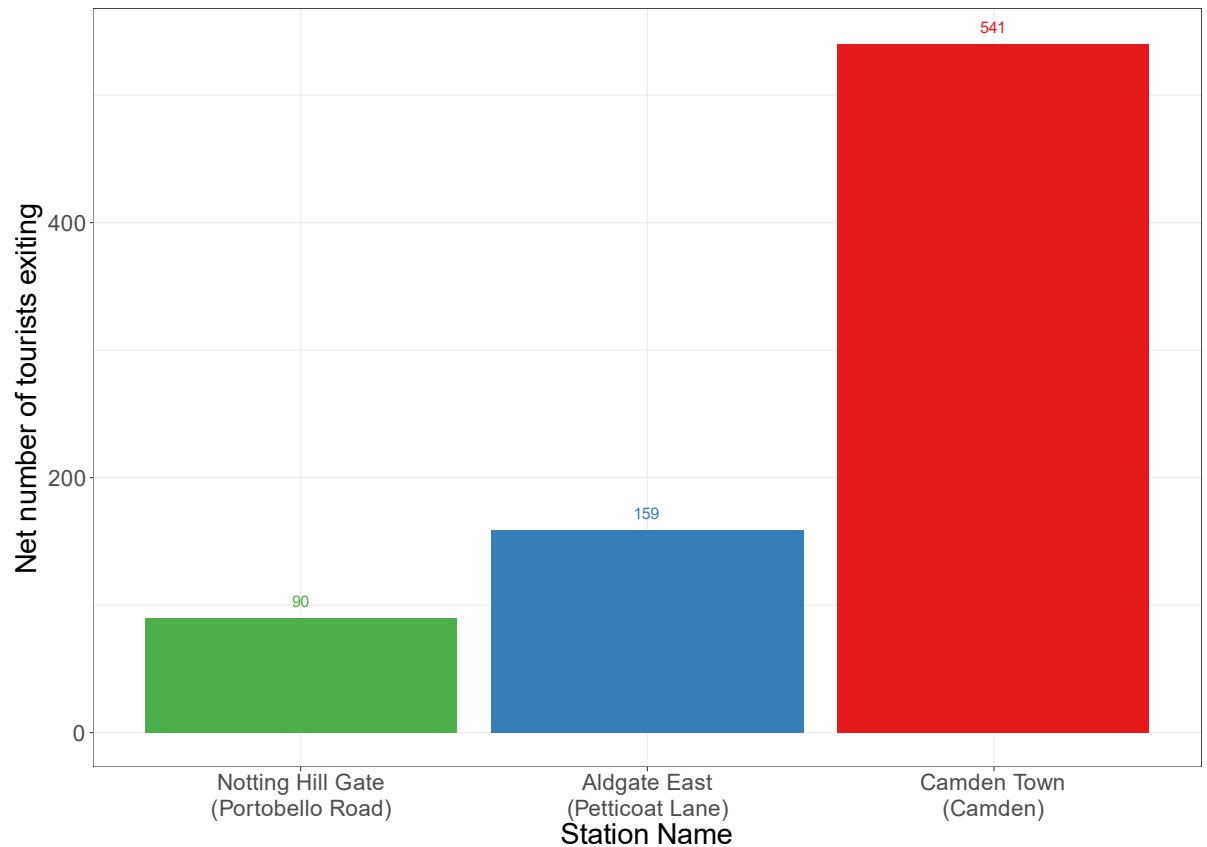


Figure 40. Net daily numbers of tourists exiting case study stations

Subtracting the number of tourist oyster- user tap-outs from touch-ins gives an estimated net of tourists exiting a station instead of interchanging within the station. It is not clear how many of these tourists will actually go on to visit the case study regions – they may exit the station to switch their mode of transport – however, it gives an indication as to the traffic that potentially passes through the case study area, thus indicating its popularity with tourists. From Figure 40, Camden Town is clearly the case study that is most likely to be frequented by tourists; this is followed by Petticoat Lane, and then by Portobello Road – a location more likely to accommodate local interests than the other two case studies. Although Ladbroke Grove station is also close to Portobello Road, RODS data returns do not record any tourist tap-ins/tap-outs from this station.

#### 5.4.3 Age Demographic

ROD surveys are carried out annually and surveys reveal demographic data for station users, including their ages. Analysing the same three stations frequented by tourists reveals that Camden High Street is most frequented by 25-34 year olds; a similar trend is apparent for Portobello Road, although this is closely followed by a high proportion of 45-59 and 35-44 year olds, indicating an

older demographic (see Figure 41). According to Figure 41, the mode age band at Petticoat lane is 25-34; like Portobello Road this age band is followed by 45-59 and then 34-35 year olds.

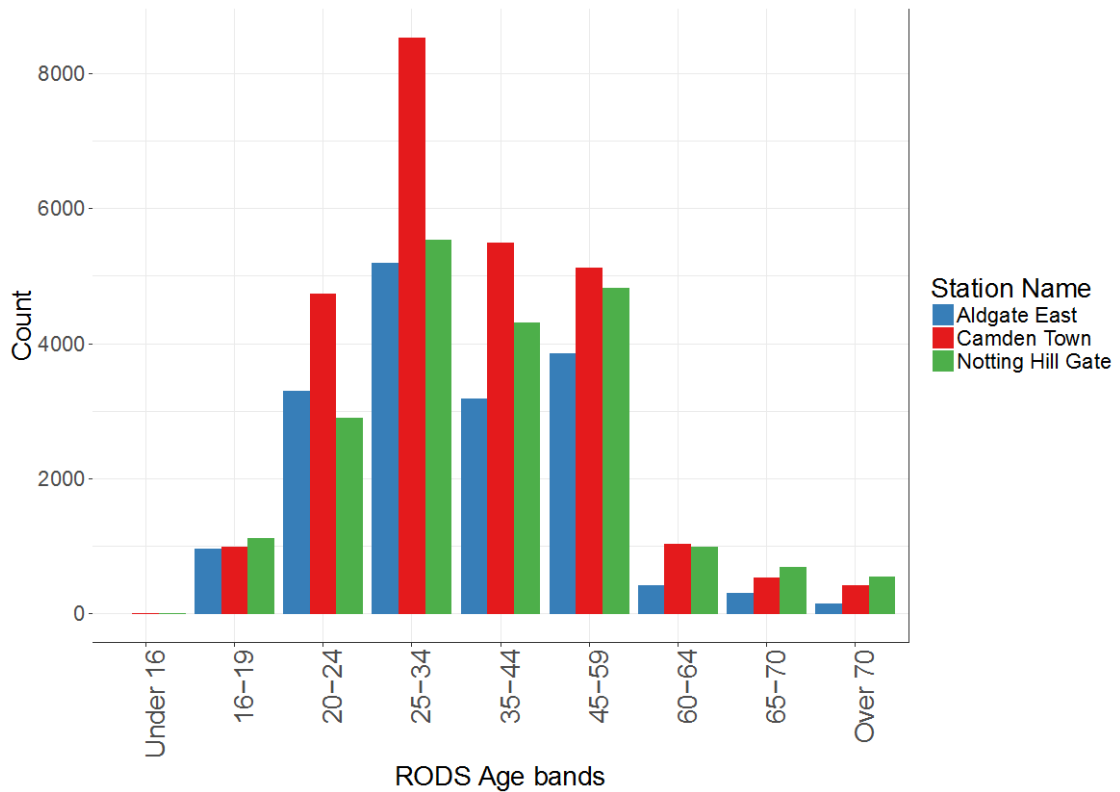


Figure 41. Station user ages by case study station

From the trends, it is apparent that older people – aged 65 and over – are more likely to favour Portobello Road while preferring to avoid Petticoat Lane. It is possible that this trend can be directly attributed to customisation. However, from this brief analysis, it is clear that the case studies are distinguishable by the age of their users:

- The youngest users are potentially found at Camden High Street (Camden Town).
- The oldest are more likely to be found at Portobello Road (Notting Hill Gate).
- Petticoat Lane is likely to display trends similar to Camden but with a higher likelihood of finding people that are close to middle age (Aldgate East).

Accordingly, the average age of the street users, based on RODS data is 25-34 across all three sites.

## 5.5 Case study profiles

### 5.5.1 Camden High Street

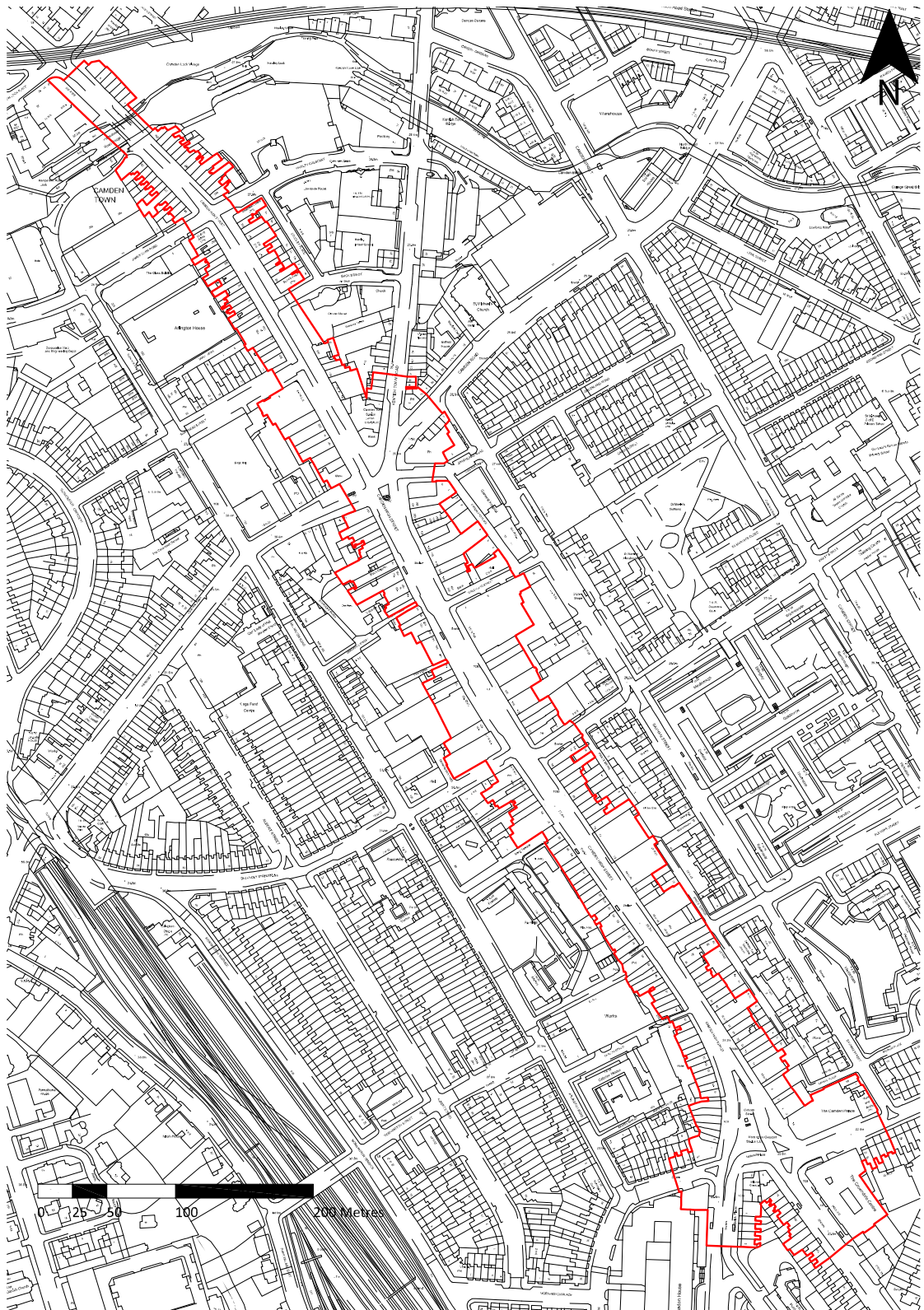


Figure 42. Ordnance survey map of the case study extents for Camden High Street (edged red). Basemap source: Edina Digimap

The Camden case study comprises 7.17 hectares of the high street running between Mornington Crescent Station, a little beyond the Grand Union Canal,

and terminating at iconic ‘Camden Lock’ Bridge (see Figure 42). The extent of the case study includes building footprints for those with facades facing the high street. This same rule is also applied to Petticoat Lane and Portobello Road also. The site is located approximately 2 miles north of Charing Cross. The major part of the high street falls into the Camden Town and Primrose Hill ward, with the southernmost section falling within the more culturally diverse Regent’s Park ward. The site contains two major road intersections: Cobden Junction (Mornington Crescent station), and Britannia Junction (south of Camden Town station).



*Figure 43. View of Camden High Street (North)*

The high street contains mostly commercial and entertainment uses. The layout of the streetscape is fairly typical to most ribbon developments in London; however, there is a drastic change in the character of the streetscape north of Camden Town station (see Figure 43), where the open air and covered markets are introduced to the setting.



*Figure 44. View of Camden High Street (South)*

Here, the most prominent feature is the Camden Lock and Markets. Arguably a grassroots regeneration effort that saw the formerly derelict lock and warehouses converted into places where people ‘worked and sold’ during the early 1970s, the market became popular with displaced hawkers, peddlers, and artists influencing, the less-than typical aesthetic of the North section of the high street (Davies, 2013, pp. 30, 52 – 53, 152). The bohemian influence is still apparent in the market today in the façade detailing of the buildings north of Camden Town station. South of this station, the buildings take on a more ‘stock’ or unaltered appearance (see Figure 44).

5.5.2 Portobello Road

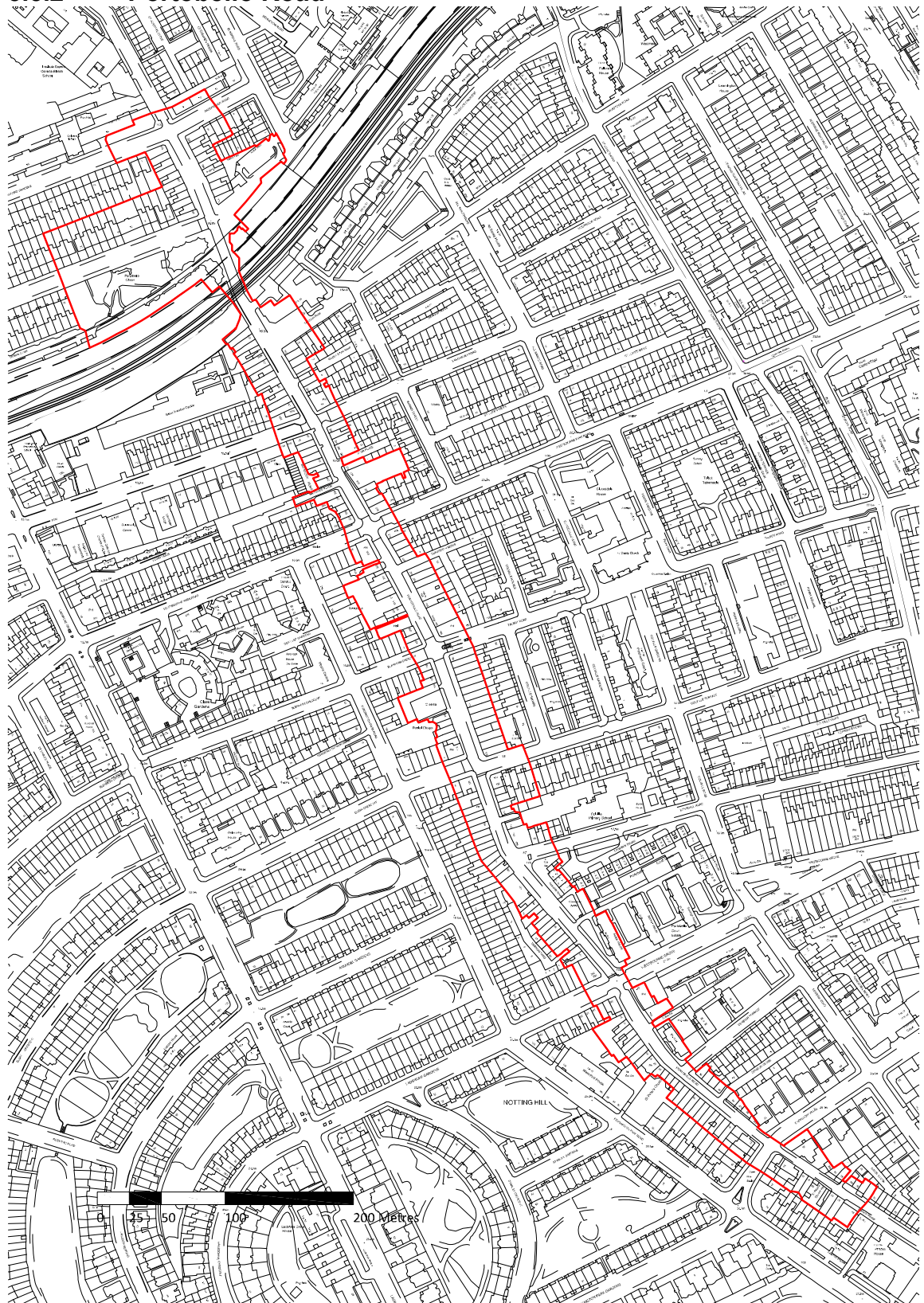


Figure 45. Ordnance survey map of the case study extents for Portobello Road (edged red). Basemap source: Edina Digimap

The Portobello Road case study occupies approximately 5.93 hectares, including most of the length of Portobello Road and linked buildings and public spaces, as well as the open space on Cambridge Gardens and the pedestrianised area between Portobello Road and Acklam Road immediately north of Westway (see Figure 45). Portobello Road is home to the Portobello Road Market which runs every Saturday; nonetheless, sporadic stalls can be found along the length of the street during weekdays. The current market character, specialising mostly in antiques, has existed on this site since the 1940s and came about as the road formed a convenient spot for ‘rag and bone’ traders and antiques dealers seeking to peddle their wares. This character is in transition owing to the gradual gentrification of the area which has introduced fashion and cutting-edge merchandise for the younger more affluent customers (Portobello Road Market, 2016).

The case study length of the Portobello Road between its junctions with Oxford Gardens/Raddington Road, and Chepstow Villas, was known to exhibit a ‘working-class’ character, “a taste of the common among the more middle-class residents” (Martin, 2005, p. 76), it was described as a “community thing” (ibid., p. 77) created by the local residents to sell antiques both to each other and visitors to the site. As such, they were largely opposed to proposals that carried the potential for gentrification / upgrading of the area occupied by the circa 160 stalls (Derbyshire, 2015).

Despite stalls running the entire length of the road, the character of the building façades changes from fairly uniformed towards the Chepstow Villas (south) end dominated by antiques shops and traders of expensive garments (see Figure 46). The change begins from the road’s junction with Westbourne Grove; shop signage become louder, and façade features begin to lack uniformity at eye level; the traders are less upmarket and sell at price points similar to those found at Camden – here numbered stall pitches have been painted onto the road.





*Figure 46. Portobello Road (South)*

Between the junction with Westbourne Grove and Oxford Gardens, more commercial uses are apparent with corporately branded stores, including Sainsbury's, and Starbucks, and Tesco, dominating sections of the high street (Figure 47); however, the presence of such commercial stores becomes less apparent north of the junction with Lancaster Road. From this point onwards, the area takes on a more impromptu bohemian character with shops including niche offerings, such as the 'unofficial Banksy store' and the Vinyl Café (Figure 48). Also present from this point onwards is the increased appearance of street art along with street performers, and evidence of DIY urbanism. These characteristics were apparent up to the northern most termination of this case study.



*Figure 47. Portobello Road (mid-way through)*



*Figure 48. Portobello Road (North)*

The expectations are higher customisation scores and subsequent static pedestrian densities towards the northern end of the case studies.

### 5.5.3 Petticoat Lane

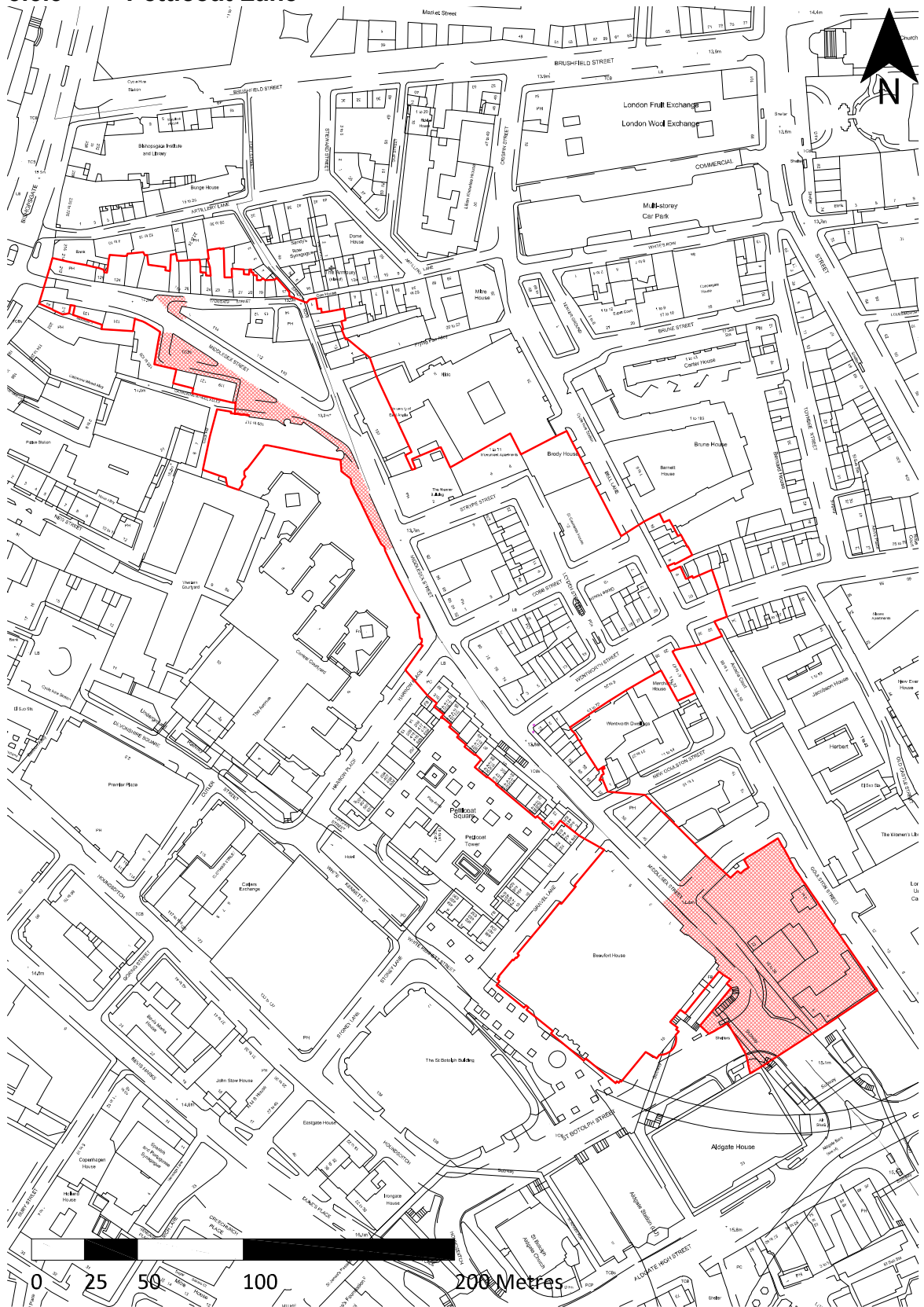


Figure 49. Ordnance survey map of the case study extents for Petticoat Lane (edged red). Basemap source: Edina Digimap

The Petticoat Lane case study covers the length of Middlesex Street, and takes in the retail uses lying immediately east, including the Petticoat Lane Market. This is the smallest case study extent as it covers an area of only 4.09 hectares (see Figure 49). This site is located approximately 2.3 miles east of London's Charing Cross.

Petticoat Lane Market, which dominates the site, specialises mostly in fashion and clothing and has operated in this way since the Huguenot's fleeing persecution in the 17<sup>th</sup> century settled in the area and subsequently began selling dyed textiles and fashions leading to the establishment of a notable market by 1830. The character was further influenced by later waves of immigration from Jewish communities during the World War 2, and later India and East Asia. The market was officially recognised during the 1930s.

The Petticoat Lane case study takes in the length of Middlesex Street between its junction with Bishopsgate and St. Botolph Street. The case study also includes land plots falling between Strype Street, Bell Lane, and the pedestrianised Wentworth Street. The northern part of the street is dominated by a public house, 'The Woodins', which is immediately surrounded by generic commercial uses, and several small businesses. This streetscape character persists until Wentworth Street intersection which introduces varied façade designs and street stalls, mostly on the east side of Middlesex Street (Figure 51). Along this length (on both sides) are shop shutters lettered by Street Artist Ben Eine (Oakley, 2014). Middlesex Street Market operates only on Sundays, but the market at Wentworth Street operate 6 days of the week (ibid.)



*Figure 50. Petticoat Lane (Western portion of Middlesex Street)*

From the market area, the character along Middlesex Street transitions back to generic commercial uniformity from New Goulston, which is dominated mostly by office spaces, and the University of East Anglia campus buildings (Figure 50). However, there are street market pitches marked up to the point of the car park / office complex which punctuate the end of the case study extent.



*Figure 51. Petticoat Lane (Market on Wentworth Street)*

The character of the streets behind Middlesex Street exhibit more evidence of grassroots bohemian interventions. Again, market pitches have been marked up. However, the façades are more uniform and, possibly owing to the lack of maintenance, have become exhibition spaces for Street Artists who contribute to the unique character of the surroundings.

It later turns out that this site was undergoing significant highways improvements works leading to the assignment of a sample size of 30 for the pedestrian opinion survey.

## **5.6 Overview of the analytical process**

The analysis of this research directly addresses the research question which remained unanswered by the literature review. Each of the three questions is answered by an analytical chapter using one of more of the methods presented here in Chapter 6.

The core objective of the analysis is to establish the influence of customisation on the occurrence of static pedestrian activities, and whether recorded static pedestrian activities are perceptively interactive with the presence of customisation. Primarily, the analysis will return empirical evidence that accepts or rejects the hypothetical association of static pedestrian activities – specifically engaged – with an increased presence of customisation. Emerging trends are tested against the qualitative data recorded by the pedestrian opinion surveys.

## **6 Analysis I: The influence of customisation on occurrences of static pedestrian activities**

**Research question: What is the influence of customisation on the occurrence of static pedestrian activities?**

**Hypothesis: The presence of customisations influences the distribution of static activities. However, in situations where high proportions of an urban environment has been customised, this catalytic effect subsides – a theoretical threshold.**

The hypothetical assertion above is based on theories concerning complexity and over complexity, where various academics have determined that visual over complexity can result in the over stimulation, causing people to avoid visually 'busy' spaces (see section 4.3). Therefore, there is an expectation that too much informality potentially weakens the relationship between customisation and concentrations of static pedestrian activities.

Applying the method outlined in section 5.1 gives a clear picture as to where customisation is most prevalent at each of the case study locations (Figure 52). Hypothetically, high numbers of static pedestrians will be located in the regions that are greenish to orange in colour, indicative of higher levels of customisation.

Mapping the densities of static activities, based on coordinates data, reveals a rough visual correlation between an increased presence of customisation and the high densities of static pedestrian activities (Figure 53). The distribution of static pedestrians is denoted by red contour lines. Each line represents a 'bin interval' or band; the outermost bands represent the lowest concentrations of static pedestrian activities at their respective case study – these coincide with the blue/purple areas of the map indicating a low attraction towards unaltered/stock features and characteristics. However, the innermost bands –



representing high concentrations of static pedestrian activities – are mostly located over regions that appear to exhibit increased evidence of informal customisation.

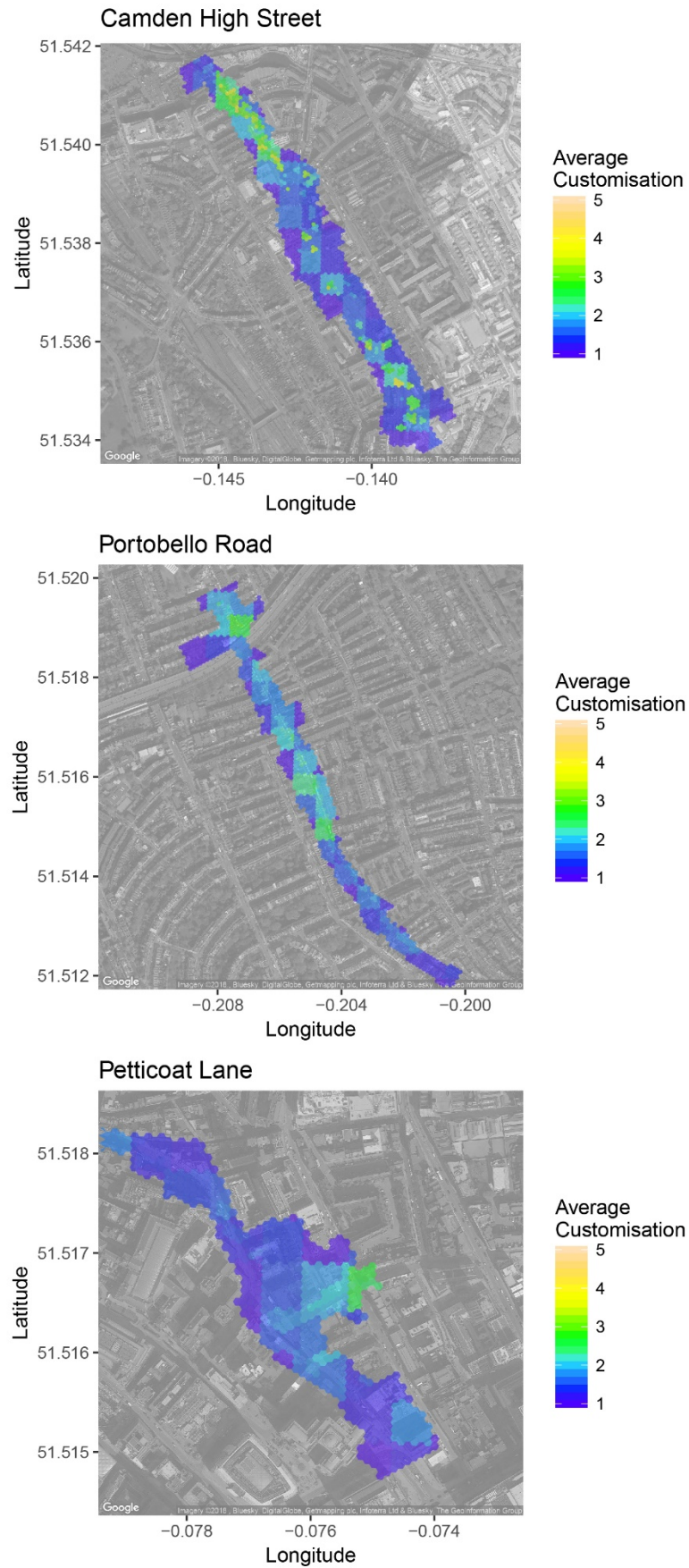


Figure 52. Intensity of customisation at each case study location

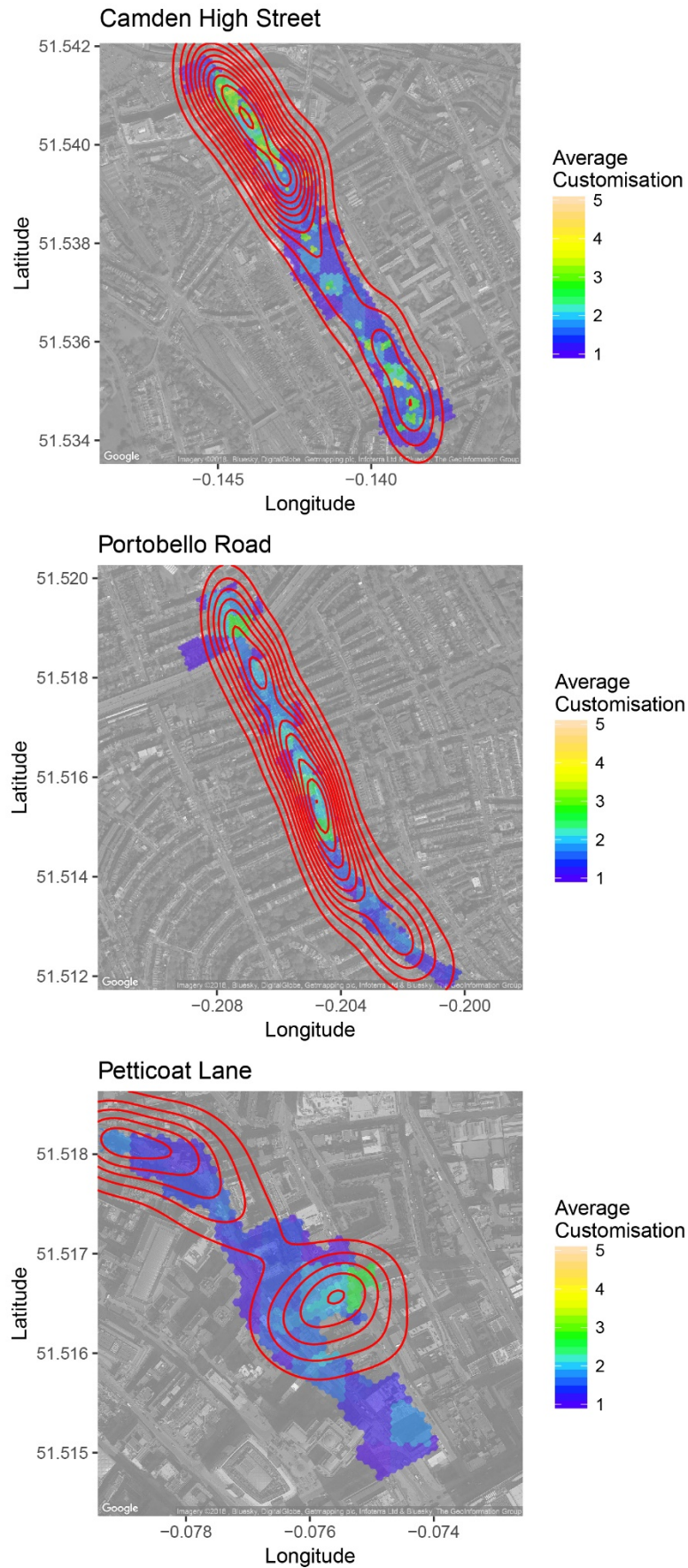


Figure 53. Pedestrian densities (red contours) vs. customisation at each case study site

## 6.1 Static pedestrian activity distributions vs. customisation

Although there is a clear visual trend between the presence of customisation and high pedestrian densities, the fits are not perfect. For example, at Portobello Road, the second highest concentration occurs slightly below one of its most customised regions (see Portobello Road, Figure 53). This occurrence can potentially be attributed to the theoretical threshold concept with roots in visual complexity theory, discussed in Section 4.3. Essentially, when a space becomes over customised, it also becomes theoretically unattractive.

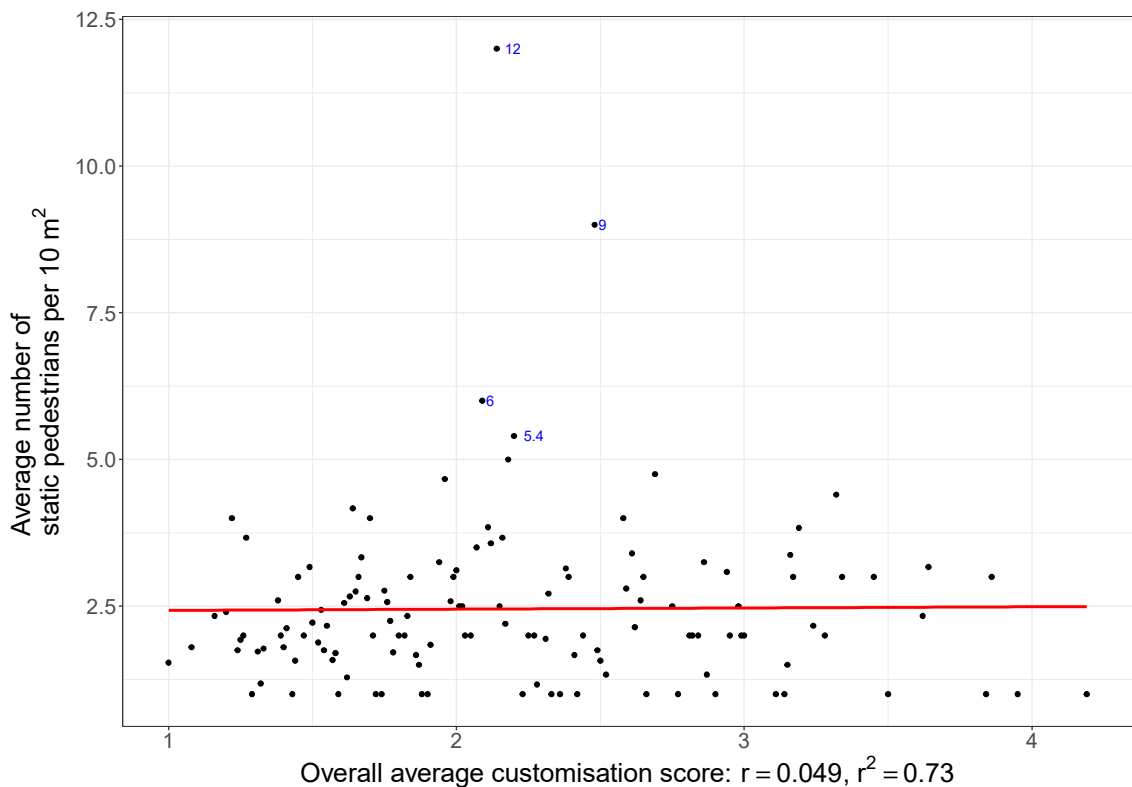


Figure 54. Overall average customisation scores against the average number of static pedestrian activities per 10m<sup>2</sup> for observations across all sites. The regression fit is shown by a red line with outlier observations labelled in blue.

Applying statistical regression analysis reveals an overall weak-positive correlation between customisation and static activities ( $r = 0.049$ , see Figure 54). The data behind this graphic finds an overall average pedestrian density of ~2.45. The correlation and distribution of points indicate that while customisation is potentially significant in influencing the overall perceptibility of urban spaces, two considerable factors emerge:

1. The fit for the regression is loose. This indicates that several factors other than customisation are potentially influencing the distribution of static activities at each of the case studies.
2. The highest observations (outliers) are recorded in regions with customisation scores ranging between 2 and 2.5. In such regions, there is an increased chance of viewing pedestrian densities in excess of 5 per 10m<sup>2</sup>.

The first consideration is discussed in detail in chapter 7. The second provides early quantitative support of theoretical discussions concerning thresholds for over complexity, where customisation turns from being an attractor of static activities to a detractor.

*Table 13. Theoretical threshold splits. Scores: 1 - 3, 3 – 5. Colours ranging from green to red, respectively represent high to low correlation coefficient (r-value) returns.*

	Regression results (r-values)			
	Overall Correlation	Scores 1 - 2.5	Scores 2.5 - 5	Scores 3 - 5
Camden High Street	0.084	0.05	0.41	-0.29
Petticoat Lane	0.067	-0.05	-1	0
Portobello Road	0.021	0.3	-0.9	0
Aggregated data results	0.049	0.23	-0.16	-0.29

When the distribution of density averages for static activities fall within regions with customisation scores between 1 and 2.5, weak-positive correlations are observed at Camden High Street and Portobello Road – as customisation presence increases so do average pedestrian density numbers (see Table 13). A weak-negative correlation is apparent at Petticoat Lane, suggesting that customisation does not influence the distribution of static activities in these regions.

From Table 13, regions with customisation scores ranging between 2.5 and 5, the positive correlation strengthens at Camden High Street ( $r = 0.41$ ). However, at Petticoat Lane, the already weak correlation becomes even weaker ( $r = -1$ ); although this strong negative correlation is based only on two observations, it is

obvious that average pedestrian activities drop from 7 per 10m<sup>2</sup> to 6 per 10m<sup>2</sup> as customisation increases. The first evidence of the theoretical threshold that highlights the tendencies of individuals to avoid over complex settings. The presence of a theoretical threshold occurring from the midway score of 2.5 is further proved at Portobello Road with, the contrasting correlations of  $r = 0.23$  in regions with customisation scores ranging between 1 and 2.5, and  $r = -0.9$  in regions with scores between 2.5 and 5.

Although the theoretical threshold isn't apparent at Camden High Street at customisation score interval breaks of 1 to 2.5 and 2.5 to 5, the threshold occurs later where scores range between 3 and 5. Therefore, at each site, there is a threshold at which increases in customisation result in increases in static activities only to a point.

The ordering of the theoretical thresholds can be further analysed by the intensity of the negativity of correlations once the threshold is reached – the ordering is: Camden High Street, Portobello Road, Petticoat Lane. At Camden High Street, that exhibits the highest degree of customisation, the negative relationship is at its weakest with  $r = -0.29$  – high customisation is a detractor but to a lesser extent than at Portobello Road and Petticoat Lane. Portobello Road has the second highest overall average customisation score and has a score of  $r = -0.9$ . The weakest overall customisation score is recorded at Petticoat Lane with the corresponding threshold  $r = -1$ . At this stage, this result can be connected to fact that customisation is under represented at Petticoat Lane and Portobello Road so that there is a lower likelihood that static activities are observed in such regions. However, these results do not justify the drop in average static densities that correspond with the theoretical threshold concept.

The overall calculated r-squared ( $r^2$ ) value for each observation is very low. This occurrence highlights that the distribution of static activities can either be linked to an external influencer (something other than customisation) or that certain activities simply are not connected with customisation while others are.

Although statistically weak, correlations observed across the case studies indicate that static pedestrian activities do correlate with customisation. However, as indicated in the methodology, the score for customisation is a composite of 14 independently scored attributes. These are summarised in Appendix I. Firstly, the averages for the customisation categories are explored in relation to distributions of recorded static activities, where the strongest correlation, negative or positive, is explored in more detail.

The majority of observations are made in regions with generally mediocre scores relative to their optimal customisation scores. For example, the majority of Petticoat Lane's observations are made in areas with customisation scores of approximately 1.5, while the site has an optimal score of approximately 3. However, this occurrence is also due to the scarcity of customisation as a phenomenon at these case studies.

Identifying the most prominent forms of customisation at each site makes it possible to align specific activities to specific pedestrian behaviours (see Figure 57). The most popular forms of customisation are recorded in relation to the distribution of pedestrian activities based on their overall averages. Split into the four low-resolution disengaged/engaged standing/sitting categories, they confirm any conscious acknowledgement or appreciation of informal customisations. The averages for the 14 recorded attributes are split into their broad composite categories (Mark I):

- Aesthetic customisations are shown in red (average derived from 4 attributes)
- Physical customisations are shown in blue (average derived from 6 attributes)
- Functional customisations are shown in green (average derived from 4 attributes)

A formula expression that summarises Mark I component scoring is as follows:

*Equation 1. Defining Mark 1 customisation components (M<sub>1</sub>). A = aesthetic customisation component scores, P = physical customisation component scores, F = functional customisation component scores.  $\mu =$*

## Chapter 6. The influence of customisation on occurrences of static pedestrian activities

overall average for each component of the main customisation score.  $n_A$  = number of aesthetic variables,  $n_P$  = number of physical variables,  $n_F$  = number of functional variables.

$$M_I = \left( \frac{\sum_{i=1}^4 A}{4}, \frac{\sum_{i=1}^6 P}{6}, \frac{\sum_{i=1}^4 F}{4} \right)$$

$$M_I = \frac{\mu_A}{n_A}, \frac{\mu_P}{n_P}, \frac{\mu_P}{n_P}$$

Mark I components are the sum of mean averages taken from the aesthetic, physical, and functional attributes of each site.

Table 14. Average customisation scores vs. Mark I splits. Regression results. Increases in functional customisation are most likely correspond with increases in average customisation scores at each case study.

Case study	Mark I customisation score splits					
	Aesthetic		Physical		Functional	
	r	r <sup>2</sup>	r	r <sup>2</sup>	r	r <sup>2</sup>
Camden High Street	0.22	0.05	0.2	0.04	0.56	0.31
Petticoat Lane	0.28	0.08	0.27	0.07	0.08	0.01
Portobello Road	0.31	0.1	-0.17	0.03	-1	1

From the Mark I split analysis, summarised in Table 14, it is evident that increases in the number of static activities correlate positively with increases in aesthetic customisations at each case study. These correlations are weak with loose modular fits.

The influence of physical customisations is weaker than aesthetic implementations, and a negative correlation ( $r = -0.17$ ) is recorded at Portobello Road. The weaker response towards physically customised environments agrees with theories that identify visual cues as most influential in the perception of urban settings. However, the negative correlation at Portobello Road suggests that pedestrians either:

- Do not appreciate changes to the environment such as the provision of movable chairs or the provision/placement of market stalls.



## Chapter 6. The influence of customisation on occurrences of static pedestrian activities

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- Are unable to settle at certain parts of a site – for example, a pavement might be too narrow or vehicular traffic might frequently interrupt the formation of high static activity densities.
- Physical customisations are underrepresented and do not intersect areas with high pedestrian densities

Functional customisations are most impactful at Camden High Street. Here, their influence is statistically twice as influential as aesthetics. Here, many people stop to watch performances and are mostly situated in regions that exhibit elements of possession (see Figure 55).



Figure 55. A pedestrian watches a street performer at Camden High Street. [Source: author]



Figure 56. A street performer struggles to attract intimate crowds at Portobello Road

Functional customisations have a little on static activities at Petticoat Lane probably due to their scarcity when compared to Camden High Street and Portobello Road. At Portobello Road, there is marked negative correlation between increases functional customisation and static activities (Figure 57). However, this pattern is based on two observations resulting in  $r = -1$  and  $r^2 = 1$ . It is probable that the recorded dip in static activities at Portobello Road can be attributed to either the base line demographics, social conditions such as gentrification, or the quality of the customisation; street performers present on the days of surveys may vary in quality, where Portobello Road's performer's might have been of poor quality during the time of the surveys (see Figure 56). These possibilities will be discussed further in the conclusions of this thesis.

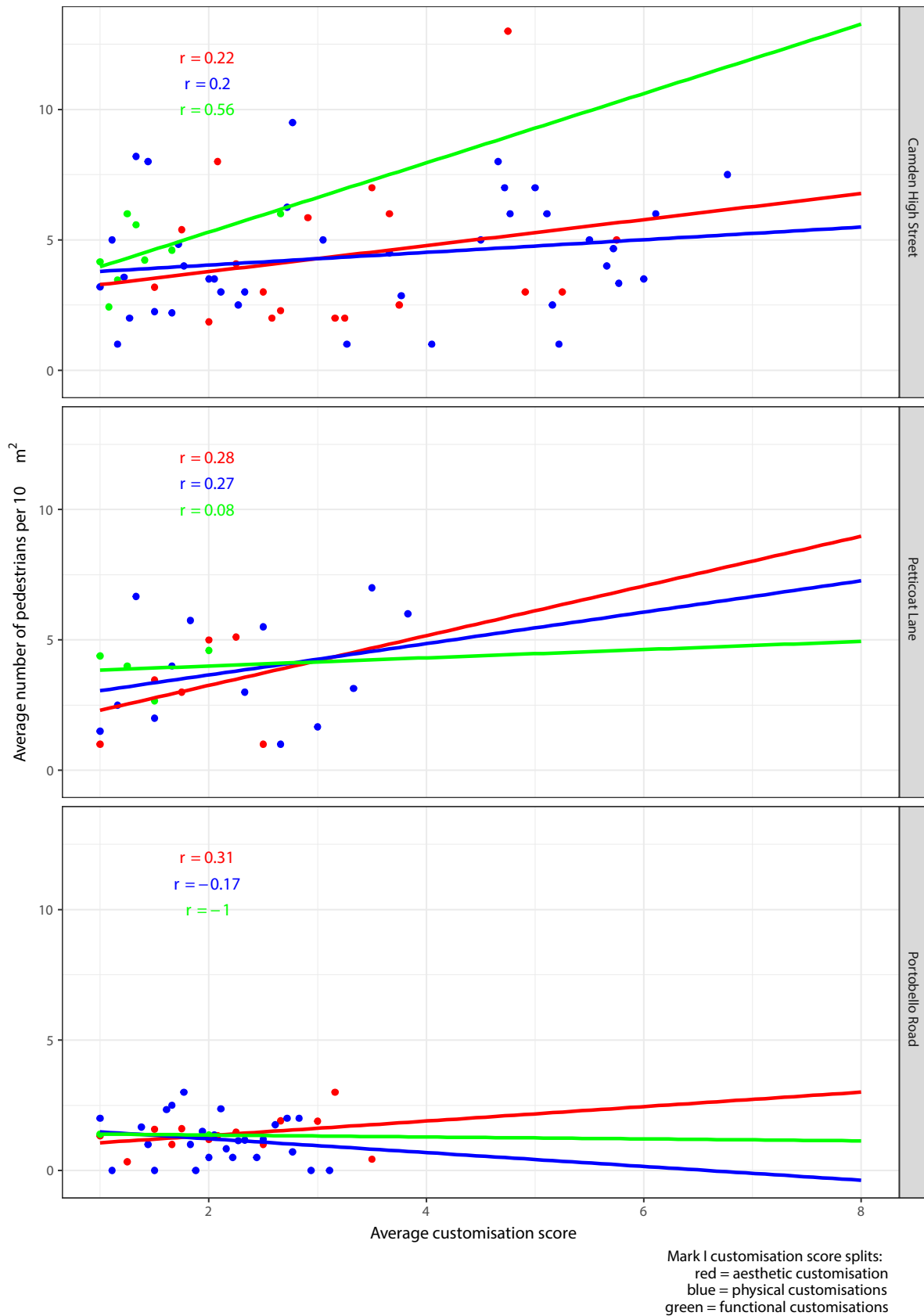


Figure 57. Average customisation scores vs Mark I customisation score splits. All three case studies are least likely to have customisation scores heavily influenced by informal aesthetic interventions

## **6.2 The influence of customisation on engaged pedestrian activities.**

While Gehl and Svarre (2013) outline two forms of static activity (standing and sitting), this research explores these laterally within the context of pedestrian behaviour. It expands on Gehl and Svarre's typology by initially recording the following activities:

- Standing Engaged
- Standing Disengaged
- Sitting Engaged
- Sitting Disengaged

Further to the explanation of the differentiation between engaged and disengaged, discussed in Section 5.2.1, engaged activities can be described as persons interacting with an environment in some way, such as viewing a window display. Stevens (2007) notes that such behaviours are the result of props that are crucial to creating a meaningful urban environment. Past research has shown that people are more receptive to informal interventions (Wunderlich, 2008).

The low-resolution static pedestrian activity survey broadly captures these occurrences and reveals correlations that build on similar studies such as William Whyte's social life of small urban spaces (1980). In total, 472 observations of static engaged activities are made at Camden High Street while 149 are made at Portobello Road, and 124 at Petticoat Lane.

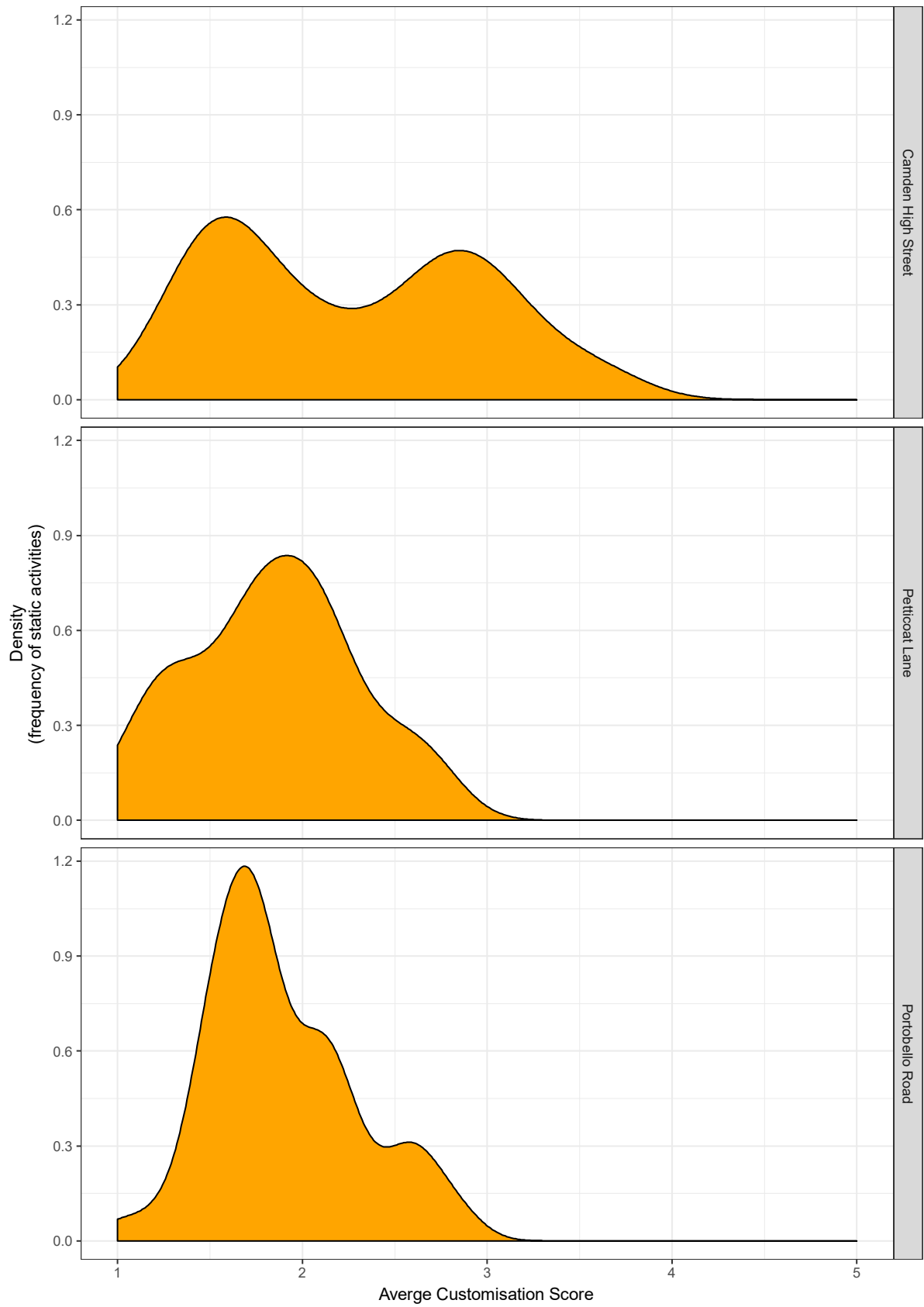


Figure 58. Distribution of engaged (combined sitting and standing) static activities against customisation at Camden High Street, Petticoat Lane, and Portobello Road. This visual is to be interpreted as a smooth histogram displaying the likelihood of an observation. For example, static activities at Portobello Road are mostly recorded in regions with scores < 2.

The first stage of the statistical analysis seeks to quantify the visual analysis that displayed concentrations of static activities over areas that have been customised to some degree. These concentrations are, in a statistical sense, densities. Densities are represented by Kernel Density Estimates (KDE) curves where the area underneath the curve represents the 100% probability ( $p = 1$ ) that an observation of a variable is made. In this thesis, the kernel is comprised of frequencies of observation along the x-axis (average customisation score). For example, a total of 50 observations of static activities might occur in regions with an average customisation score of 1.2. Unlike a histogram, that shows actual frequencies of observations, the KDE interprets average customisation score data as continuous rather than discrete. Its output becomes an estimate. Therefore, a spike in a graph will represent an increased probability that an observation will be made at specific point along the x-axis. Here, densities are determined by counting the number of pedestrians falling within the specific score ranges of the customisation quadrants used to power the heat maps.

Focusing only on engaged activities (Figure 58), finds that there is an increased probability of finding static activities located in regions with customisation scores that are greater than 1.5. This result confirms the core hypothetical stance of this research that customisation attracts static activities, capturing the interests of an urban space's users. However, a 'bi-modal distribution' is noted at Camden High Street – the peaks occur just after customisation scores of 1.5 and just before scores of 3. This result translates either to there being two radically differently characterised regions of Camden High Street, or people clumping in regions that have contrasting characteristics: heavily modified versus lightly modified.

The KDE distributions noted at Petticoat Lane and Portobello Road exhibit strong left skews in the distribution of engaged activities. These results indicate that street users are less likely to stop in an area that has been heavily customised. However, before concluding that this distribution can be attributed to a possible preference for people to congregate around features that aren't heavily customised, it is worth noting that these sites are predominately composed of lightly customised/modified

features. There is an under representation of highly customised regions at each of the case studies.

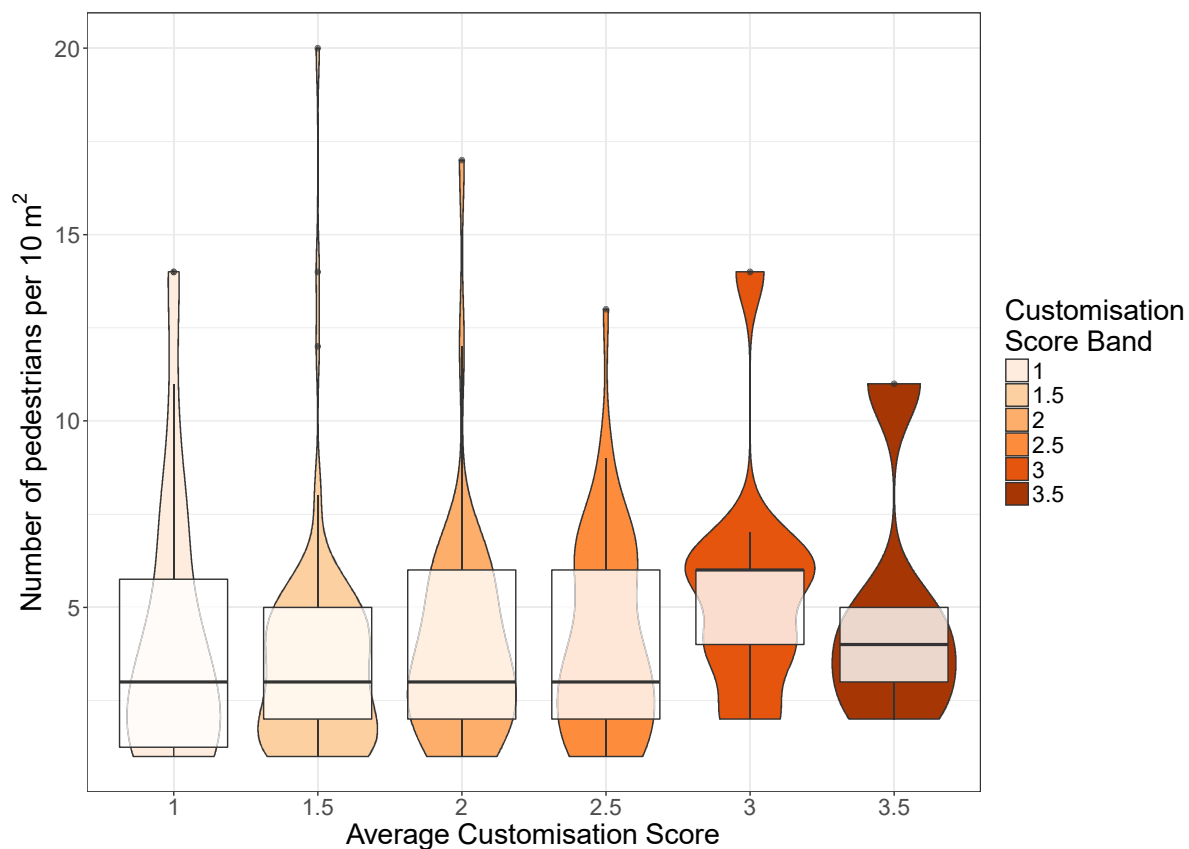


Figure 59. Violin/Box-whisker plot of engaged static activities at customisation score bands (intervals)

To account for the underrepresentation of highly customised regions, violin plots overlaid on box-whisker plots are applied to record more precisely the distribution of static pedestrian activities against specific customisation score intervals. The purpose of a box-whisker plot is to show a series of density distributions split in quartile ranges; the highest density is depicted as the box, the median (middle-value) is the horizontal line that splits the box into the 2<sup>nd</sup> and 3<sup>rd</sup> quartiles. The violin plot dimension depicts the actual densities associated with a customisation score band. Specifically, violin plots help to explain the impact of outliers recorded in the box-whisker plots (solid points), but also help to add more resolution to the box-whisker distributions.

Figure 59 splits customisation scorings into broad categories. The placement of scores follows is based on whether a score falls into a certain range. The rationale for this recoding process is summarised in the following table (also see Figure 60).



Average Customisation Score Range	Assigned Score (recoded)
<1.5	1
=1.5, <2	1.5
=2, <2.5	2
=2.5, <3	2.5
=3, <3.5	3
=3.5, <4	3.5
=4, <4.5	4
=4.5, <5	4.5
=5, >5	5

This rationale is applied using a nested-if statement in Excel to automate the assigning of recorded. A template statement is recorded below:

$$s = \begin{cases} \text{if } x < 1.5 \text{ then } y = 1 \\ \text{if } x = 1.5, x < 2 \text{ then } y = 1.5 \\ \text{if } x = 2, x < 2.5 \text{ then } y = 2 \\ \text{if } x = 2.5, x < 3 \text{ then } y = 2.5 \\ \text{if } x = 3, x < 3.5 \text{ then } y = 3 \\ \text{if } x = 3.5, x < 4 \text{ then } y = 3.5 \\ \text{if } x = 4, x < 4.5 \text{ then } y = 4 \\ \text{if } x = 4.5, x < 5 \text{ then } y = 4.5 \\ \text{if } x = 5, x > 5 \text{ then } y = 5 \end{cases}$$

Figure 60. Formula for the Excel Nested IF rationale. s = assigned score, x = recorded average customisation score, y = assigned score (recoded)

`=IF(A2 <1.5, 1, IF(OR(A2 =1.5, A2<2), 1.5, IF(OR(A2 = 2, A2 <2.5),2,IF(OR(A2 = 2.5, A2<3),2.5,IF(OR(A2 =3, A2 <3.5),3,IF(OR(A2 = 3.5, A2 < 4),3.5,IF(OR(A2 = 4, A2 < 4.5),4,IF(OR(A2 = 4.5, A2 <5),4.5,IF(OR(A2 = 5, A2 > 5),5,0 )))))))))))`

Figure 59 demonstrates that although the majority of engaged static activities are observed in regions that have been lightly customised, the number of pedestrians per 10m<sup>2</sup> is low when examined in against higher customisation scores. The density of static activities appears to increase with customisation scores across all three case studies, with modal distributions stretching into higher pedestrian densities.

Significant outliers are apparent in with customisation scores of 3 and 3.5. Other unexpected results are noted with scores of 1.5 where there is a recorded instance of 20 pedestrians in an area of 10m<sup>2</sup>. According to this data, regions with customisation scores of ~3 are more likely to be associated with pedestrian densities of 6+ pedestrians per 10m<sup>2</sup>.

When this trend is broken down by case study, the distribution of pedestrians almost mirrors the overall distribution (see Figure 61). Erratic distributions are noted at Petticoat Lane and Portobello Road, however, both sites do not feature quadrants that have customisation scores bands beyond 2.5.

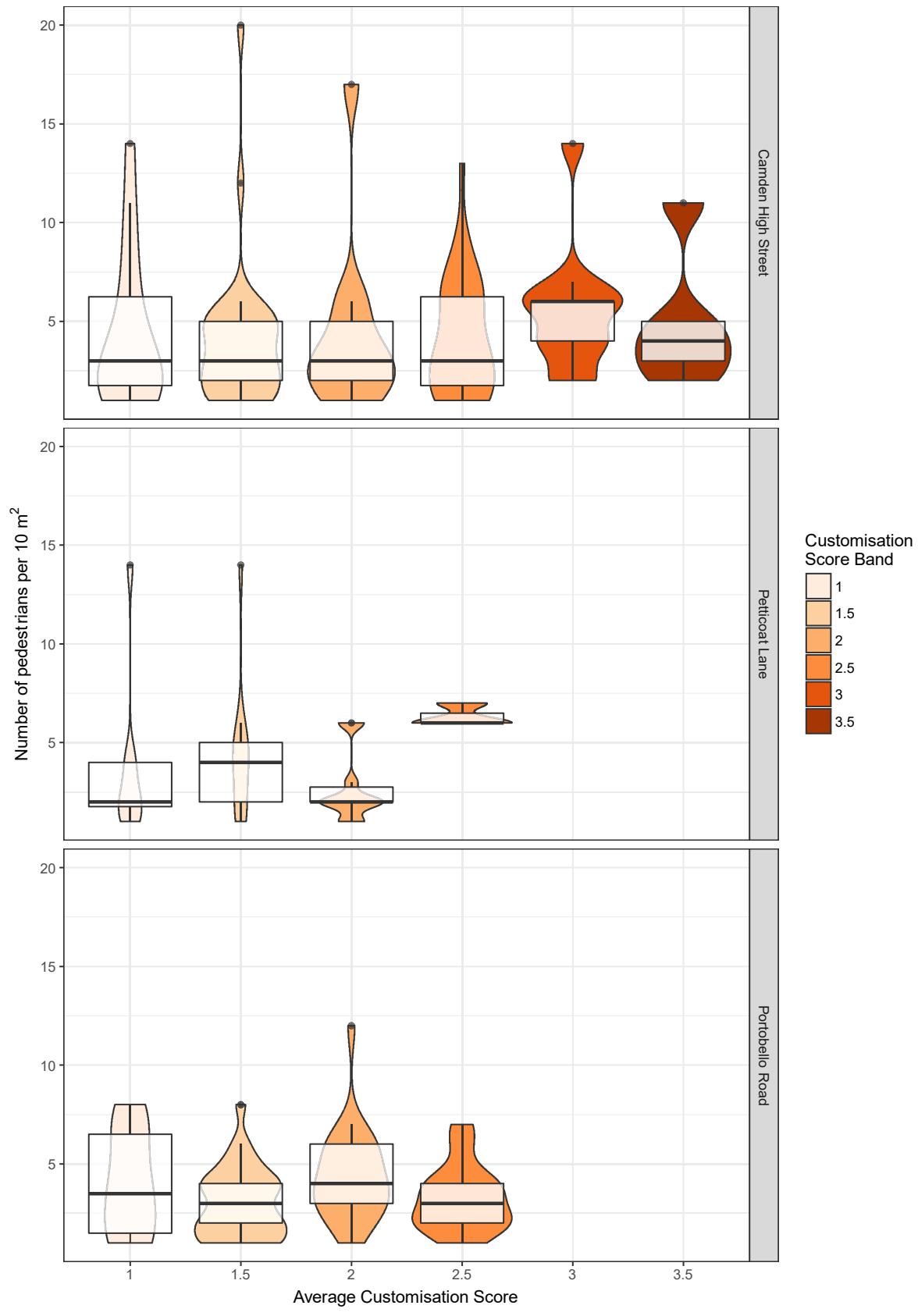


Figure 61. Box-whisker and violin plots by case study

Fewer observations of static activities in regions with customisation scores of 2.5 are noted at Petticoat Lane. However, where these occur, the pedestrian density is high in comparison to regions that have been customised to a lesser extent. There is an increased presence of static activities between scores of 1 and 1.5, but a fall in density at scores ~2 highlights an anomaly that can be explained by looking at factors other than customisation that might influence the distribution of static activities.

At Portobello Road, distributions are relatively even across the customisation scores – all have pedestrian densities that are more likely to be less than 5 per 10m<sup>2</sup>. This finding suggests that the distribution of static activities appears to be relatively unaffected by customisation in general.

To shed further clarity on the impact of customised environments on the distribution of static activities, the Mark I customisation scores (aesthetic, physical, and functional) are explored towards identifying the key forms of customisation that play a role in the distribution of static activities at each of the case studies.

Regression analysis is used to determine whether increases in these Mark I component forms of customisation correlate with increases in the distribution of engaged static activities. Because the scoring criteria at each case capture instances where no recorded changes between tiles scores are evident, there are tiles with repeated customisation scores, but with varying numbers of static pedestrians falling within them. For example, two tiles with scores of 1 might have static activities densities of 4 and 10 respectively. To avoid distorted correlations, averages of counts of pedestrians per 10m<sup>2</sup> are gathered for each recorded customisation heat map score and contrasted against a Mark I component. The employed logic is summarised with the following formula:

*Equation 2. Calculating the overall average static activity density ( $\mu_D$ ).  $f$  = number of pedestrians observed in a tile's (y-values).  $C$  = average customisation score (x-values).*

$$\mu_D = \frac{\sum f}{C}$$

This formula approach for carrying out mean averages for y-axis values was repeated for each unique customisation score. To achieve this, the r-package *dplyr* was used. The coding steps are as follows:

### Step 1

Import raw data sets of customisation scores matched with counts of static activities for each site. Each site should comprise of a column containing the site name (ID), column containing an average calculated according to Mark I component (i.e. Aesthetics), and column counting the number of observed activities (Count\_). The datasets are subsequently bound by row (*rbind*), for example:

```
MainData <- rbind(Data 1, Data2 , Data 3)
```

Data 1 contains selected attribute scores for Camden High Street, Data 2 represents Portobello Road, and Data 3 refers to Petticoat Lane.

### Step 2

The next involves calculating the respective means based on the counts of static activities. This is achieved by using *dplyr*'s inbuilt algorithm to summarise the dataset on the row values. For example

```
SumMainData <- dply(MainData,.(Aesthetics, ID), summarise, Mean =  
mean(Count_))
```

### Step 3

Prepare visuals in r-package *ggplot2* with the option of generating summary statistics using data from *dplyr*.

By this point, there are no duplicated values along the y-axis leading to clearer distributions for analysis for each Mark I attribute.

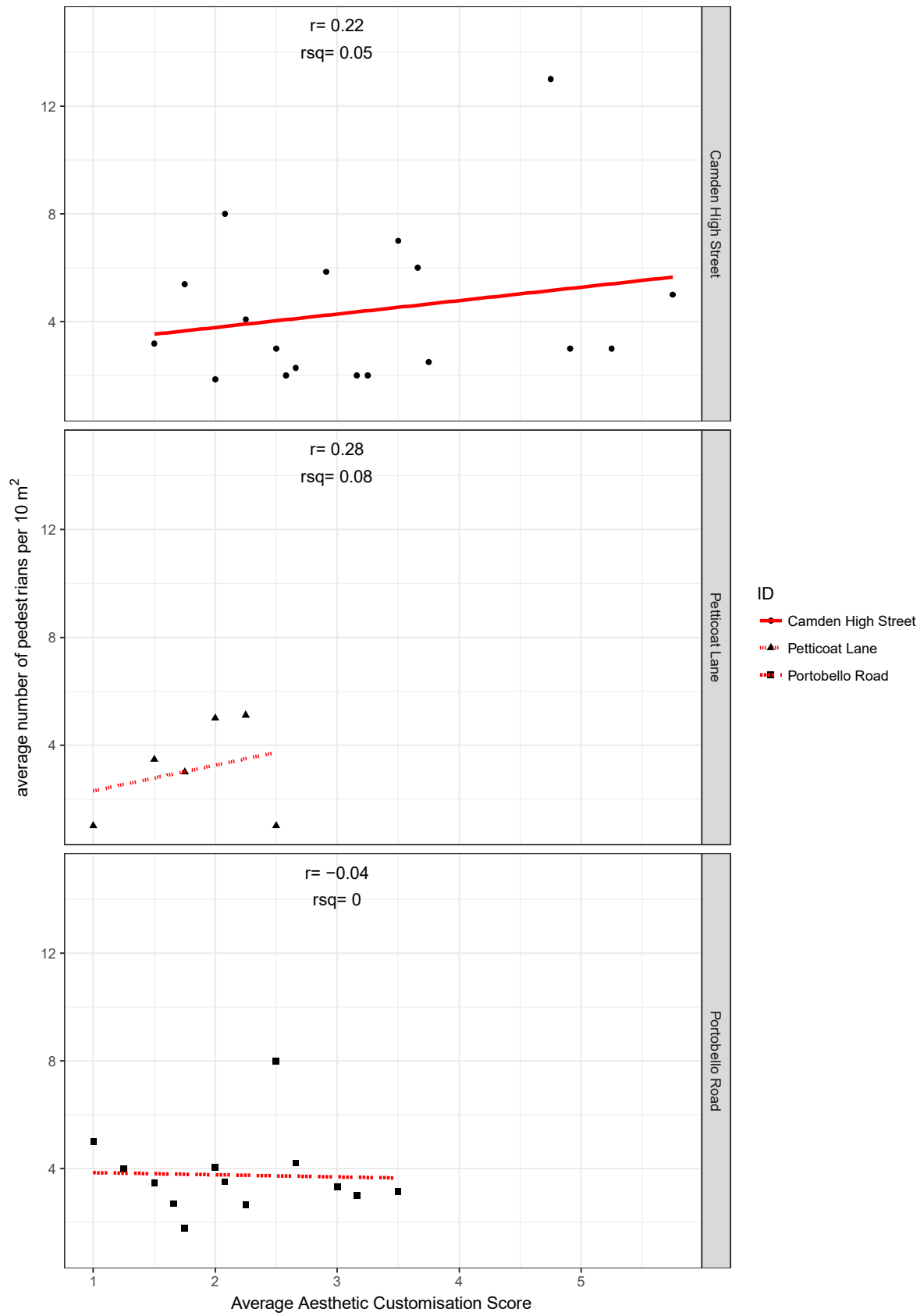


Figure 62. Aesthetic average customisation scores (Mark I) versus engaged static activities at each case study. Respective trend is represented by red line variations.

From Figure 62, weak-positive correlations are noted at both Camden High Street and Petticoat Lane ( $r = 0.22$ , and  $0.28$  respectively). However, a near-neutral yet negative correlation is noted at Portobello Road ( $r = -0.04$ ). At both Camden High Street and Petticoat Lane, evidence indicates that engaged static activities are directly influenced by increases in aesthetic (visual) forms of customisation. However, these trends are based on highly scattered data points pointing to either static engaged activities being either connected to a specific sub-component of aesthetic customisation or are more likely influenced by either another implementation of customisation or an external influencer such as 4G network connectivity.

Taking into considering the sub-components of the Mark I score, the individual attributes from which aesthetic, physical and function average scores are calculated, patterns become apparent. For the purpose of this research, these sub-components will be referred to at Mark II attributes. The sourcing of Mark II attribute score data is exactly the same as outlined in 5.1.4, where attributes are summarised in Appendix III.

Across all three sites, positive correlations are recorded to increasingly informal occurrences of street art, a Mark II attribute extracted from the Mark I aesthetic component. The correlations are as follows:

Table 15. Correlation results for numbers of static engaged activities and recorded increases in the informality of street art – Mark II (refer to Appendix for charts).

	<b>r-value</b>	<b>r<sup>2</sup>-value</b>
Camden High Street	0.67	0.45
Petticoat Lane	1	1
Portobello Road	0.67	0.45

However, increases in the informality of street art produces negative correlations at Camden High Street and Portobello Road. The correlation at Petticoat Lane is strongly positive with  $r = 1$  and  $r^2$  therefore being 1.

Although strong-positive correlations are associated with colour at Petticoat Lane and Portobello Road, a weak-negative correlation is noted at Camden High Street albeit with highly dispersed data (see Table 16).

Table 16. Correlation results for numbers of static engaged activities and increased colour variance – Mark II (refer to Appendix for charts).

	<b>r-value</b>	<b>r<sup>2</sup>-value</b>
Camden High Street	-0.08	0.01
Petticoat Lane	0.66	0.44
Portobello Road	0.45	0.2

Decreases in uniformity, where higher scores are assigned to increased variety in a street block frontage do not return positive correlations with increased numbers of static engaged activities at Camden High Street and Petticoat Lane. However, a strong correlation ( $r = 1$ ,  $r^2 = 1$ ) is noted at Portobello Road, translating to people involved in engaged static activities coinciding with varied façade designs at this site.

When explored in isolation, the influence of environments that have been physical customised, where informal modifications are made to the morphology and tactility of a space, on engaged static activities results in weak-positive repeated correlations at Camden High and Petticoat Lane (r-values = 0.2 and 0.27 respectively). There are weaker than those associated with aesthetic scores (compare Figure 62 with Figure 63). The negative correlation observed at Portobello Road in this context is notably negative with  $r = 0.38$  with a higher  $r^2$  value when contrasted with the aesthetic result ( $r^2 = 0.14$ ).



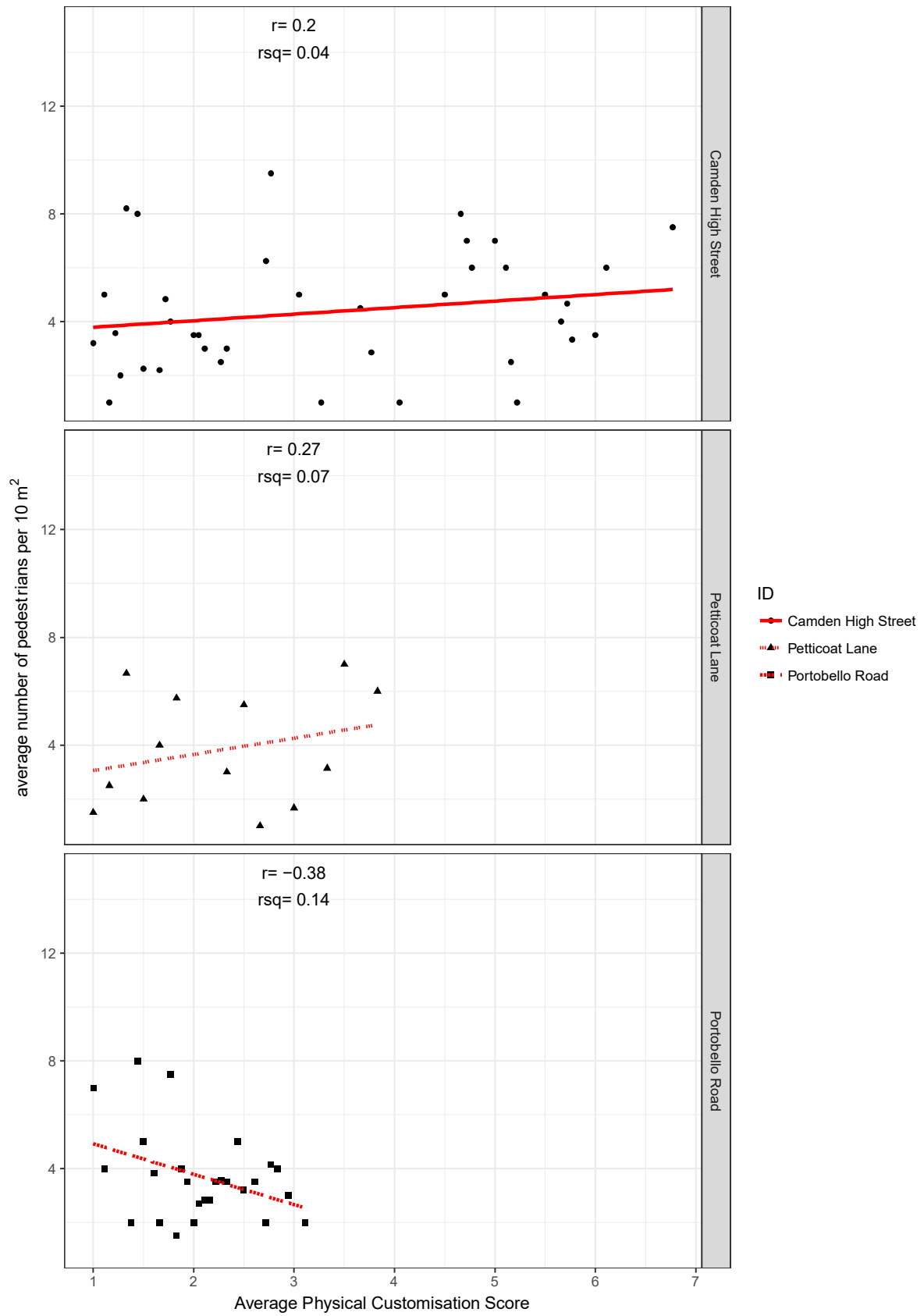


Figure 63. Physical average customisation scores (Mark I) versus engaged static activities at each case study. Respective trend is represented by red line variations.

The roles of physical customisation Mark II components is presents inconsistencies between the three sites. Here, there are no instances of components that return positive correlations across all three sites. However, there is a positive correlation between increasingly informal wayfinding/signage and an increased presence of engaged static activities at Petticoat Lane and Portobello Road. Although, the correlation is negative at Camden High Street, the scatter plot is highly dispersed (see Appendix 1) with an  $r^2$  value of 0.04.

	Change of use		Other		Performances		Possession	
	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>
Camden High Street	0.27	0.07	0	0	0.93	0.86	0.4	0.16
Petticoat Lane	n/a	0	n/a	0	n/a	0	0.08	0.01
Portobello Road	-1	1	n/a	0	1	1	0.69	0.48

Responses to reconfiguration – street furniture with scores increasing with the amount of flexibility they offer the street user in their positioning/placement – are varied across the three sites. A positive correlation is noted at Camden High Street ( $r = 0.23$ ,  $r^2 = 0.6$ ), an almost neutral correlation at Petticoat Lane ( $r = 0.01$ ,  $r^2 = 0$ ), and negative correlation at Portobello Road ( $r = -0.5$ ,  $r^2 = 0.25$ ). This result challenges William H Whyte’s assertion that well-designed, well-placed, movable street furniture is crucial in the vitality of urban spaces. There is a possibility that street furniture will only work in this way in when juxtaposed with other environmental conditions, for example proximity to a Wi-Fi hotspot, large screening of a sports event, or when placed in setting where people are able to observe interesting activities. In the case of Camden, an argument for its positive correlation can be the higher footfall and tourist numbers when compared with the other case studies.

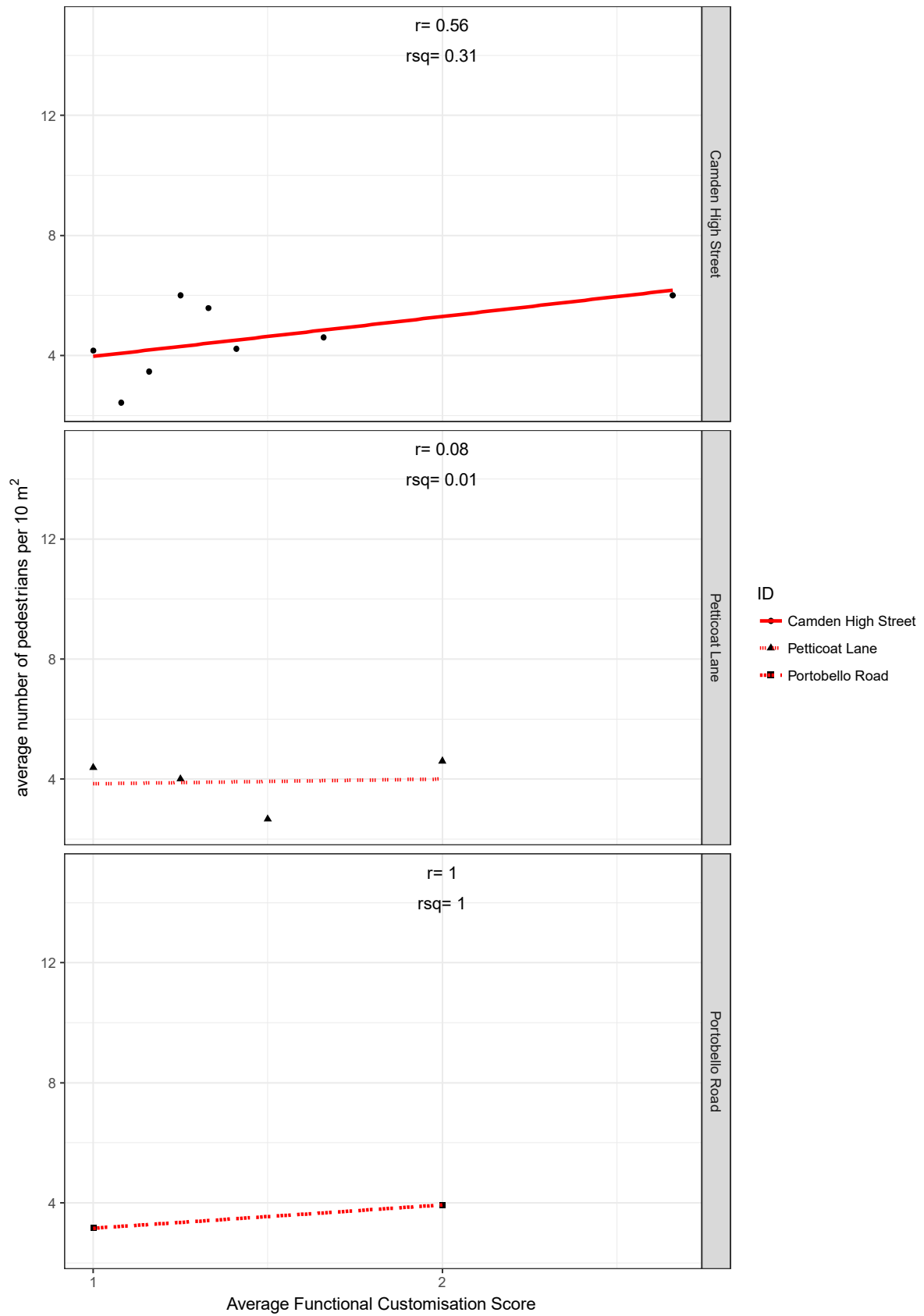


Figure 64. Functional average customisation scores (Mark I) versus engaged static activities at each case study. Respective trend is represented by red line variations.

Functional customisation has the least presence all three case studies (see section 6.1). However, three sites exhibit positive correlations in relation to this component that captures the presence of alterations to the function of parts of a streetscape, namely deviations from its intended purposes, performances, and possession (Figure 64). On closer inspection (see Appendix I), positive correlations are noted in connection with possession at all three sites. There aren't enough observations made at Petticoat Lane to determine the influence of regions that have been functionally customised in terms of change of use, performances, and 'other'/sui generis; in categorical terms, no customisations were observed that couldn't fit into a predefined category.

	Change of use		Other		Performances		Possession	
	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>
Camden High Street	0.27	0.07	0	0	0.93	0.86	0.4	0.16
Petticoat Lane	n/a	0	n/a	0	n/a	0	0.08	0.01
Portobello Road	-1	1	n/a	0	1	1	0.69	0.48

At Camden High Street, Possession plays a stronger role in the distribution of static activities than 'changes of use' ( $r = 0.4$  and  $r = 0.27$  respectively). A negative correlation is recorded in relation to change of use at Portobello Road, while a strong positive correlation is noted here in relation to street performances. Camden High Street has a strong correlation with performances and engaged static activity distribution ( $r = 0.93$ ,  $r^2 = 0.86$ ), however, no data is available for Petticoat Lane.

So far, this section has recognised that aesthetic and physical attributes both play significant roles in the distribution of engaged activities. Although functional customisation is weak, its correlation with static activities is strongly associated with performances and possession/occupation. Specifically, the most influential customised Mark II sub-components are:

- Street art – quality. Where higher customisation scores are allocated to increasingly informal properties.
- Colour

- Wayfinding/Signage
- Street Interruptions
- Possession
- Performances

The correlations between engaged static activities and customised environments provides early proof that informality in urban environments is linked to increases in interaction/interfacing among urban space users. However, literature suggests that certain types of customisations are potentially connected to specific behaviour types. An example is the assumption that street/space users are more likely to 'stand and watch' an impromptu performance, yet, there is relatively little quantifiable proof of such clear connections. The high-resolution static activities data collected as part of this research will be used to provide an early statistical insight into possible connections between specific static activity types and streetscape features that have been customised in specific ways. The hypothetical expectation being that increases in the presence of certain customisations will result in increases in certain forms of static activities.

Calculating the mean customisation scores of each of the influential Mark II components reveals the activity of sitting to eat is most affected by the presence of customisation ( $r = 0.8$ ;  $r^2 = 0.64$ ); where customisation scores increase, people are most comfortable to eat followed by 'sitting to enjoy life' ( $r = 0.5$ ,  $r^2 = 0.25$ ) and 'sitting to read' ( $r = 0.559$ ,  $r^2 = 0.312$ ). A weaker-yet-positive correlations with Sitting to have a break ( $r = 0.364$ ,  $r^2 = 0.133$ ). Therefore, it can be concluded that regions that have been customised in terms of the informality of street art, colour, signs, street interruptions, possession and performances are most likely encouraging sitting activities. However, there is a need for a specific study on the conditions related to 'sitting to supervise', regardless of it being a categorically disengaged static activity.

When explored in isolation, increased colour variance correlates positively with each activity, with the exception of sitting to supervise and standing to quench thirst where 0 to 1 observation is made. The strongest correlations are related to the activities of

'sitting to read' ( $r = 0.67$ ), 'standing to look at an activity' ( $r = 0.642$ ), and 'standing to do something' ( $r = 0.613$ ).

Increased informality in the quality of public art is connected to increases in static activities, although these are weaker correlations than those observed with public art, street interruptions, wayfinding and signage, and possession. Exceptionally strong positive correlations are connected to the activities of 'standing to trade' ( $r = 0.709$ ), 'Standing to look at something' ( $r = 0.701$ ), 'Sitting to enjoy life' ( $r = 0.625$ ). An outcome of this result is that market places can become synonymous with liveliness if they incorporate increasingly informal forms of public art, where people are more likely to stop and admire the quality of an environment – an environment that they are more likely to settle in for the sake of the surroundings. This finding directly challenges the concept of a theoretical threshold associated with visual over complexity, although the data has only been subject to linear regression modelling, and not loess curve modelling that might show such a threshold if apparent.

Street interruption increases correlate positively with an increase in all forms of recorded static activities apart from 'standing to eat'. The strongest correlation is associated with 'sitting to eat' ( $r = 0.614$ ). This followed by 'standing to look at something' ( $r = 0.604$ ) and standing to do something ( $r = 0.58$ ). The activity of standing to trade, that relates directly to the informal placement of market stalls has an  $r$ -value of 0.55. The result for 'sitting to eat' is connected to the placement of street furniture – moveable chairs. This finding confirms Whyte's assertion that the moveable chair is an urban space's 'greatest invention', where it will seem that people are more likely to sit down on more flexible forms of seating. Standing to look at something is connected to the aspect of street interruptions being connected to increased visual complexity and a break in the rhythm of a streetscape. However, the connection of it being popular with people standing to do something is less clear – the high correlation is possibly connected to an increased probability of this activity with higher concentrations of pedestrians attracted to the street interruptions in the first place.

Wayfinding/Signage display some of the strongest correlations in the collected data, where all activities correlated with increasingly informality in the design and placement of these features. 'Sitting to have a break' correlates strongest with this form of customisation ( $r = 0.885$ ) followed by 'sitting to enjoy life' ( $r = 0.822$ ), 'sitting to eat' ( $r = 0.774$ ). This result suggest people generally able to settle in close proximity to features that exhibit increased informality that can be associated with their display of a familiar culture or embodiment of a cultural vernacular. High correlations ( $r > 0.6$ ) are also noted with:

- Standing to do something
- Standing to enjoy life
- Standing to trade
- Sitting to read
- Standing to greet and talk

Activities in connection with Performances display overall weak correlations (Figure 65 and Figure 66). This can be attributed to there not being many performances during the survey periods; it can also be attributed to the case studies being streetscapes, specifically designed for through-traffic and not stasis. However moderate positive correlations are associated with 'sitting to have a break' ( $r = 0.364$ ), 'standing to do something' ( $r = 0.407$ ) – not an engaged activity, 'standing to look at something' ( $r = 0.42$ ). An increase in performances is definitely connected to people stopping to look at something which, according to Shaftoe (2008), is connected to increased use of local food vendors (also see Whyte 1980).

Possession/Occupation scores increase as informality becomes more prominent in a heatmap quadrant. Positive correlations are found in relation to most of the activities apart from 'sitting to read' ( $r = -0.043$ ). The strongest positive correlations are connected with 'sitting to eat' ( $r = 0.845$ ), 'standing to look at something' ( $r = 0.82$ ), and 'standing to do something'. High correlations ( $r > 0.6$ ) are also observed in connection with:

- Sitting to enjoy life
- Standing to enjoy life
- Standing to greet/talk

- Standing to trade

Indicatively speaking, possession/Occupation, where people are allowed to dominate an urban space, is connected to increased conviviality, and positive perceptions of an urban setting.



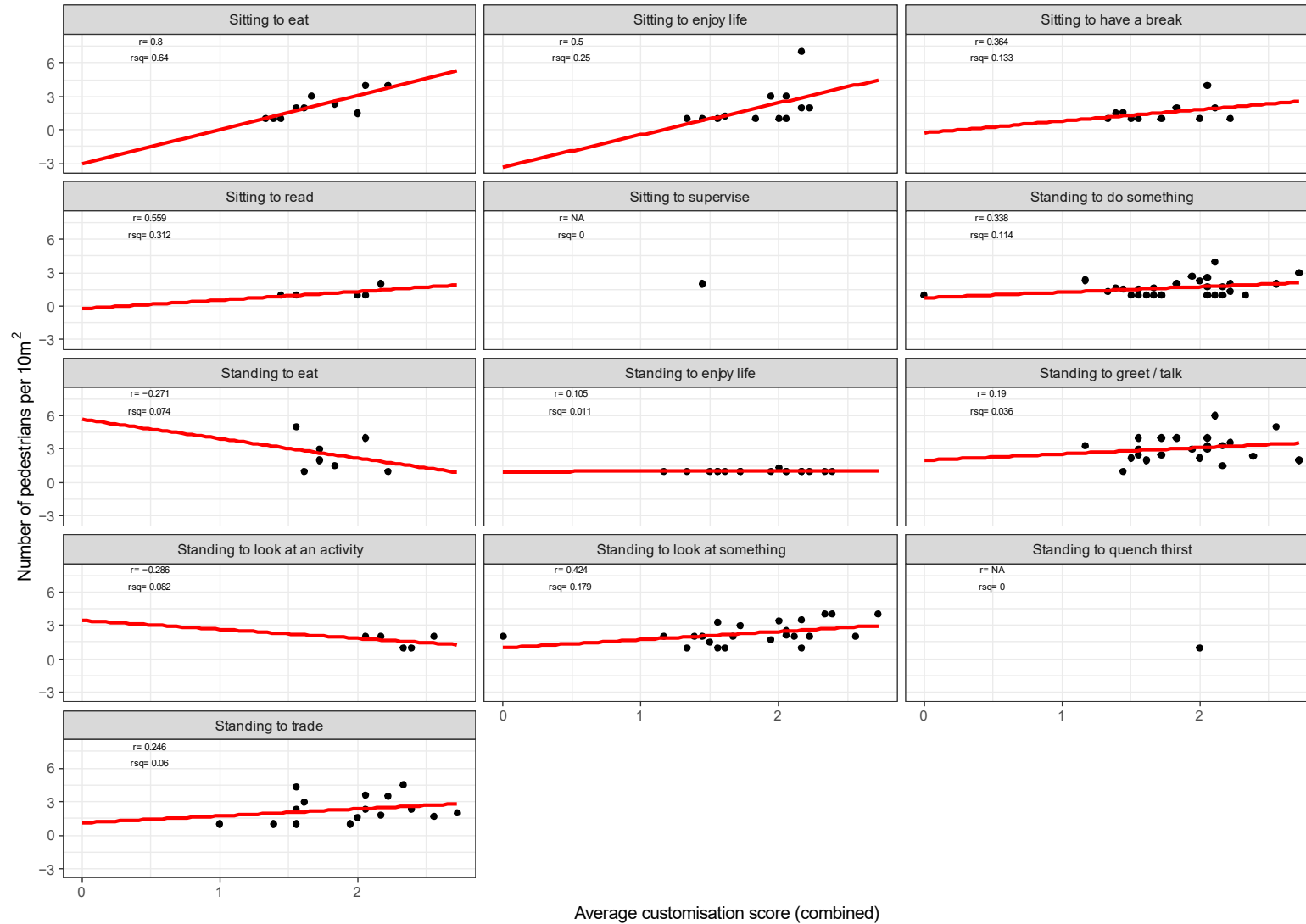


Figure 65. Static activities (average numbers of pedestrians per 10m<sup>2</sup>) vs averaged influential customisation scores.

Activity	Aesthetic				Physical				Functional				All	
	Colour		Public Art - Quality		Street Interruptions		Wayfinding/Signage		Performances		Possession/Occupation		r-value	r <sup>2</sup> -value
	r-value	r <sup>2</sup> -value	r-value	r <sup>2</sup> -value	r-value	r <sup>2</sup> -value	r-value	r <sup>2</sup> -value	r-value	r <sup>2</sup> -value	r-value	r <sup>2</sup> -value		
Sitting to eat	0.141	0.019881	0.305	0.093025	0.614	0.376996	0.774	0.599076	0	0	0.204	0.041616	0.8	0.64
Sitting to enjoy life	0.24	0.0576	0.625	0.390625	0.119	0.014161	0.822	0.675684	0.081	0.006561	0.601	0.361201	0.5	0.25
Sitting to have a break	0.326	0.106276	0.017	0.000289	0.227	0.051529	0.885	0.783225	0.384	0.147456	0.59	0.3481	0.364	0.132496
Sitting to read	0.67	0.4489	0.42	0.1764	0.501	0.251001	0.67	0.4489	0	0	-0.043	0.001849	0.559	0.312481
Sitting to supervise	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standing to do something	0.613	0.375769	0.607	0.368449	0.58	0.3364	0.769	0.591361	0.407	0.165649	0.762	0.580644	0.388	0.150544
Standing to eat	0.433	0.187489	0.537	0.288369	0	0	0.218	0.047524	0	0	0.845	0.714025	-0.271	0.073441
Standing to enjoy life	0.322	0.103684	0.365	0.133225	0.144	0.020736	0.741	0.549081	0.065	0.004225	0.742	0.550564	0.105	0.011025
Standing to greet/talk	0.348	0.121104	0.594	0.352836	0.314	0.098596	0.689	0.474721	0.161	0.025921	0.712	0.506944	0.19	0.0361
Standing to look at an activity	0.642	0.412164	0.064	0.004096	0.286	0.081796	0.216	0.046656	0	0	0.211	0.044521	-0.286	0.081796
Standing to look at something	0.537	0.288369	0.701	0.491401	0.604	0.364816	0.755	0.570025	0.42	0.1764	0.82	0.6724	0.424	0.179776
Standing to quench thirst	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Standing to trade	0.388	0.150544	0.709	0.502681	0.55	0.3025	0.743	0.552049	0.082	0.006724	0.73	0.5329	0.246	0.060516

Figure 66. Static activities associated with recognised customisation influencers across all case studies

### **6.3 Chapter Summary**

There is an overall weak correlation with increased customisation and the presence of static pedestrian activities with an  $r$  coefficient value of approximately 0.16. When the scoring range of customisation is split into the bands of 1-3 and 3-5, a positive correlation is noted with scores ranging between 1 and 3, but not with scores ranging between 3-5, which exhibit a negative correlation (Figure 67). This pattern alludes to the theoretical threshold which is based on eventual aversions to perceptual over complexity. However, further analysis of the data composites provides insights into the most influential forms of customisation. A challenge to the theoretical threshold is noted with positive linear correlations between increased customisation scores and most of the observed activities in connection to colour, public art, street interruptions, and wayfinding/signage. In these areas, strong correlations are noted with specific static activities. For example, increases in colour variance results in increases in people 'standing to look at an activity', 'sitting to read', 'standing to look at something' or 'standing to do something'.

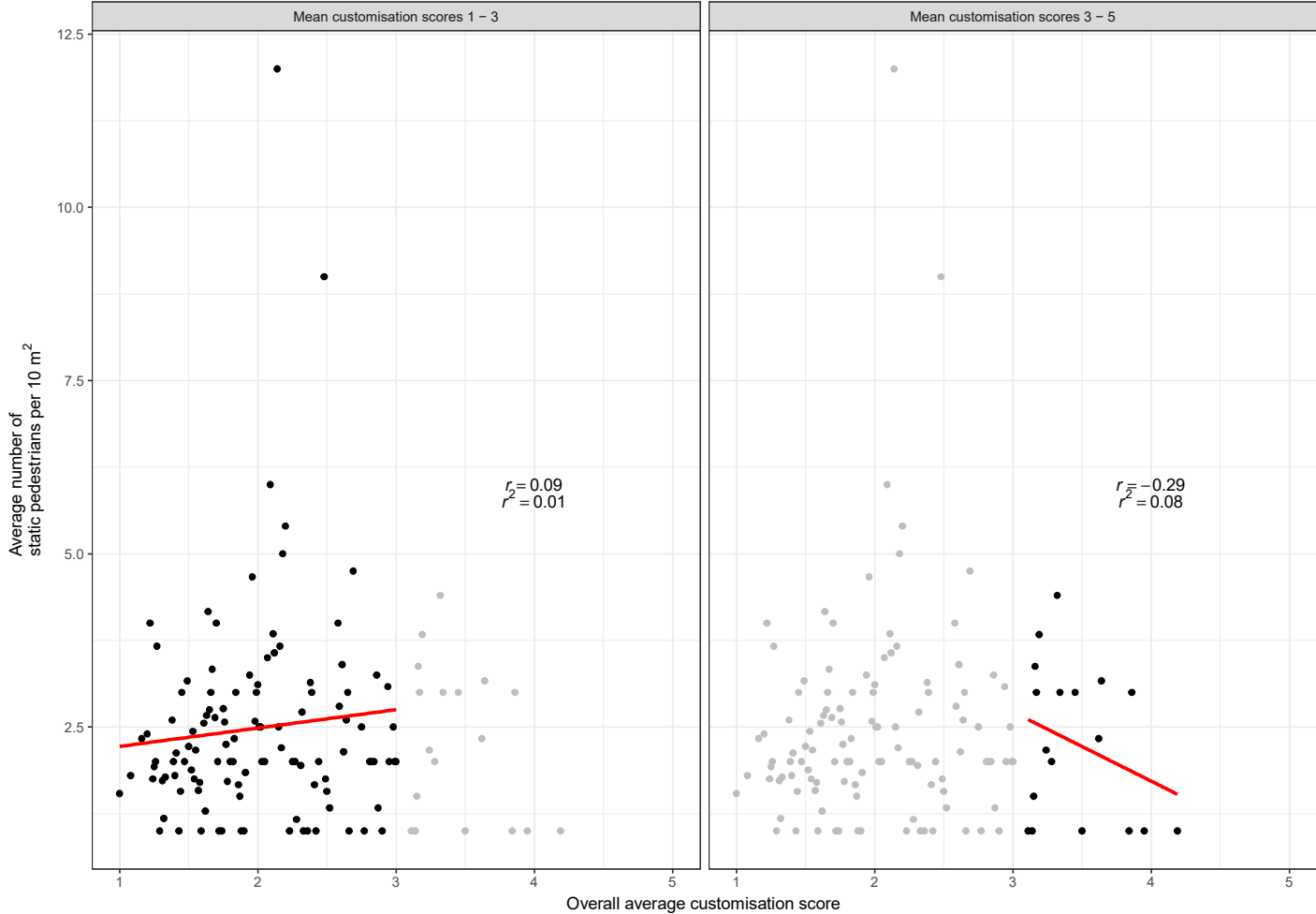


Figure 67. The theoretical threshold apparent in static activity observations (black dots). The red line illustrates the direction of the correlations at specific mean customisation score bands (1 – 3, -1 – 5). In a score band facet, the data from the neighbouring score band are presented by grey points. Note: the bulk and high pedestrian densities are recorded in regions with midway scores.

Customisations vary across the three case studies which exhibit different design compositions. For Camden High Street and Petticoat Lane, aesthetic customisations were most prevalent in the regions where static pedestrians were observed, while physical customisations were most prevalent at Portobello Road. Functional customisations correlate positively at Portobello Road and Petticoat Lane but are not the most dominant forms of customisation. From the initial analysis, this research identifies the most influential implementations of customisation in streetscape settings based on whether their increased presence resulted in an increase in static activities. Based on low-resolution data covering engaged and disengaged pedestrian activities, these attributes are determined as:

- Colour
- Public Art (quantity)
- Street interruptions
- Wayfinding and Signage
- Performances
- Occupation/Possession

Studied against high resolution engaged activities, clear positive correlations are observed across all three sites. Specifically, correlations between increased informal wayfinding/signage and possession/occupation play down the significance of visual complexity and the theoretical threshold at least in terms of the findings from the observation studies. This is further emphasised by high correlations between pedestrians 'stopping to look at something' – take a picture – and public art, street interruptions, wayfinding and signage, and possession.

Across all three sites, customisation score values in high-resolution polygons do not exceed 3. This finding means that customised environments are generally not over complex in descriptive terms. However, the highest recorded customisation score is noted at Camden High Street (~4.1). The numbers of people engaged in static activities in proximity to Camden High Street falls between Portobello Road and Petticoat Lane with regards to static activity correlations associated with aesthetic and physical alterations. Portobello Road, with a modal customisation

score of ~2.9, exhibits the highest correlations in these categories, while Petticoat Lane is lowest (highest customisation score of approximately 2.7). These results are significant because they indicate that earlier recorded responses to over complexity are broadly connected to a theoretical threshold.

The data for each activity is highly dispersed as indicated by the subsequent r-square values. Highly dispersed data is common in social science research due to variability brought about by various externalities – other independent variables. In the case of this research spatial factors associated with negative correlations or high dispersion are covered in Chapter 7. However, it is apparent that acts of customisation do influence the occurrence of static activities in urban spaces.

## **7 Analysis II: External influences and static pedestrian activity distributions**

**What are the influencing factors, other than customisation, that determine the location of static pedestrian activities?**

**Hypothesis: Factors including land use, street configurations, streetscape features and the popularity of smart devices play powerful roles in the distribution of static pedestrian activities. However, customisation acts as a catalyst in all instances.**

In chapter 6, an overall weak-positive correlation between increased customisation and the occurrence of engaged static pedestrian activities is apparent. However, the low correlation coefficients and r values, in addition to the high dispersion of data, suggest that, short of the subjective individual decision to stop and engage in a particular activity, other external factors are playing a role in the distribution of engaged static pedestrian activities. Therefore, the low r-squared values can be attributed to randomness within the sample, and that pedestrians and their behaviours are unpredictable. However, the weak r-square value coupled with weak correlations warrant further investigation.

Within the context of regression analysis, a scatter plot can be partially interpreted with the trend line. The broad understanding is that points falling underneath the trend are 'explicable' – they agree with the hypothetical stance that increased customisation positively correlates with static pedestrian activities ( $x \sim y$ ); points above the trend are regarded as inexplicable and errant in terms of the hypothesis, where they are potentially explained through the analysis of external factors. The majority of observations appear over the trend line, suggesting that the majority of static activities are mostly attributed to something other than how customised an urban space is.

Section 1.1 of the literature review broadly discusses the conditions associated with liveliness in urban spaces. It highlights previous studies that align mixed-uses, social media, and spatial configurations to varying degrees of liveliness

within urban spaces. However, these studies typically are discussed in isolation or in stark comparison. This research suggests that, while the findings of these previous studies are true, their effectiveness is further catalysed by the presence of customisation.

This chapter explores several environmental factors that potentially contribute to the occurrence of static activities. Following the discussion of the literature review, the analysis here covers:

- The roles of streetscape features – the impact on the configuration and distribution of street furniture and obstacles on the distribution of static pedestrian activities.
- The influence of specific land uses on static pedestrian activities
- The influence of 4G network accessibility in static pedestrian activities

Within this chapter, the analysis looks at both engaged and disengaged activities and examines the listed factors from both in and out of a customisation context.

### **7.1 The roles of streetscape features on pedestrian distributions**

Streetscape design features discussed in a study by Ewing et al (2015) were explored within the context of how they related to specific pedestrian activities. The premise was based primarily on previous research inferring that more street furniture results in an increased presence of static activities (see Whyte, 1980, p. 18; Gehl, 2013, pp. 134 – 147). However, such research does not consider the occurrence of customisations as being a potential catalyst in increased occurrences of static activities and street furniture use – a revised premise. For this research, ‘catalyst(s)’ refers to acts of customisation, with an understanding that the most ‘influential’ forms are summarised in section 6.3.

The broad assertion of Ewing et al, is that specific streetscape characteristics are synonymous with static activities. If a particular activity correlates positively with Transport for London (TfL) street furniture but negatively with customisation, then Ewing’s hypothetical assertion is considered the main determinant in the distribution of pedestrians engaged in that activity. However, if a particular activity



correlates positively with customisation but negatively with TfL street furniture, then customisation is considered the more significant influence in the distribution of that activity.

This section will ascertain pedestrian responses to streetscape features against responses to customisation, to test whether an understanding of the occurrence of static activities can be enhanced, and also provide a novel glimpse into the specificities of activities that can contribute to the creation of meaningful urban spaces.

An earlier study by TfL is published in the guidance document, *Pedestrian Comfort Guidance for London* (Finch et al, 2010). Within, the question is asked, “What type of street furniture generates static pedestrian activity?” (Finch et al, 2010, p. 25). In answering, street furniture types are identified as follows:

- Presence of guard rails. Pedestrians are noted to lean against these during pauses in their journeys.
- Map based wayfinding signs. Pedestrian briefly stop at these to plan or check their journey.
- Market vendors. These are useful for encouraging static activities.
- Café seating
- Planned seating (benches, ledges)
- Bus stands/shelters
- ATMs

To determine the impact of these features, the same heat map matrices employed to capture the extent to which an environment has been customised are employed to model the occurrence of these features. The quadrants that intersect these features are extracted from the main heat map and matched to recorded high-resolution static activities. Metadata within the heatmap relating to the influential customisation manifestations are selected, and a mean average customisation score is calculated for each activity (row). To minimise duplications for average customisation scores (x-axis), each activity is summarised based on their frequency. The y-axis is average count of pedestrian activities over the survey duration.

Like Ewing (2015), the Transport for London hypothesis is that an increased presence of identified street furniture installations inevitably leads to an increased presence of static activities. The Transport for London survey suggests that the correlation between static activities and street furniture obstacles is likely to have a notably close fit.

The observations of high-resolution static activities at the site challenge this conclusion when compared to increases in customisation. In each case, the transport for London hypothesis is reversed when their identified street furniture types are analysed as a group. The density plots indicate that observations carried out during this research were more likely to fall in regions without the identified Transport for London catalysts for static pedestrian behaviours.

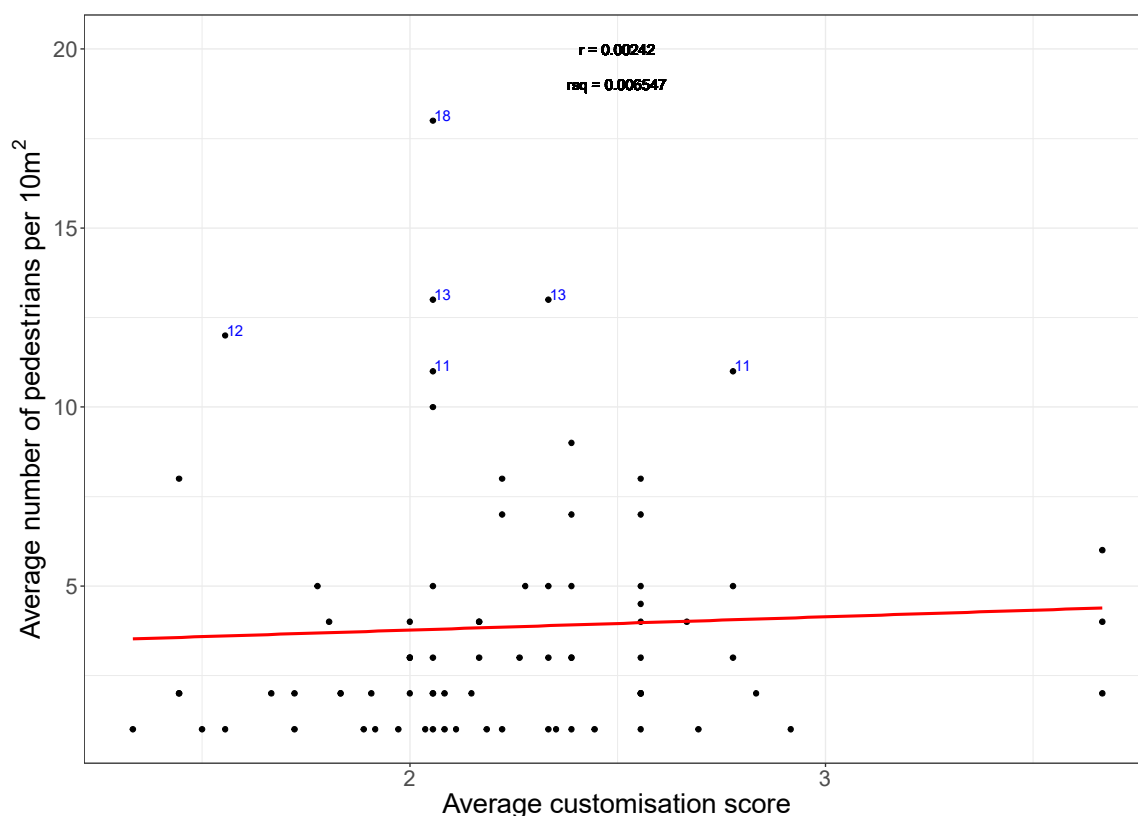


Figure 68. The distribution of average static activities counts per 10m<sup>2</sup> in quadrants intersected by TfL defined street furniture

The catalytic effect of customised environments is apparent in static activities occurring within 10m<sup>2</sup> quadrants that contain a TfL feature. Across all three case studies, 391 high-resolution static activities are recorded. When the counts of activities are averaged over the fieldwork duration and regressed against the quadrant customisation scores, averaged from their most influential

customisation forms derived in section 6.3, a weak positive correlation is observed (see Figure 68). While this correlation proves that these forms of customisation are important components in the subsequent use of TfL features, the correlation comprises of highly dispersed points ( $r = 0.00242$ ,  $r^2 = 0.00655$ ). This result indicates that there are forms of customisation that both correlate positively or negatively with the TfL parameters. Identifying the forms of customisation that do result in an increase in static activities within these parameters sheds further light on the study by Ewing et al and also provides further insights on the determinants of predictable responses in streetscapes and/or public spaces.

Exploring the overall trend by category reveals the presence of customisations as a significant catalyst for the activity of standing to look at something, where the higher densities of this static activity are observed in quadrants with higher customisation scores ( $r = 0.433$ ,  $r^2 = 0.188$ , see Figure 69). Similarly, positive correlations are noted with the activity of 'standing to do something' ( $r = 0.338$ ,  $r^2 = 0.114$ ), and 'standing to look at an activity' ( $r = 0.327$ ,  $r^2 = 0.107$ ), based on 3 averaged static densities). While weaker positive correlations are recorded with the activities of 'sitting to eat' and 'sitting to enjoy life', negative correlations are associated with the following activities:

- Sitting to have a break ( $r = -0.768$ ,  $r^2 = 0.618$ ). People recorded doing this activity are far less concerned with the aesthetic, physical, and functional aspects of an environment than the practicality of the seating provided.
- Standing to greet/talk ( $r = -0.129$ ,  $r^2 = 0.017$ ). People are either interacting with other people or are using their phones. Therefore, they are less attuned of the quality of their surroundings.
- Standing to trade ( $r = -0.017$ ,  $r^2 = 0.003$ ). For example, when a stall or booth is set up in an environment, people are likely to stop and see what is on offer. Also, if that stall is a food vendor's, people will be responding to olfactory as well as visual cues (Whyte, 1980; Carmona et al, 2010)
- Standing to enjoy life ( $r = -0.026$ ,  $r^2 = 0.001$ ). This result is a surprise as this activity is categorically an engaged activity. However, studies have shown that people prefer the refuge of edges and objects to lean on (Whyte, 2008; Gehl, 2007; Stevens, 2007). For example, the practicality of

a guardrail – located at the edge of a space – provides a good vantage point to enjoy life.

Correlations are not apparent for the remaining activities of ‘sitting to supervise’ and ‘sitting to read’ leading to inconclusive results.

Table 17. Activity regression values between customisation and static activities in regions intersecting TfL’s indexed street furniture.

High-resolution activity	Correlation Coefficient (r-values)		
	Camden High Street	Petticoat Lane	Portobello Road
Sitting to eat	0.854	0	0.694
Sitting to enjoy life		0	-0.753
Sitting to have a break	-0.924	0	-1
Sitting to read			0
Sitting to supervise	0		
Standing to do something	0.98	-0.088	1
Standing to enjoy life	1	-1	-0.179
Standing to greet / talk	-0.35	-0.655	0.472
Standing to look at an activity	0.327		
Standing to look at something	0.376	0.923	0.403
Standing to trade	-0.075	0.225	-0.788

Despite these findings, exceptions are noted when activity correlations are split by case study (Table 17). Notable observations in broad terms are:

- Standing to enjoy life. While this activity is more likely to be determined by the presence of TfL features at Petticoat Lane and Portobello Road, a positive correlation is noted at Camden High Street
- While ‘standing to greet/talk’ correlates negatively at Camden High Street and Petticoat Lane, it is positive at Portobello Road – people are more likely to stand engage in conversation in the customised parts of this site.
- ‘Standing to do something’. A negative correlation is associated with observations made at Petticoat Lane.
- ‘Standing to trade’ correlates positively at Petticoat Lane. More people are likely to trade in regions with a higher presence of customisation.
- In the activity of ‘standing to look at something’, positive correlations are noted at each site. This finding provides evidence of customisation’s role as a catalyst to the increased use of street furniture in public spaces.

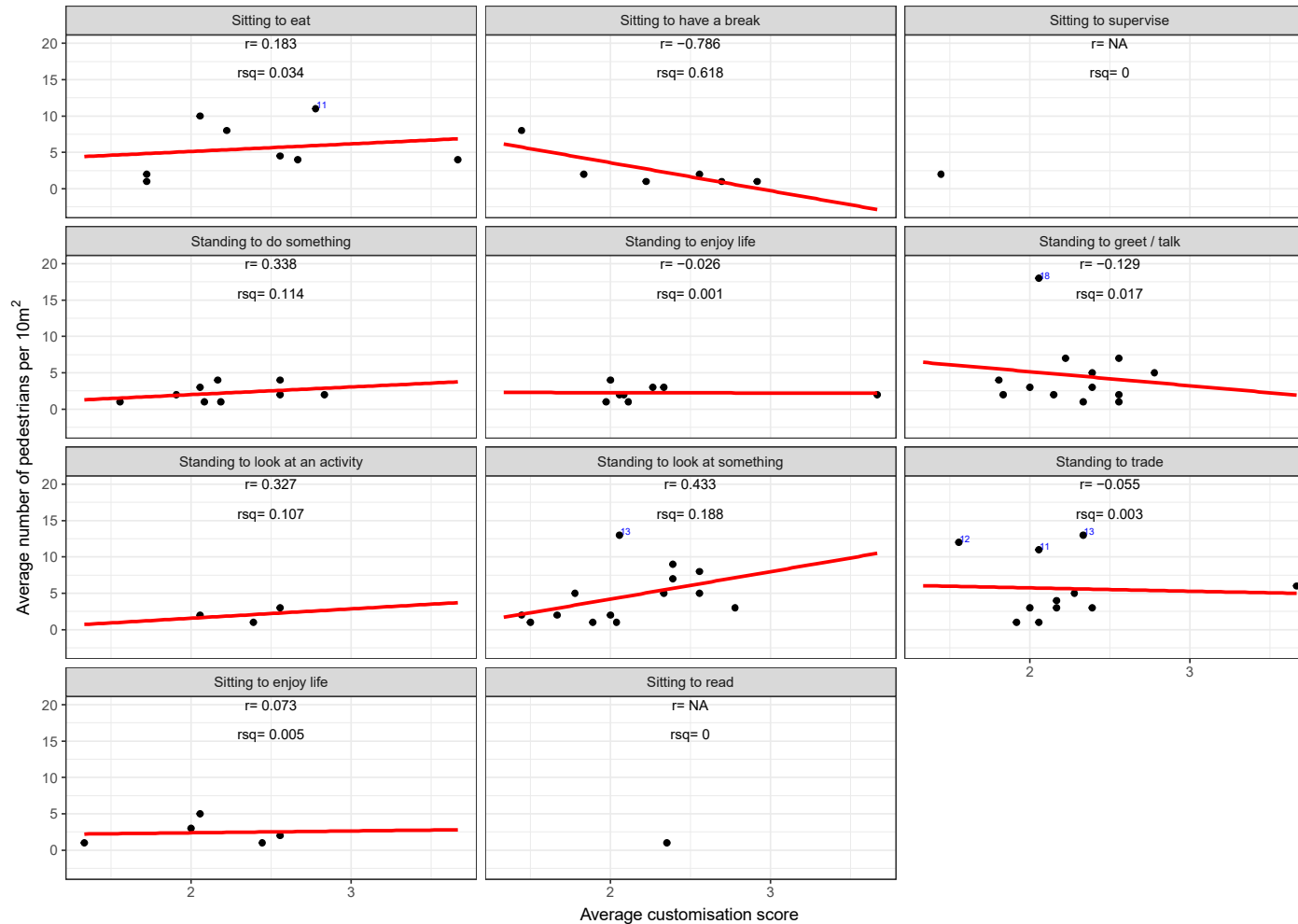


Figure 69. Distributions of high resolution static activity average densities, as they occur in quadrants intersected by TfL street furniture attributes, against customisation. Outliers are densities > 10 (numbered with blue text within the plots).

This assertion by Ewing et al is challenged by the influence of customisation and its role as a catalyst in the creation of lively streetscapes and urban spaces.

Inconclusive data is recorded in relation the activities of 'standing to quench thirst' and 'sitting to enjoy the sunshine'. Along with 'sitting to read' and 'sitting to supervise' shows no correlations with TfL street furniture and customisation at the case studies.

This section identifies the impact of particular types of street furniture on the distribution of particular pedestrian activities. It finds that particular activities that do not explicitly interact with the built environment are more likely to be influenced purely by street furniture than customisation. However, for the majority of recorded activities, evidence of customisation can be considered a catalyst in the occurrence of particular activity types.

The forms of customisation explored were determined as the most influential in the distribution of static activities (Chapter 6). Therefore, the expectation that customisation would correlate positively with static activities despite other streetscape characteristics is unfounded in relation to trading, talking, and people described as 'standing to enjoy life'. However, the distribution of activities is not constant across the case study sites for these activities. These exceptions will be covered in the subsequent chapters of this thesis in to see whether the distributions of static activities are more likely attributed to land uses, 4G network connectivity, and subjectivity than to customisation itself.

### **7.2 The impact of land uses on pedestrian activities vs. customisation**

Writing in 2010, Jan Gehl suggests that cafés play significant roles in encouraging static activities, specifically 'staying' activities (see section 1.1, Gehl, 2010). Like libraries, parks, and shops, cafés are places where people socially interact (Kelly et al, 2012); additionally, cafés typically provide seating that facilitate social encounters, staying activities, and embody 'café culture' (ibid.; Gehl, 2010; Carmona, 2014). Therefore, it is possible that staying activities can relate more strongly to static activities than customisation either at individual case studies or combined. Similarly, studies have demonstrated that restaurants are

also associated with the production of attractive public spaces in ways that also promote the occurrence of particular static activities (Stadler, 2013; Ferguson and Ferguson, 2016).

Consequently, a need arises to consider whether land uses play a more significant role than customisation in the distribution, density, and frequency of static activities. Naturally, the opposite could be true. This section comparatively tests the influence of customisation alongside land uses on recorded static pedestrian activities, towards determining whether one is more likely to influence an activity over the other. The exploration highlights the role of *proximity* and discusses the nature of activities that occur close to specific land uses. To expand on previous research, the exploration of land uses goes beyond restaurants and cafés to include:

- Retail / shops
- Takeaways
- Offices
- Storage facilities
- Services
- Leisure facilities
- Institutions
- Residential

Ground floor land uses are aligned to building units, as recognised by the Ordnance Survey at a scale of 1:1250. Land uses are categorised using the same classifications presented in the Town and Country Planning (Use Classes) Order 1987 (Planning Portal, 2018; see Appendix IV). Classifications are determined through a combination of desktop studies using Google Street View, Google Earth, and web directory searches for addresses falling within case study boundaries.

Land uses are recorded electronically into an ESRI shapefile from which static activities falling within two metres of the shapefile are analysed. With an understanding that land uses are actors in a public performance (Stevens, 2007), proxemics determines close-phase social distances as ranging between ~2 to

~3.5 metres (Altman and Wohlwill, 2012). Therefore, static pedestrian activities falling within 3 metres are considered to be under the influence of particular land use(s). The two most popular land uses are studied in relation to the numbers of pedestrians within the metre catchment in contrast to present customisation scores assigned by the overlaid 10 metre polygon matrix.

Figure 70 shows that A1 (shops) and A3 (restaurant) uses dominate the three case studies. Combined, they account for 72% of the recorded land uses at Camden High Street, 83.4% at Portobello Road, and 71.9% at Petticoat Lane. Given this dominance, where the majority of the land uses are mainly A1, there is an indication that the distribution of pedestrian activities is unlikely to be aligned solely to the presence of a particular land use. If true, the catalytic role of customisation is confirmed.

Visual analysis of the distribution of static pedestrian activities and A1 and A3 land uses show distinct distributions of static activities that appear to correspond with land uses that with higher respective customisation scores. Respective land use customisation scores are ascertained by averaging customisation scores from the heat map quadrants that intersect building. Furthermore, the native values of the quadrants are altered to only capture the most influential forms of customisation discussed in section 6.3.

From the initial analysis of static activity distributions in Chapter 6, it is apparent that activities are concentrated at specific parts of the streetscapes. Within the context of land uses, an immediate inference is that people are most likely to be stopped outside of shopfronts, where the nature of the shop and/or its presentation are potentially key to being able to stop pedestrian flows.



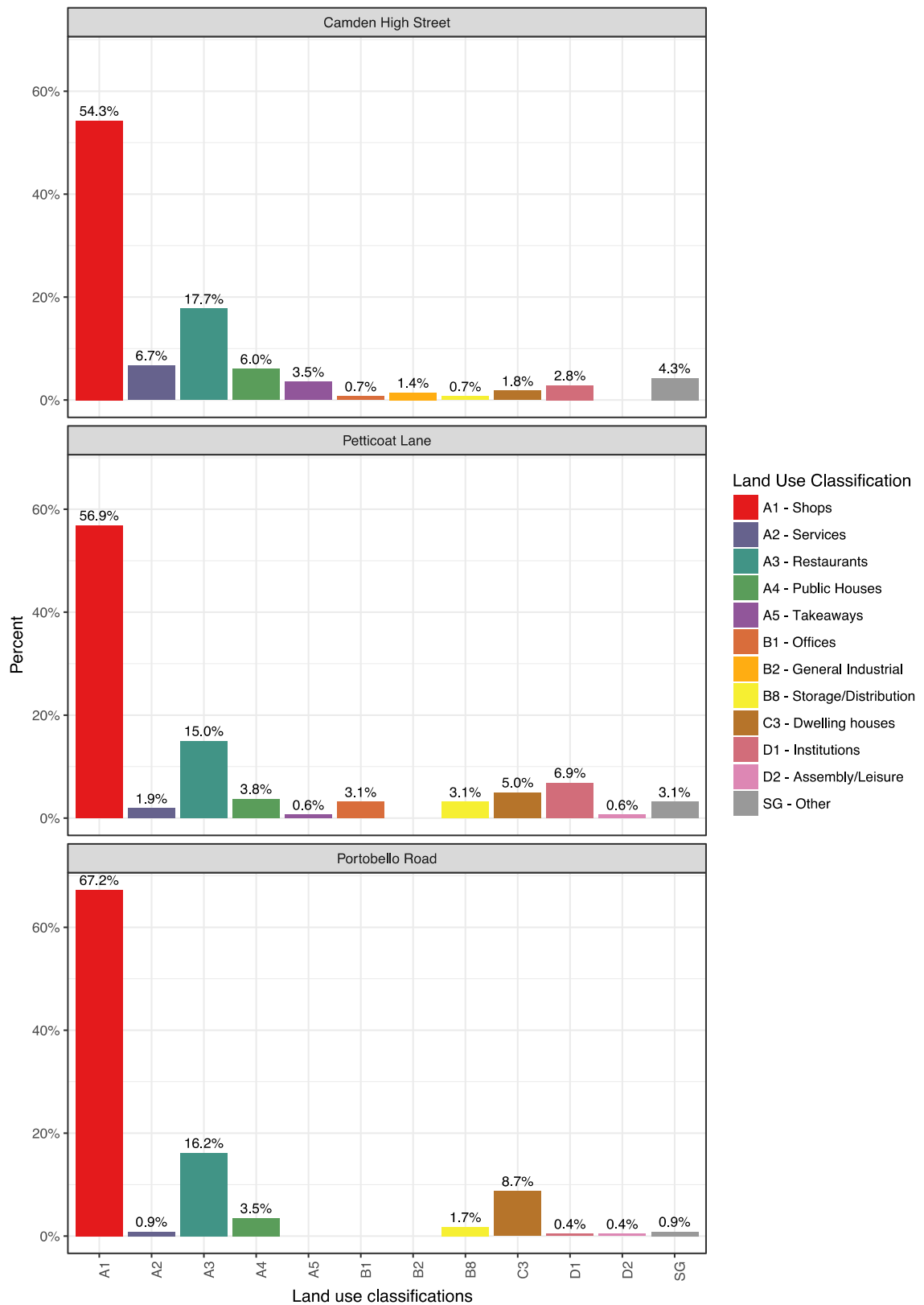


Figure 70. Composition of land uses at Camden High Street, Portobello Road, and Petticoat Lane. All are dominated by A1 and A3 uses.

Earlier literature review discussions suggest that the most effective shopfronts, the ones most likely to be popular, are those that reflect cultural vernacularisms (Nasser 2005). As such, shopfronts are theoretically customisable because the owners are able to alter the displays to appeal to the needs of the end user communities – transparent customisation (Pine and Gilmore, 1997). Although the objective of this research is to explore whether adaptively customised urban environments are more successful than those created by non-local/detached designer, transparent customisation is a considerable factor in the choice of colours and variety of a building’s façade design. Therefore, customisation scores take into consideration effective modifications by property owners.

Visual analysis of the distribution of static pedestrian activities and A1 and A3 land uses show distinct distributions of static activities that appear to correspond with land uses that have higher respective customisation scores (see Figure 71, Figure 72, and Figure 73). Respective land use customisation scores are ascertained by averaging customisation scores from the heat map quadrants that intersect building. Furthermore, the native values of the quadrants are altered to only capture the most influential forms of customisation discussed in section 6.3. There was a distinct lack of A3 land uses compared to A1, reducing the likelihood of restaurants being a key determinant in the distribution of static activities. However, concentrations of activities do appear to coincide with customised restaurants.

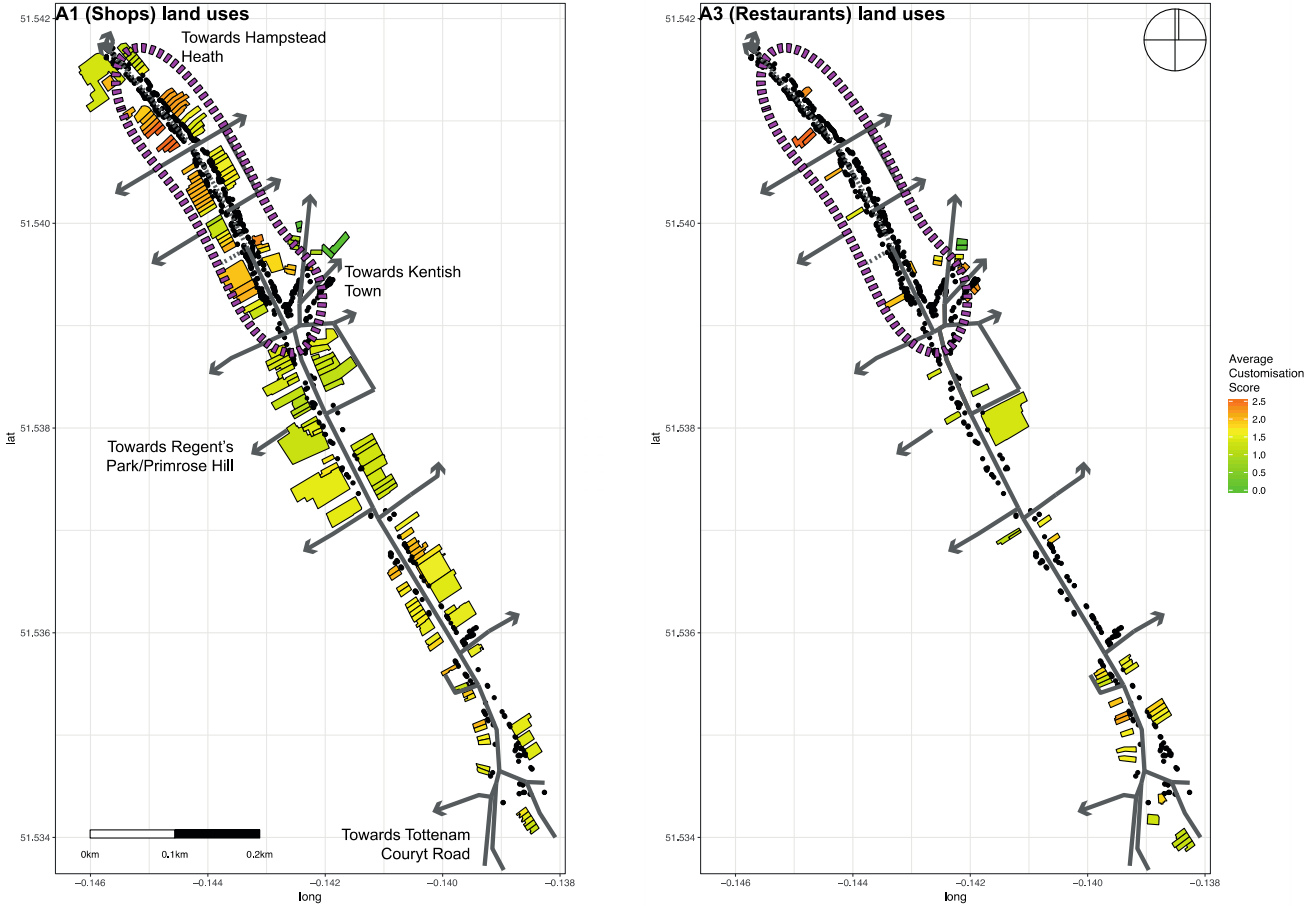


Figure 71. Respective land use customisation scores (average customisation score) by static activity distributions (magenta dashed lines). The extent of the daily market is represented by grey dashed lines; black dots are the actual locations of pedestrians. Camden High Street.

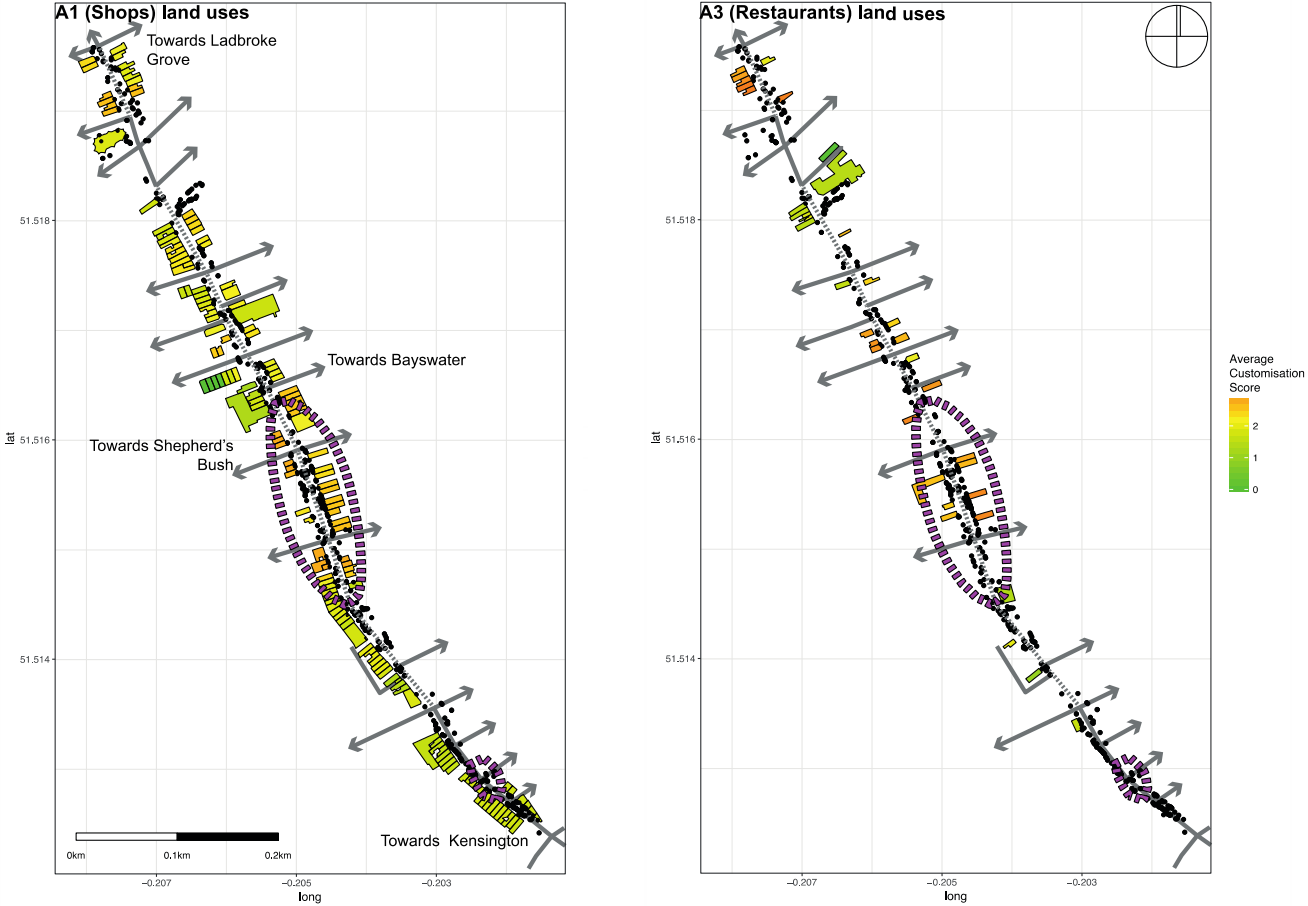


Figure 72. Respective land use customisation scores (average customisation score) by static activity distributions (magenta dashed lines). The extent of the daily market is represented by grey dashed lines; black dots are the actual locations of pedestrians. Portobello Road.

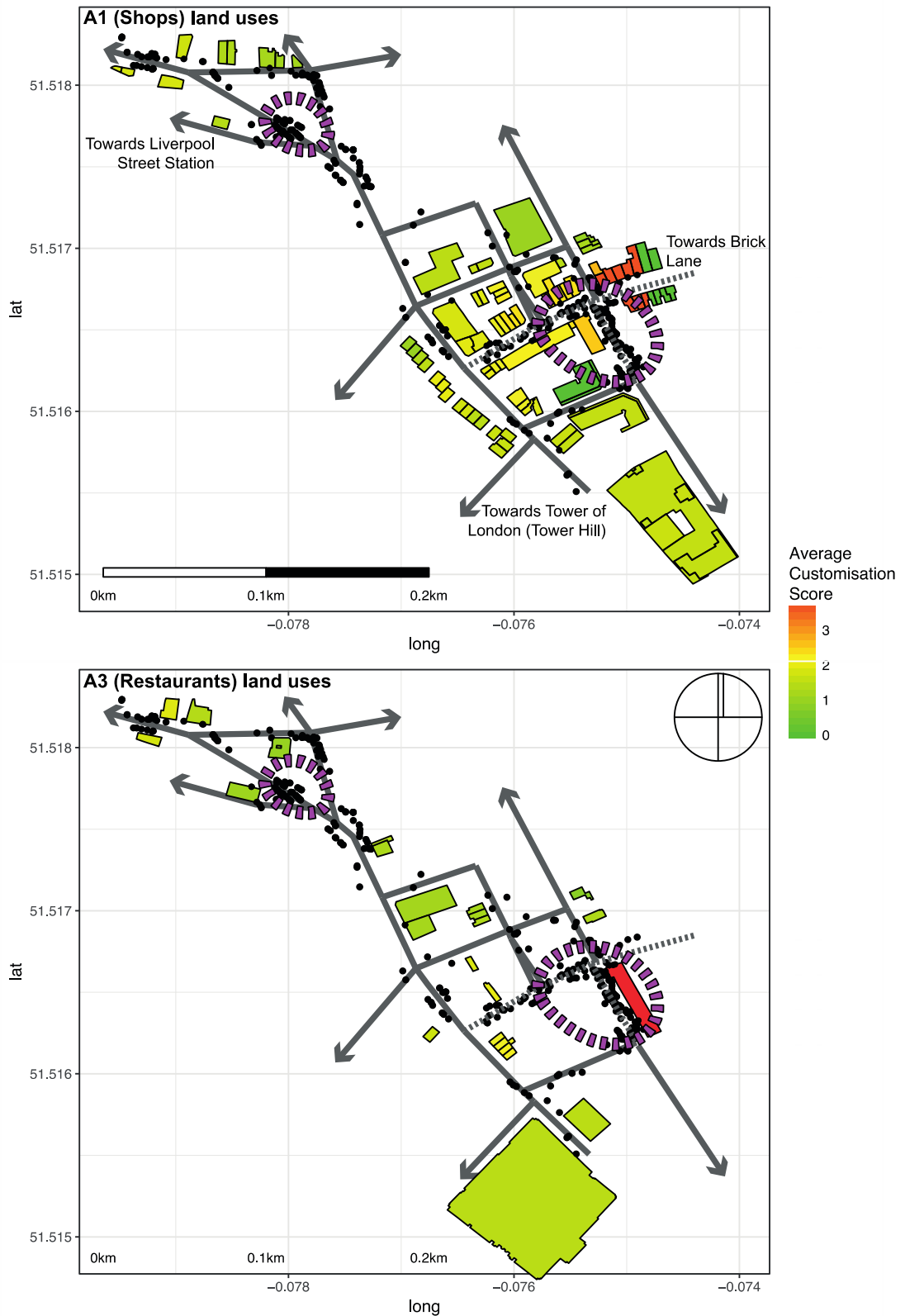


Figure 73. Respective land use customisation scores (average customisation score) by static activity (magenta dashed lines). The extent of the daily market is represented by grey dashed lines; black dots are the actual locations of pedestrians. Petticoat Lane.

Where perceived, the dashed grey lines seen in Figure 71, Figure 72, and Figure 73 represent the extents of street markets. Noted at each site is that the bulk of static activities occur in regions incorporating the market stalls. At Camden, the highest concentration of static pedestrian activities occurs in the regions including the entirety of the market. However, similar trends are not observed at Portobello Road and Camden High Street – highest concentrations of static activities are located in only parts of their respective markets; particularly notable at Portobello Road is the distribution of the most static activities in regions incorporating daily market stalls. At Petticoat Lane similar densities are recorded at both a market and non-market area. Therefore, it is apparent that land uses are not solely responsible for distribution patterns for static activities; however, this assumption is broad and not true for all static activities.

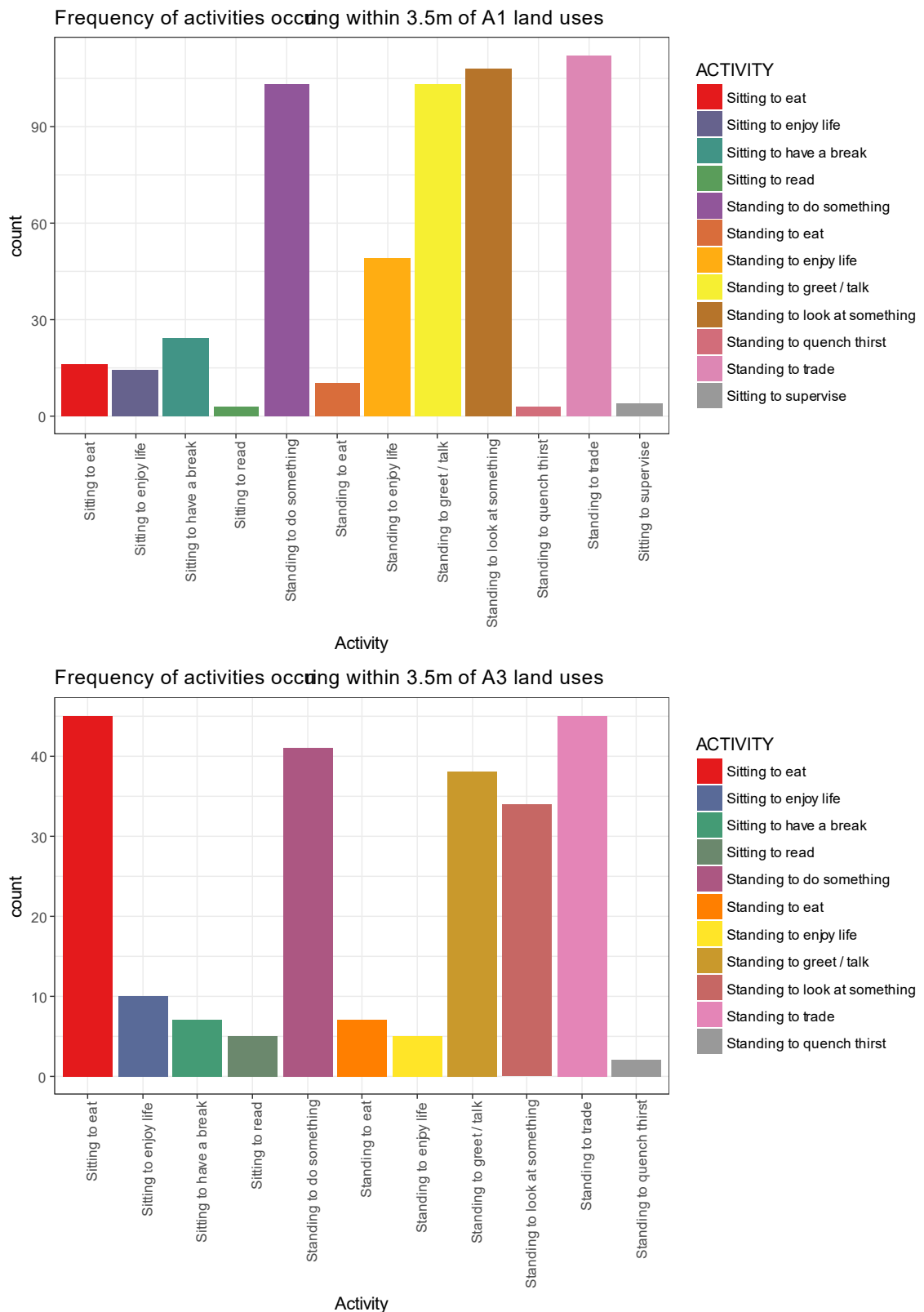


Figure 74. Distribution of static activities within 3.5 metres of A1 and A3 land uses (all case studies)

The distribution of activities varies according to the nature of a land use. For example, people are significantly more likely to trade outside of a shop than

outside for a restaurant, where people are more likely to sit and eat (see Figure 74).

When the proximity of average pedestrian densities (per 10m<sup>2</sup>) are correlated with relative average customisation scores, patterns emerge that further confirm the central role played by apparently customised land uses in the subsequent static activity distributions.

Figure 75 and Figure 76 shows correlations between the proximities of static activities to A1 and A3 land uses and relative average customisation respectively. Here, a positive correlation infers that customisation is more likely to influence the distribution of a specific activity rather than the proximity to a land use; a negative correlation translates to the increases in concentrations of static activities in close proximity to a land use being influenced by customisation.



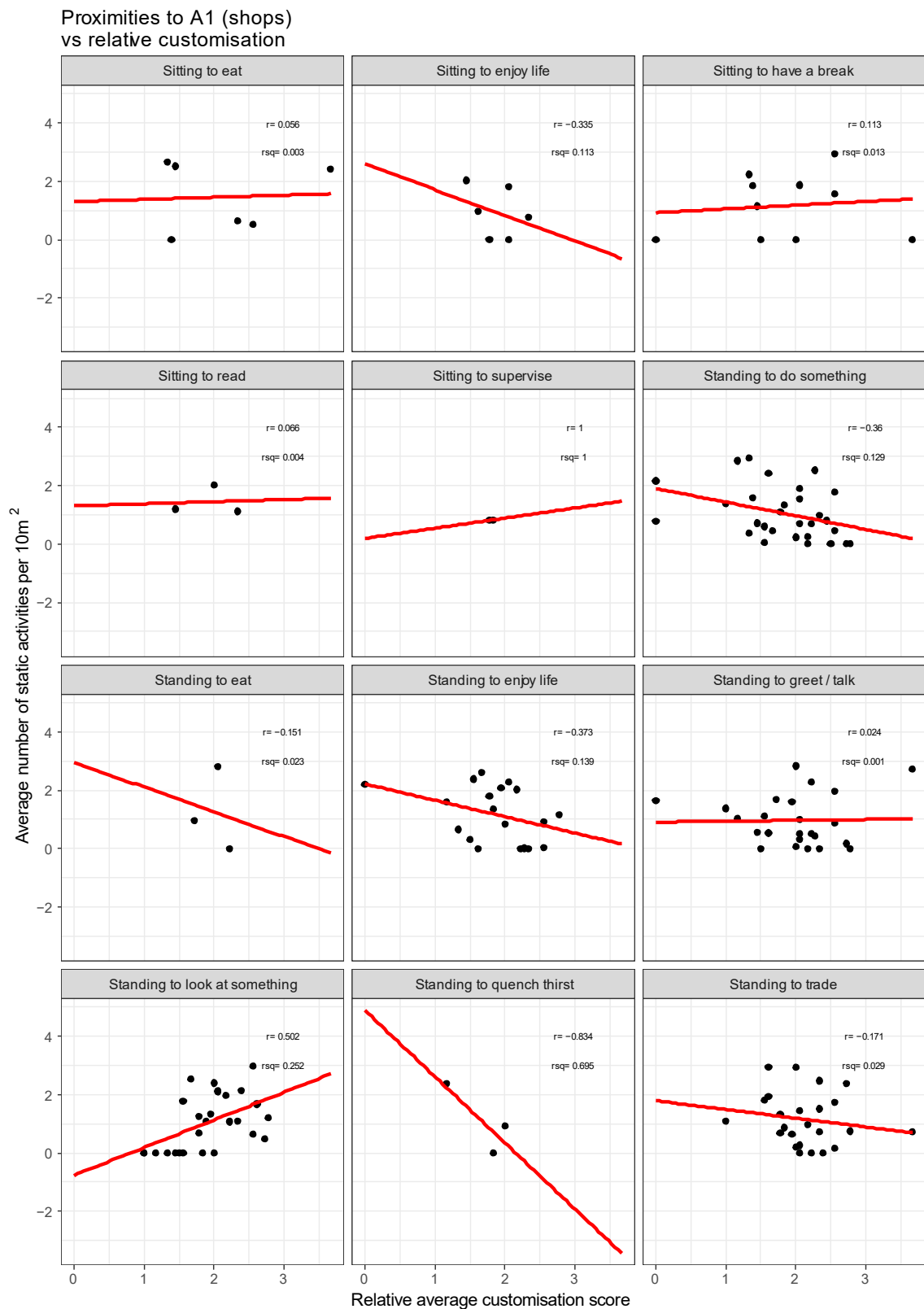


Figure 75. Proximity to A1 land uses versus customisation – aggregated data. x = proximity to A1, y = customisation score

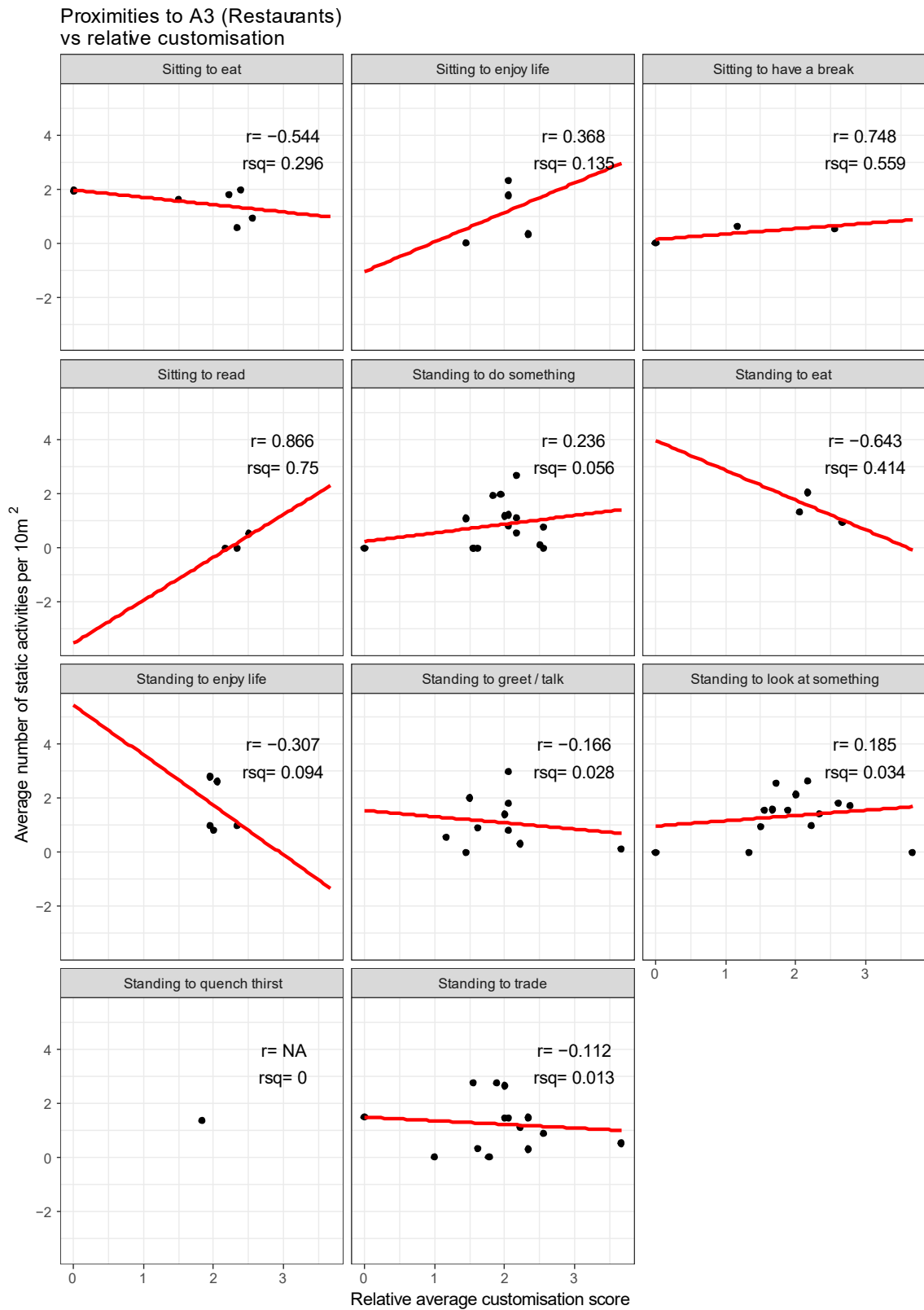


Figure 76. Proximity to A3 land uses versus customisation – aggregated data. x = proximity to A1, y = customisation score

Figure 75, shows that customised A1 uses are more likely to attract the following activities across the three case studies:

- Sitting to enjoy life
- Standing to eat
- Standing to enjoy life
- Standing to quench thirst
- Standing to trade

The remaining activities correlate positively. However, the weaker correlations (nearly neutral) may indicate that neither land use nor customisation were playing key roles in the distribution of static activities. With regards to A1 uses, these activities are:

- Sitting to eat
- Sitting to read
- Standing to greet/talk

Those that have an r-value of 0.1 or greater relate more to customised environments over the presence of a land use. For A1 land uses, these are:

- Sitting to have a break
- Sitting to supervise (not many observations of this activity)
- Standing to look at something.

For the proximity of static activities to A3 Land uses (see Figure 76), the following activities correlate negatively:

- Sitting to eat
- Standing to enjoy life
- Standing to eat
- Standing to trade
- Standing to greet/talk

With the exception of 'Sitting to enjoy life', each of these activities are directly related to restaurants and tell us that people are more likely to eat at a restaurant that exhibits evidence of having been customised – increasing design vernacularism, moderating visual complexity – reintroducing the 'human-scale'

into a building, making it more relatable. Similarly, the activities of standing to enjoy life and standing to greet/talk relates to an area's conviviality. Theoretically, restaurant owners who hope to have a busy-looking/popular establishment often implement customised features to help entice potential diners either through vibrant aesthetics, flexible seating arrangements or having a live performance.

For each activity, the clustering of observations occurs towards the mid-way customisation scores. The significance of this pattern is the probability that pedestrians are most likely to opt for moderately customised streetscape features. Seeking to find the best balance for customisation becomes the main challenge. Based on these findings, it can be suggested that close proximities to A1 shops and A3 shops are additionally related to urban environments that have been customised in the following ways:

- Colours are not monotonic. However, there are no more than 2 or 3 distinctions made between cyclical colour changes. This relates to theoretical discussions on over complexity, where these results contribute some evidence towards the substantiation of such theories.
- Public art is installed to specifically enhance the quality of the local community/quality of the streetscape. This is based on successful implementations elsewhere, where the process is comparable to 'cosmetic customisation'. The art doesn't specifically have to reflect a cultural vernacular as its objective is appeal to a variety of shoppers and diners. An example is the current use of pop art that is influenced by popular ideologies and cultures more generally in such a way that it relates to a broad spectrum of street users (non-niche).
- Street interruptions are limited to a single row of market stalls or another form of sub-hierarchal division of a high street. More than one interruption is likely to either increase the complexity of a site beyond the theoretical threshold for optimal visual complexities, or create a situation where pedestrians are more likely to be interested in the market stalls than their nearby land uses.

- One or two informal signs are present. Note that this is preferred over a lack of informal signs. People are more likely to use A1 or A3 sites that display mild expression of informality over the rigidity of a corporate image.
- Customers are more likely to use A3 (or A1) shops that feature a performance of some kind.
- Customers are more likely to gravitate towards A1 or A3 land uses that exhibit some evidence of general informality – a break from the norm, where ~25% of the site is occupied by already-present informal activities.

To further explore the influence of factors other than customisation that are connected to distributions of static activities, the emergence of smart media and 4G network connectivity will be considered. According to the literature review, social media and other network reliant activities are on the increase where there are tied to sedentary behaviour patterns that manifest in static pedestrian flows. The next section attempts to uncover whether these trends correspond with increases in the static activities recorded in this research, and whether network connectivity is more influential than customisation.

### **7.3 Mobile network strength vs static activities**

Studies in parallel academic fields suggest that people become less engrossed in their present reality as they opt to immerse themselves in virtual reality (see Section 1.1). Ownership of smart devices, including phones and tablets, have increased with 33% of internet users opting for their smart device over a desktop computer in 2015, an increase of 11% since 2010 (Ofcom, 2015). People are less likely to engage in social encounters in person; instead, they prefer to use social media (Kim, 2017; Chóliz et al., 2009). Based on these findings, the assumption is that a notable portion of static activities could be attributed to the presence of a strong phone network signal which encourages smart media communications.

Second Generation wireless technology (2G) was introduced in 1991. Its most notable features included the digital encryption of telephone calls, text messaging, and picture messaging (Fendelman, 2018). Its introduction marked the birth of smart media communication. Third Generation Wireless introduced mobile broadband services and information transfers at significantly higher speeds than previous 2G networks and thus enabled video calls and internet access on mobile devices (ibid.). 3G was superseded by 4G which notably provides a faster data transfer rate (ibid.). Consequently, current uses include HD video streaming. Each case study has had access to 4G networks, albeit at varying signal strengths (ibid.).

### **7.3.1 Measuring 4G signal strengths against static activities**

To test the idea that access to 4G networks results in a potential increase in static pedestrian activities, phone signal strengths are averaged per 10m<sup>2</sup> polygon as metadata to the customisation heat map. In essence, this exercise produces an alternative heat map for signal strengths that can correlate with the occurrence of specific static activities.

Data is sourced from Open Signal, a company specialising in mapping phone signal strengths across major cities including London. It is applied directly to the three case studies and was supplied through University College London's Centre for Advanced Spatial Analysis (CASA, UCL).

To ensure fair comparisons, only data captured during May 2017 is used as this time period saw the simultaneous surveying of all three case studies.

Subsequently, high resolution static activity data collected during May 2017 is matched against the phone signal strength heat map from the same month and statistically analysed. The key unit for measuring phone signal strength is the Arbitrary Strength Unit (ASU), an integer value proportional to received signal strength on mobile devices – the higher the score, the stronger the signal, where high signal strength is able to accommodate the full functionality of 4G networks.

### **7.3.2 Activities vs. 4G network signal strengths**

The distribution of static activities varies by site when studied within the context of network signal analysis (refer to Appendix IV). Variance can be attributed to individuality of the pedestrians, the configuration, and proximity to land uses. However, when the observations are aggregated, clear patterns emerge (see Figure 77).

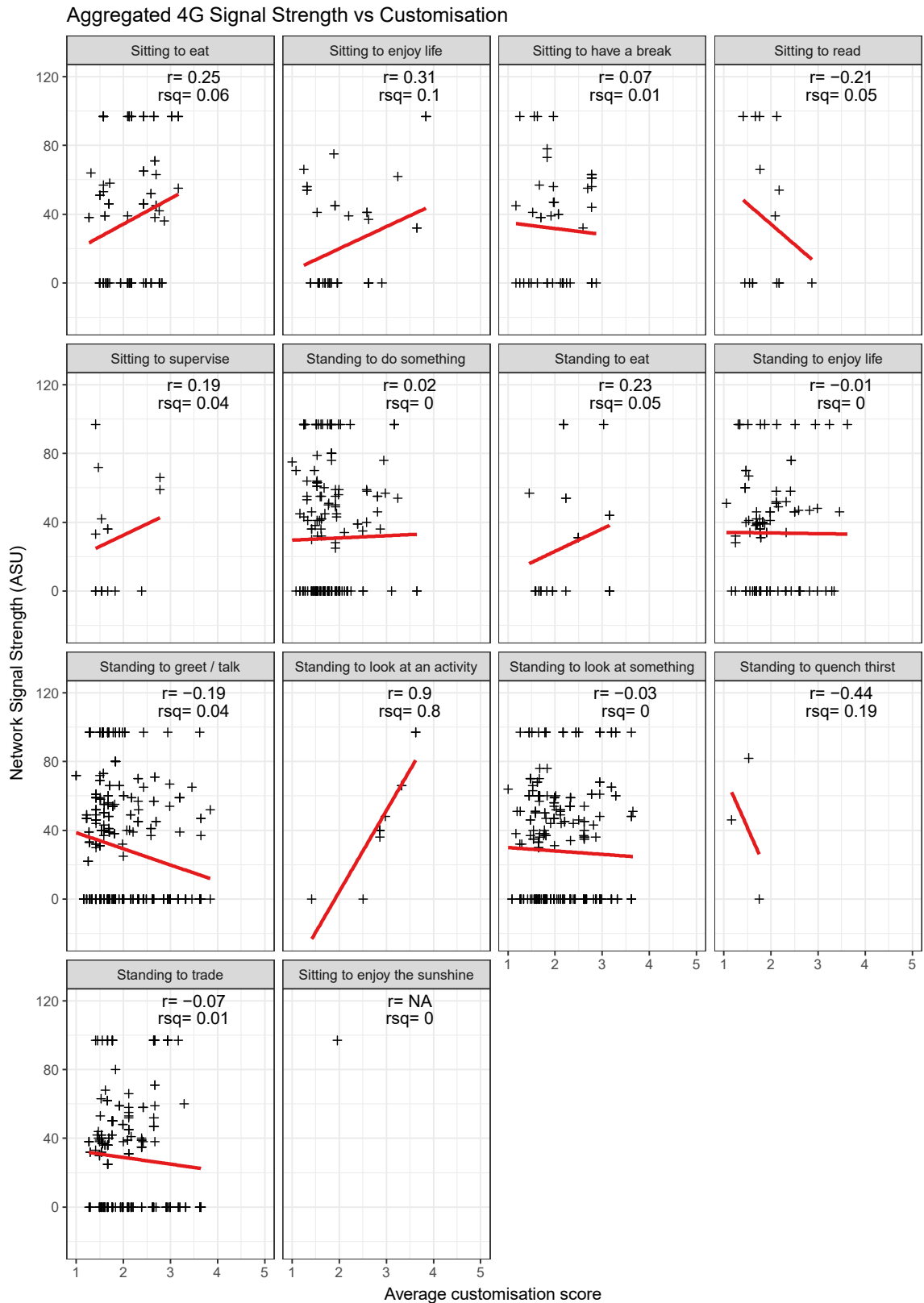


Figure 77. Customisation (all x-axes) by Network Signal Strength (ASU, y-axes)

In essence, positive correlations indicate that customisation (x-axis) is more influential than network signal strengths in the distribution of activities. Negative correlations reverse this to suggest that phone signal strengths play a more



significant role in the distribution of pedestrian activities. Positive correlations are associated with the following activities:

- Sitting to eat
- Sitting to enjoy life
- Sitting to supervise
- Standing to do something
- Standing to eat
- Standing to look at an activity

With the exception of 'sitting to supervise', these activities are categorically 'engaged' or interacting with the urban fabric. Therefore, people are more likely to take part in these activities when situated in an area possessing customisation. In contrast, the following activities possess negative correlations:

- Sitting to have a break
- Sitting to read
- Standing to enjoy life
- Standing to greet / talk
- Standing to look at something
- Standing to quench thirst
- Standing to trade

Of the activities listed here, 57% are categorically 'disengaged' activities. However, the remaining 43% 'engaged' suggest that network connectivity may play a role in how people engage with their environment, highlighting the findings of past studies covering the role of augmented reality in the enhancement of perceptivity of urban spaces (see Section 1.1 and Chapter 4).

However, the majority of the trends apparent in Figure 77 are based on highly scattered correlations, suggesting that neither customisation nor network signal strengths are core determinants in the distribution of particular activities. An exception to this assertion is the activity of standing to look at an activity. As there is almost a perfect correlation between network strength and customisation which suggests that customisation and good signal receptions are both significant factors in drawing a crowd to a performance. This finding indirectly builds on

Steven's work conveyed in 'Ludic Cities' (2007) by documenting the potential catalysts of both customisation and phone signals in the case of this activity.

In all cases, there is a significant number of observations made in regions with extreme ASU (Arbitrary Strength Unit, refer to section 5.2.3.3) scores of 0 and 97. An assumption can be made that activities in settings with ASU 0 scores are more likely to be affected by customisation, while those with an ASU of 97 are less likely to be influenced in this way.

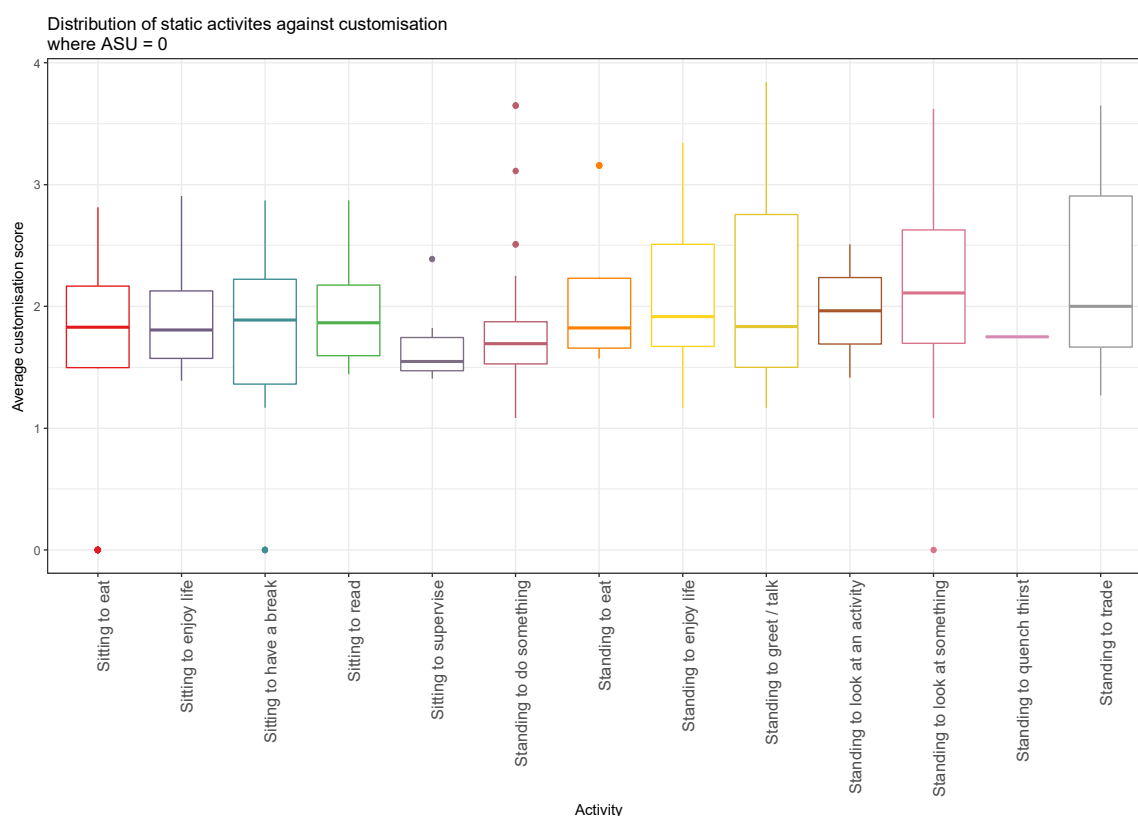


Figure 78. Distribution of static activities vs. customisation in regions with ASU = 0

When ASU = 0, approximately 50% of most static activities are located in regions with customisation scores slightly below or above 2 (Figure 78). Exceptions to this are noted in the following activities:

- Sitting to supervise
- Standing to do something
- Standing to quench thirst

These activities are introspective and disengaged. At the same time, the whiskers further support the theoretical threshold with the majority of pedestrians preferring

to avoid the excessively customised spaces (scores no higher than 3). An exception is standing to greet / talk. In a situation where pedestrians are not in an area with a high phone signal, they are most likely to move towards customised regions.

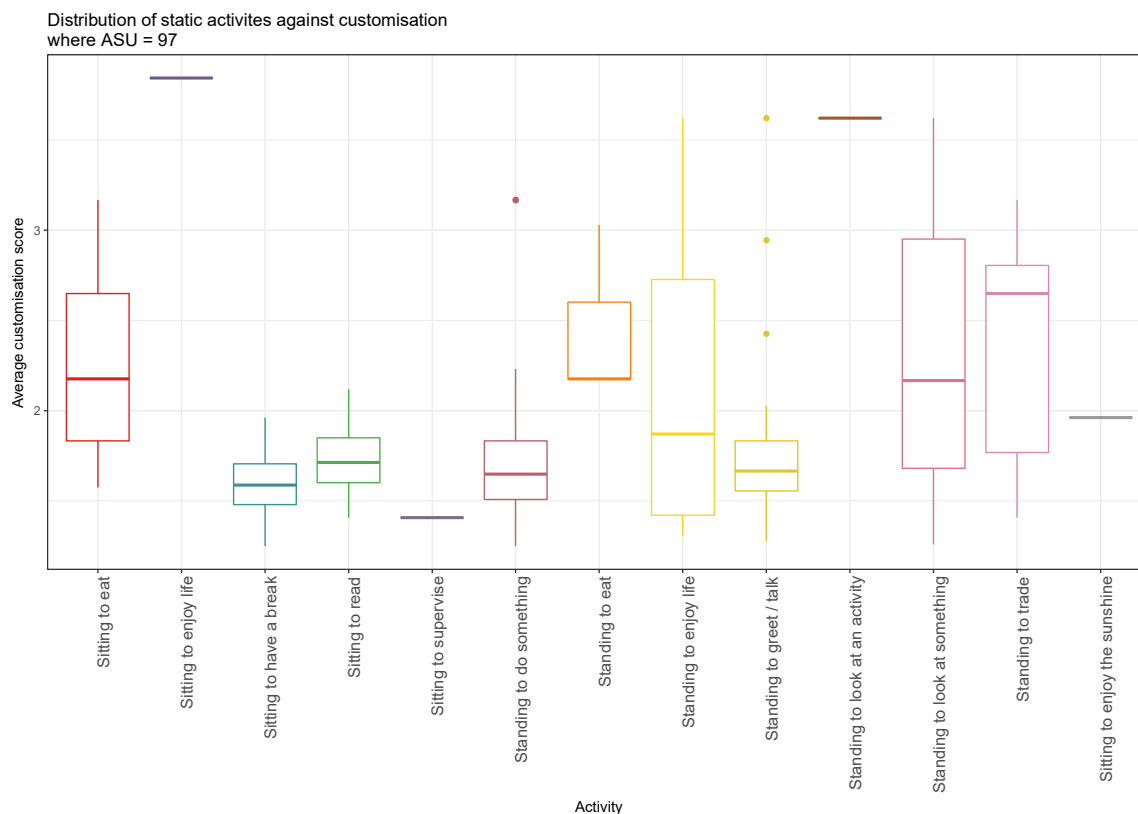


Figure 79. Distribution of static activities vs. customisation in regions with ASU = 97

When pedestrians are located in regions with high ASU scores (97), they are less likely to be influenced by customisation (see Figure 79). Exceptions to this are the following activities:

- Sitting to eat
- Standing to eat
- Standing to enjoy life
- Standing to look at something
- Standing to trade

These activities are descriptively 'engaged'. There is the potential that these activities are more likely to be influenced by customisation than phone signals, stressing the significance of the role placed by informality in the design of successful urban spaces.

With the exception of Petticoat Lane, the activities of ‘standing to greet / talk’ and ‘standing to trade’, correlate negatively with phone signal strengths. The lack of a negative correlation at Petticoat Lane questions whether this occurrence is potentially owing to the lack of customisation in comparison to the other case studies.

### **7.4 Chapter Summary**

The regression analysis conducted in chapter 6 notes highly scattered data with weak correlations between customised environments and static activities.

Chapter 7 has attempts to explain the data dispersion by studying several influential external factors falling into the broad categories of:

- Streetscape features
- Land uses
- 4G network strengths

Given that customisation generally correlates positively with most recorded activities, the assumption is that although these externalities may encourage certain static activities, customisation acts as a catalyst so that customised environments are more likely to have an increased occurrence of static activities.

The assumption derived from Transport for London’s research is that the installation of street furniture alone results in heightened occurrences of static activities; similar assertions are also made by William H Whyte and Jan Gehl (see 7.1). Comparing instances where TfL street furniture occurs suggests a number of positive correlations that support these assertions. However, exploring the impact of street furniture on specific pedestrian activities alongside customisation scores, finds that stronger correlations are associated with customised streetscape features.

At each case study, the dominant land uses are A1 (shops) and A3 (restaurants). Studying the proximities of static activities to these particular land uses demonstrates that in the majority of activities, customisation does play a key role in the distribution of static activities. These findings hint that, when apparent,

customisation does influence how people interact with urban spaces. Allowing informality in the design of everyday streetscapes and urban spaces holds true power in the potential success of a public space. In a similar way to the analysis of street furniture, land uses that have been customised are also more likely to attract static activities, specifically ones that relate to the service provided; for example, more people are likely to 'sit and eat' at a restaurant that has been customised.

Finally, the analysis of 4G network signals generally do not directly influence the occurrence of static pedestrian activities over customisation. However, there are instances that infer that access to stronger 4G network signals in streetscapes, symbiotic with the use of social/smart media, is connected to activities that previously would have been attributed to the visual qualities of an environment. Here, customisation seemingly acts as a catalyst to those in areas with high signal strengths taking part in predominately engaged static activities such as 'standing to enjoy life'.

## **8 Analysis III: Customisation and Pedestrian Satisfaction**

**Do apparent positive/negative correlations correspond with distributions of street user satisfaction?**

**Hypothesis: Based on the findings of chapters 6 and 7, increased satisfaction will be associated with increased customisation.**

Chapters 6 to 7 provide evidence in support of the overarching hypothetical stance of this thesis – increased customisation results in both higher concentrations of static activities, and increased interactions with urban environments. Although gravitations towards customised features are clearly evident, it remains unclear as to how influential these features are in the conscious perception of customised/stock surroundings. In this thesis, the conscious perception of an environment manifests in expression of satisfaction/dissatisfaction with an urban environment. This final stage of analysis will attempt to ratify the findings of chapters 7 and 8 by obtaining the opinions of a sampled representation of street users in order to gauge whether or not customised environments are connected with an improved overall satisfaction.

To test the hypothesis presented at the start of this chapter, pedestrian opinions relative to their placement in ‘stock’, through to ‘customised’ settings, are assessed through multiple-choice surveys. The surveys assign satisfaction scores primarily through Urbiscape assessments and choice-based conjoint analysis (see Section 5.3.1). To compensate for potentially skewed responses, demographic data is simultaneously collected to determine whether responses can be anticipated based purely on background instead of customisation.

## 8.1 The role of customisation in satisfaction scoring

Testing the assertion that ‘a higher presence of customisation will result in a higher satisfaction score’ is based primarily on the use of geographically weighted regression (GWR). For context, the core distribution of satisfaction scores are first analysed by site, and then correlated with customisation using the same linear regression processes applied to chapters 6 and 7.

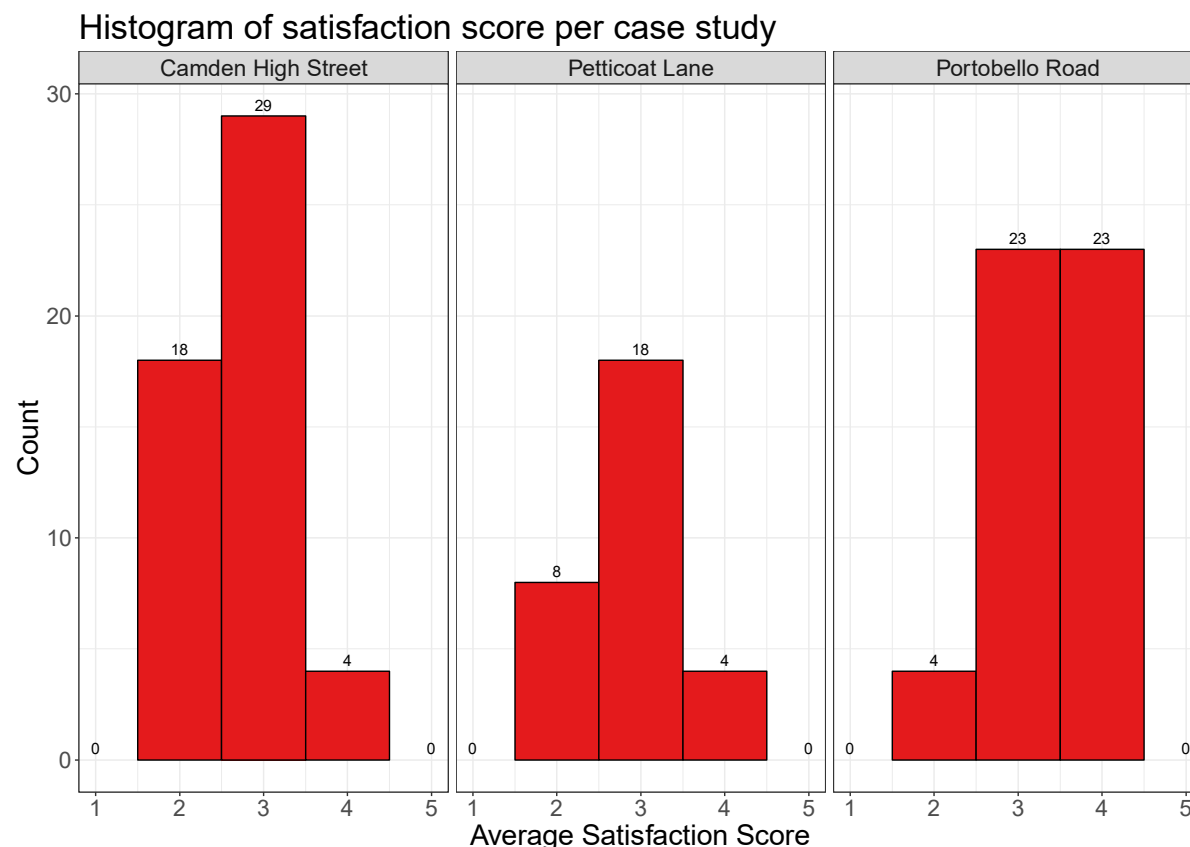


Figure 80. Histogram facets showing the frequency of pedestrian opinion scores per case study (bin widths are set to 1 in ggplot2).

From an initial analysis of average satisfaction scores, based on individual Urbiscape scores (see section 5.3.1), Camden High Street has the highest response rate but is behind Portobello Road in terms of higher opinion scores. Based on the outputs of a histogram plot of average pedestrian opinion scores (see Figure 80), almost six times as many pedestrians were likely to assign satisfaction scores of ~4 at Portobello Road than at Camden High Street. At Petticoat Lane, pedestrians were more likely to assign middle-valued opinion scores – an indicator of indifference to the quality of their environments. The highest opinion scores are proportionally noted at Petticoat Lane. This pattern indicates that customisation is a potential deterrent to

satisfaction when consciously perceived by street users, based on the fact the Camden High Street exhibits the most customisation and Petticoat Lane the least, or other reasons such as that responses to customisation vary according the prevalence of a specific demographic characteristics of the sampled street users.

The composition of these urbiscape scores vary by site, with most being weighted by visibility, décor and appearance (see Figure 81). However, sound and smell also play significant roles in perceptibility of space.

Specifically, pedestrians were asked by the researcher to rate the features of their immediate surroundings that fall into the following categories:

- Visibility. How easy is it to see what is going on in the space? It is easy to understand the function of this space?
- Sound/Noise. Is the impact of the sound of traffic, plant machinery, music, and other ambient background noises very good or very poor?
- Smell. Does an area smell very good or does it smell very bad (poor), based on odours occurring in the pedestrian's immediate proximity?
- Décor. How do you rate the fine details of window fronts?
- Air quality. A subjective take on how clean they feel the air is around them – an indicator of their enjoyment of the space.



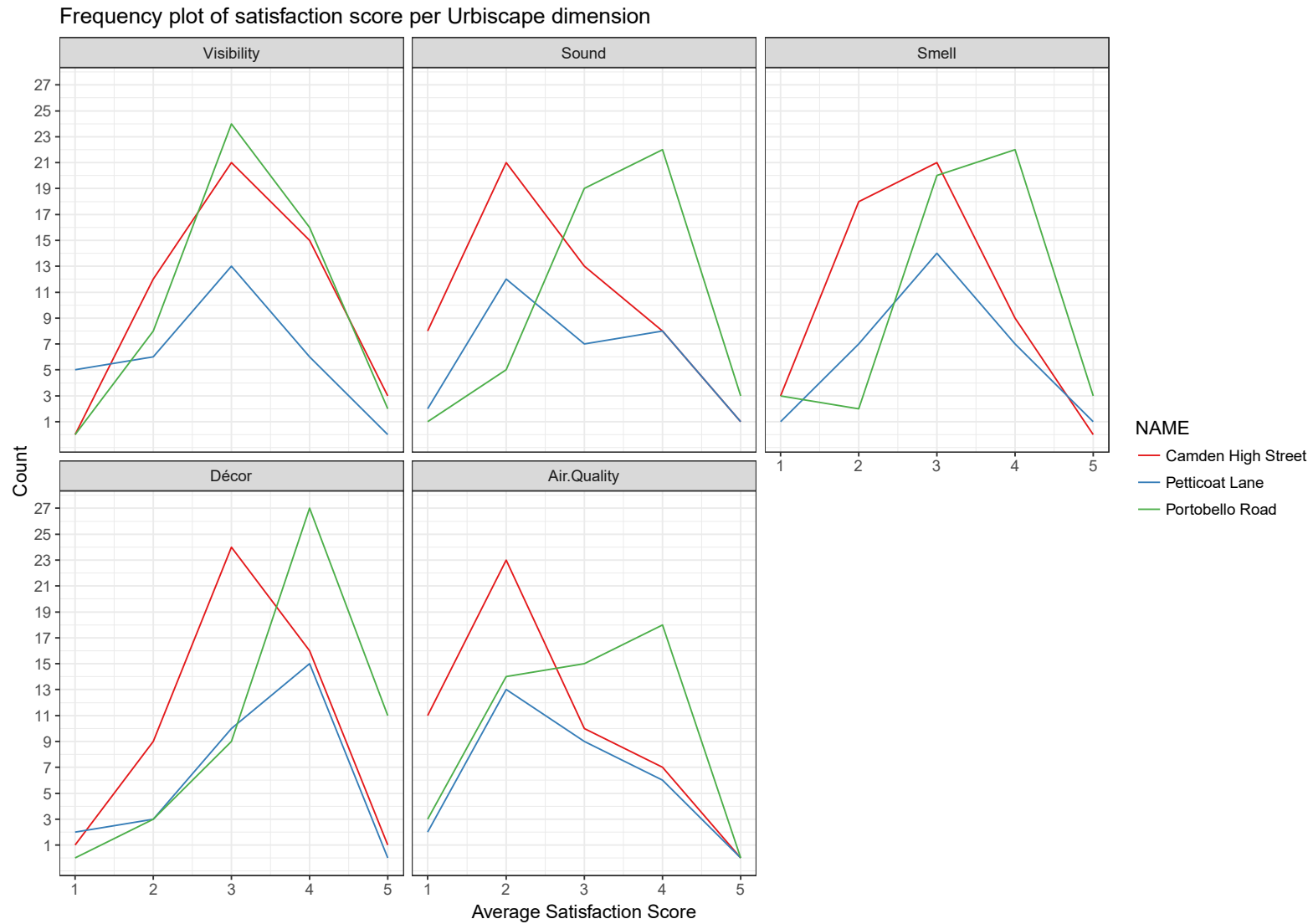


Figure 81. Frequency facet plots showing pedestrian satisfaction at each case study per urbiscape dimension/feature

Visibility scores at each case study are mostly mediocre. An interpretation is that, regardless of placement in a customised or stock setting, a pedestrian will most probably assign an 'average' rating to the attribute of visibility. However, differences in the distribution of scores are noted between the sites when Décor is considered. Pedestrians at Portobello Road and Petticoat Lane were more likely to assign 'good' ratings translating to scores of 4 in Figure 81. Observations at Camden High Street fall into categories of visual surroundings being poor.

From the data presented, it is clear that participants in the pedestrian opinion survey did not particularly base their opinions on the quality of sound at Camden High Street and Petticoat Lane, although the reverse is true at Portobello Road. A similar trend pattern emerges concerning appearance.

Smell is also key factor in the scores allocated at Portobello Road, but is less influential in the assignment of higher scores at Petticoat Lane and Portobello Road; a similar pattern emerges with regards to décor and air quality with scores for these attributes being predominantly above 'good' or 'very good'. At Petticoat Lane, décor appears to be a vital component in the assignment of higher scores, while the frequency plot for décor (Figure 81) shows that this is also significant at Camden High Street with modal scores of 3 – average ratings.

However, the distribution of the scores are spatially random as indicated in the adapted feeling map overleaf (see Figure 82). Noted in the first chapter of this research is that people are inclined to personalise objects, in so doing optimising them. In an urban planning context, this translates to people modifying parts of an urban environment to a similar effect. The nature of modifications reflects the tastes of local business owners and local residents. Evidence presented in chapters 7 and 8 demonstrate that people respond to bland environments in predictable ways – they are generally less likely to stop and engage in a static activity. Opinions of such fabrics are often of boredom and dissatisfaction. Therefore, this research proposes that the increased opinion scores are related to an increased presence of customisation.

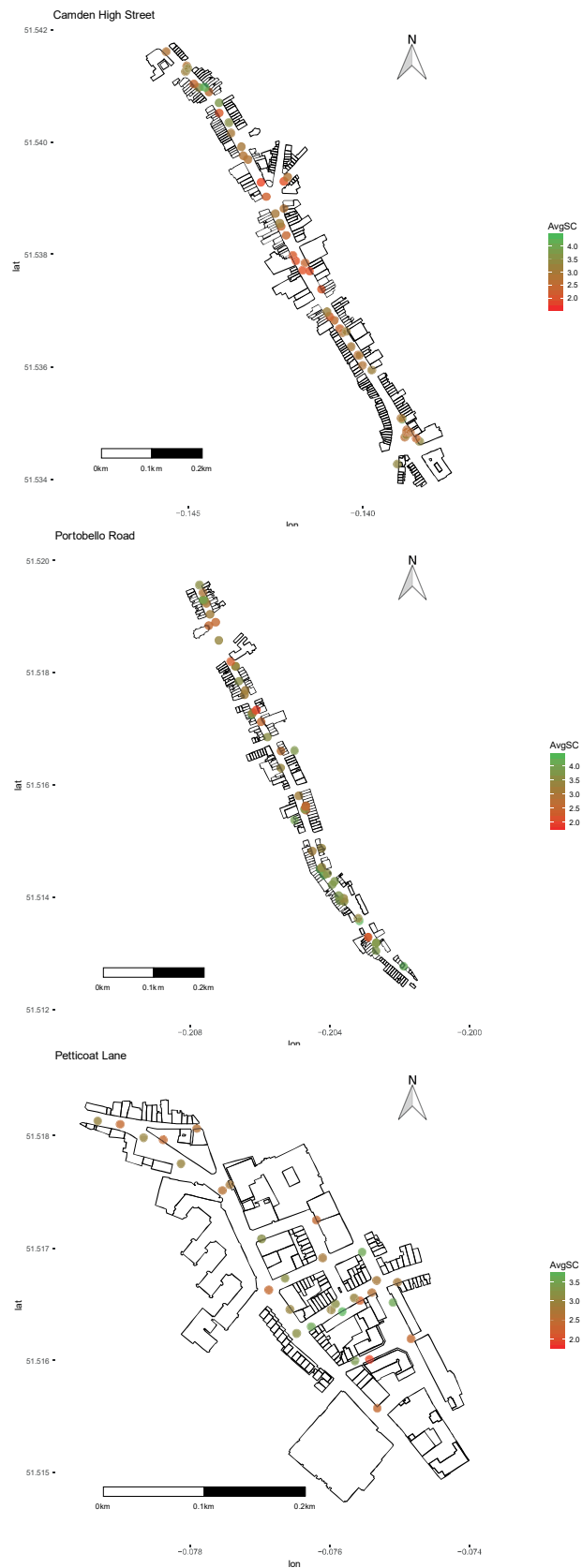


Figure 82. A feeling map showing the average opinion scores of pedestrians at each of the case studies (AvgSC). lat = latitude, long = longitude

Conducting regression analysis reveals positive correlations with customisation and pedestrian satisfaction indicators at Camden High Street and at Petticoat Lane (see Figure 83). In each of the correlations, the distributions are highly dispersed and fall outside of the 95% confidence interval leading to a high possibility for dramatically varied data in future repetitions of the survey, discounting the surveying of a larger sample of streetscape users. The weaker overall correlations also demonstrate the randomness/individuality of responses from survey participants.

Examining the correlations at Camden High Street and Petticoat Lane shows an even distribution of high and low satisfaction scores, generally increasing with customisation. However, the scores at Portobello Road appear to be mostly high with more responses made in areas exhibiting little evidence of customisation. These observations are confirmed in the geographically weighted regression exercise (see Figure 84). At Petticoat Lane, each average opinion correlates positively with its relative customisation score – the higher the customisation score, the higher the pedestrian satisfaction score. However, at Portobello Road, the predominately high scoring leads to an overall negative correlation between customisation and satisfaction – unlike satisfaction here, customisation presence varies throughout the site. However, the strength of the negative correlation weakens as pedestrians are located in parts of the case study that have been customised – street users are more likely to assign higher scores to regions exhibiting a higher presence of customisation. The correlations at Camden High Street are mostly positive, and strengthen towards the more customised regions; however, a similar anomaly to Portobello Road – persistently high scores – are noted towards the southern portion of the site.

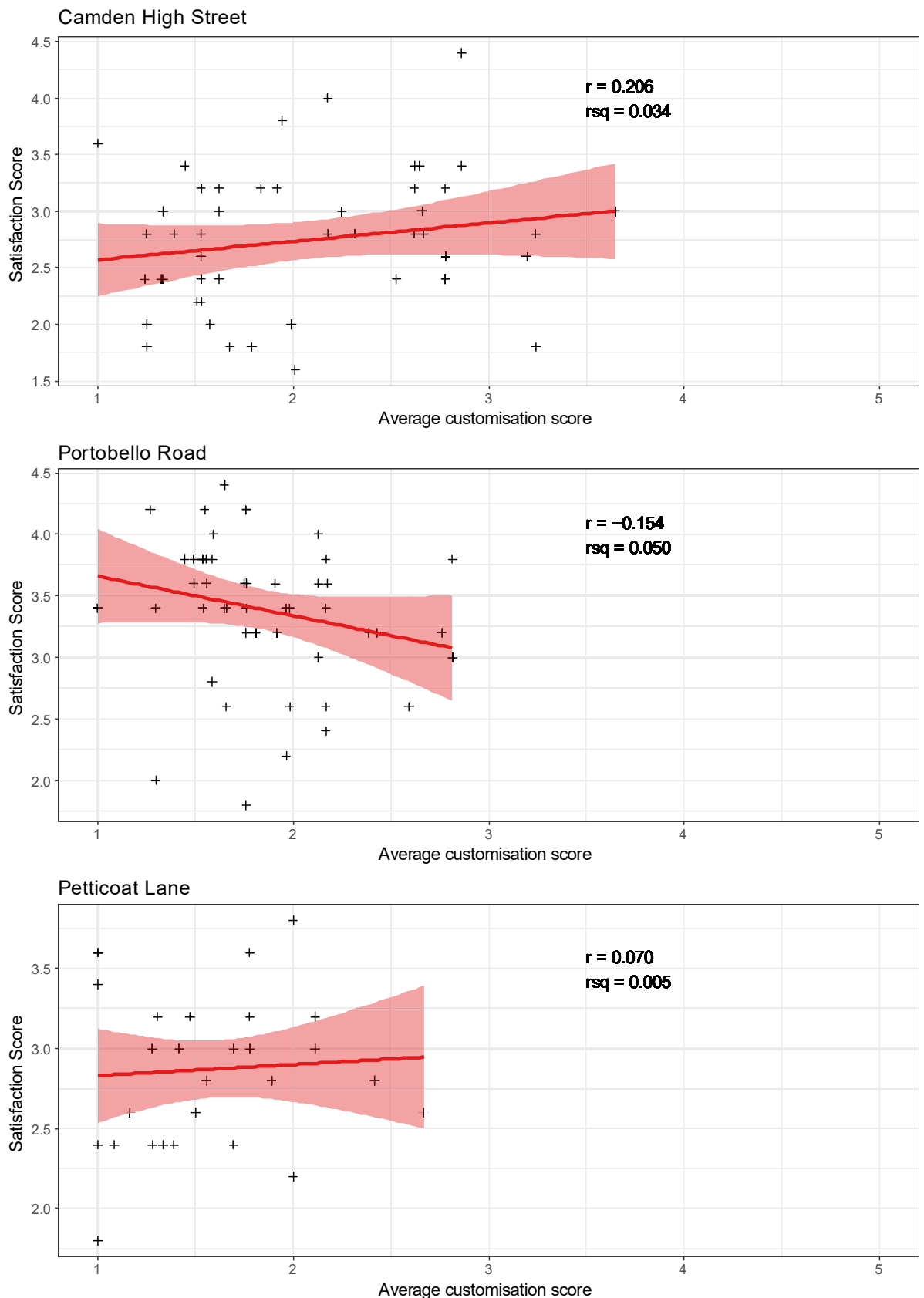


Figure 83. Average customisation scores and pedestrian satisfaction scores at each of the case studies. The upper and lower confidence of 95% is represented by the area shaded pink (standard error) – points falling outside of shaded area are highly dispersed and have a marginal effect on the angle of the line presented by the negativity or positivity of the  $r$ -values.

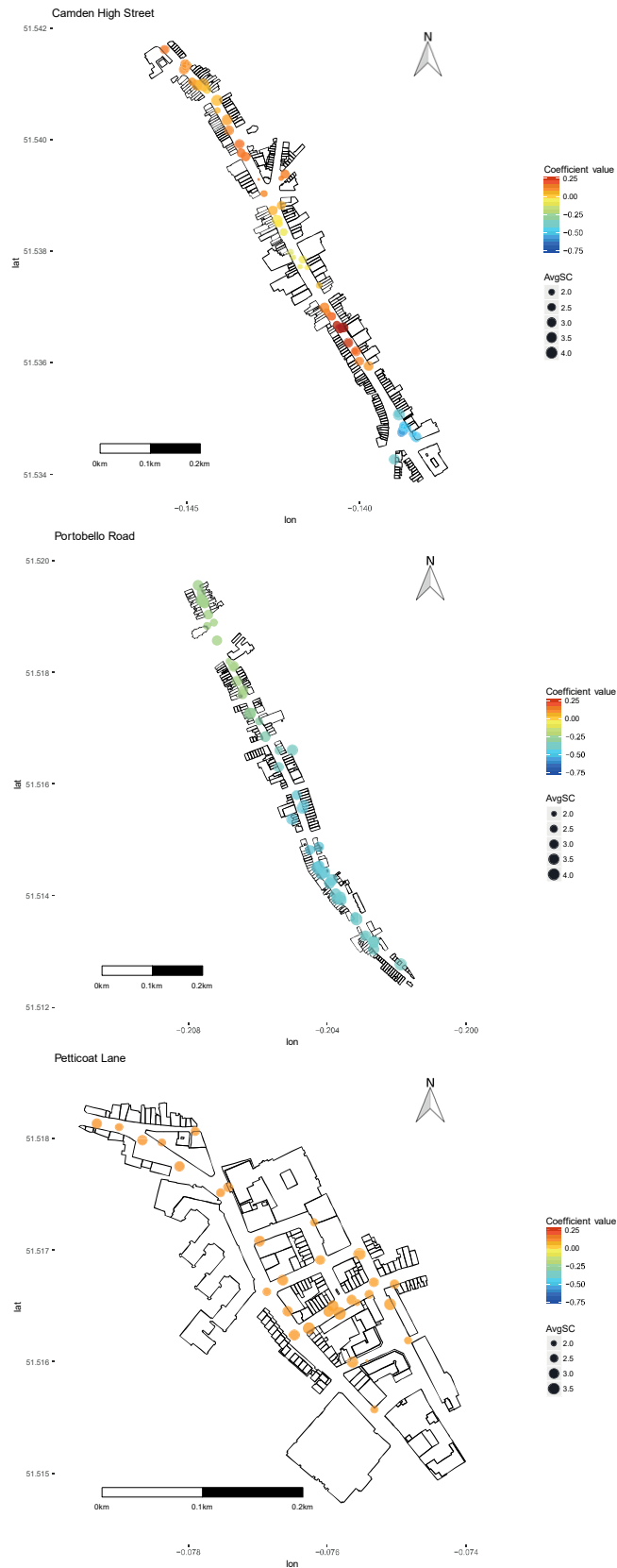


Figure 84. Geographically weighted regression: correlations between customisation and satisfaction scores. Positive correlations between pedestrian opinion scores and customisation presence are noted at Camden High Street and Petticoat Lane. Although Portobello Road has an overall negative correlation with customisation, the coefficient values weaken in regions that have been customised (green colouring). Petticoat Lane sees an overall positive correlation – as expected higher satisfaction scores are associated with regions with higher customisation scores. However, the correlation is very weak/almost neutral.

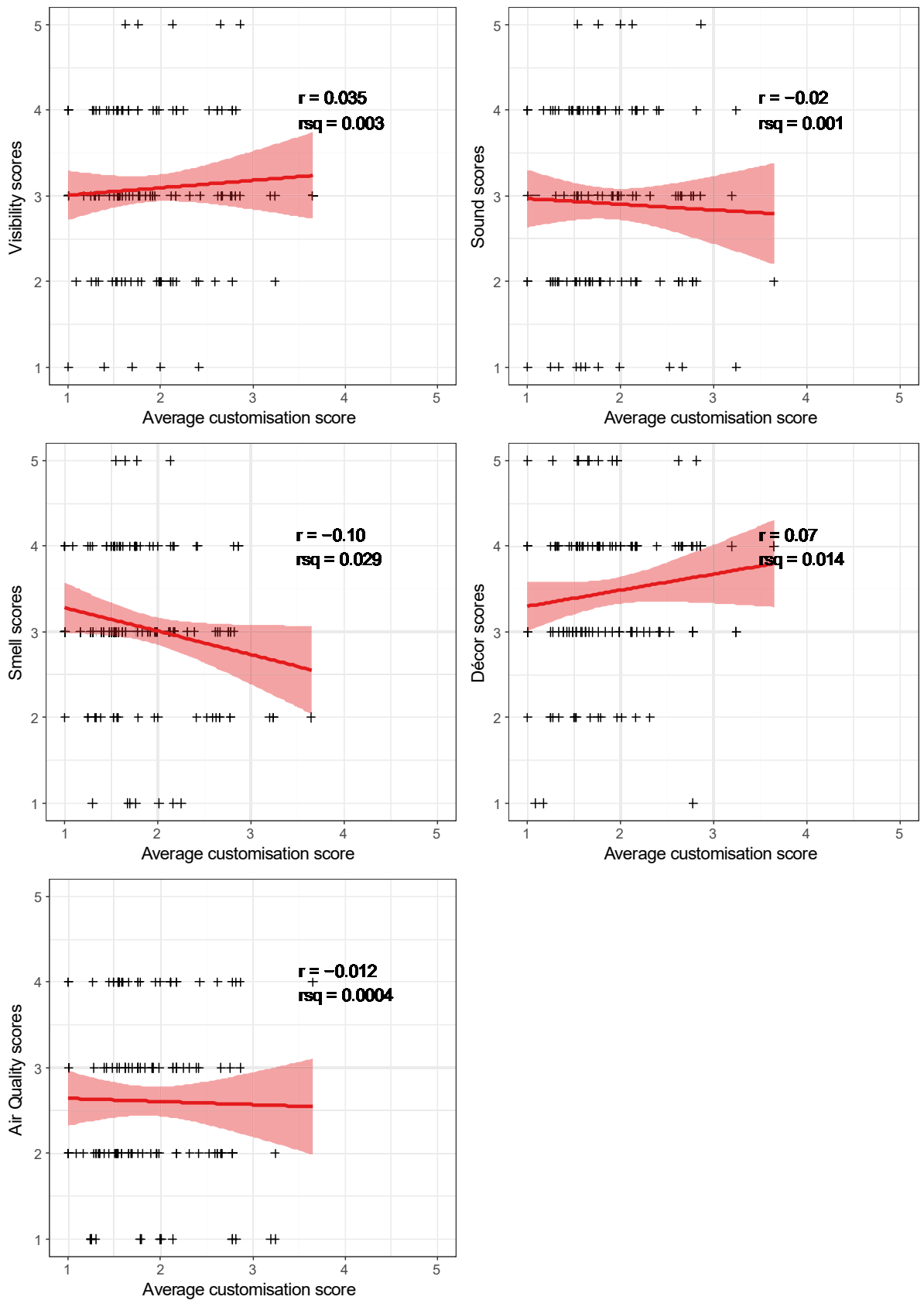


Figure 85. The influence of customisation on satisfaction score composites. These scatters are highly dispersed and indicate the significance of the role played by individuality. Overall, responses to customised environments are mixed and random, however positive correlations are apparent.

Across all three sites, the satisfaction scores concerning smell are less likely to correlate with customisation with a correlation of  $r = -0.1$  from the collected sample. The score most likely to correlate with customisation is Décor ( $r = 0.07$ ), followed by visibility ( $r = 0.035$ ). These are weak correlations that, as demonstrated in the previous chapter, are most likely to be based on other external factors or an individual's personal preferences (see Figure 85).

The majority of observations are made in regions with customisation scores ranging from 1.5 to 1.75. The density plots shown in Figure 86 represent the probabilities of surveyed pedestrians occurring in highly or lowly customised regions – probabilities range from 0 (0%) to 1 (100%). Examining the distribution of customisation scores with conventional heat mapping reveals confirms the presence of the theoretical threshold with the majority of pedestrians assigning above average scores to regions with comparatively moderate customisation interventions (see Appendix VI).



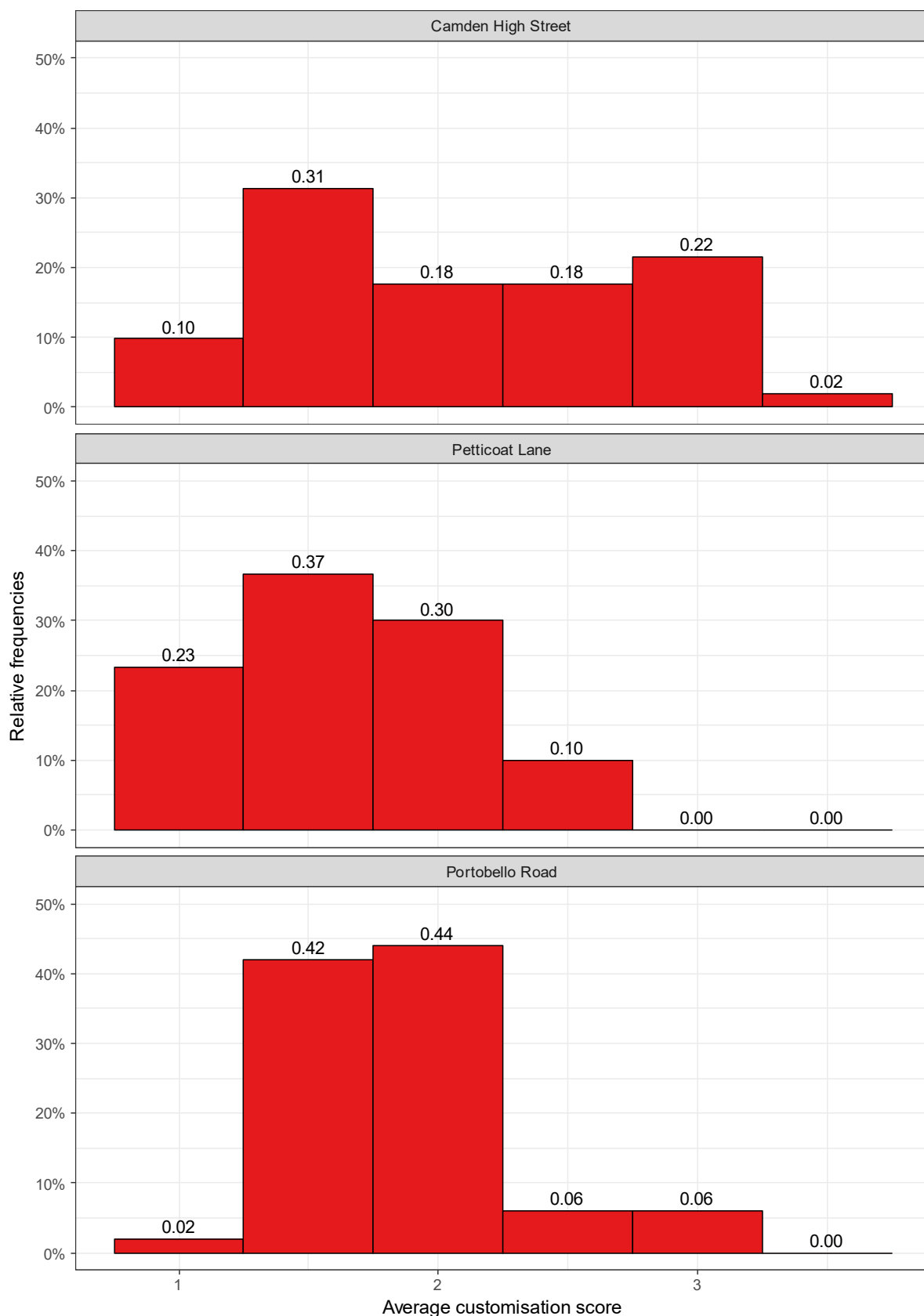


Figure 86. Density plots for participants and their relative customisation scores – all case studies (ggplot geom\_histogram bins are set 0.5). Density plots calculate the percentage of a frequency. This in this case, this statistic indicates the likelihood that survey participants will have stopped in areas with particular overall customisation scores.

Figure 86 shows that 31% of the survey participants at Camden High Street were located in regions with customisation scores of approximately ~1.5; approximately 37% of those surveyed at Petticoat Lane were located in regions with customisation scores of ~1.5 – 30%, in regions with scores of ~2. At Portobello Road 42% of the participants were located in regions with customisations scores of 1.5 – 44%, regions with scores of 2. With the exception of Petticoat Lane, the majority of survey participants are located in regions with customisation scores of 2 or higher. These distributions are in harmony with the global distributions of static activities in relation to customisation at each case study (see Figure 58). Therefore, the pedestrian survey results are a representative sample of street user views and reactions to customised/stock regions that can be used to qualify the quantitative findings expressed in chapters 6 and 7.

However, this effect wasn't intentional as the researcher stopped people at random throughout the case study extents. Nonetheless, people preferring to take part in the surveys were more inclined to do so in parts of the case studies that are typically busier. This could boil down to an increased probability of someone being willing participate because of there being a higher chance of finding someone whose priorities are able to facilitate the survey participation. Alternatively, this finding could also relate to increases in conviviality, noted in densely populated regions in earlier academic studies (see chapter 2). Conviviality is synonymous with informal interventions, so it can be argued that the presence of customisation is potentially connected to a willingness of people to participate in the survey. The argument is provisional because the majority of observations occur in regions with customisation scores ranging between ~1.5 and ~3 across all three case studies, resulting in minimal to moderate evidence of customisation in the immediate locality of survey participants. However, customisation – in the context as representing deviations from the norm – does appear to play a catalytic role in street user decisions to participate or avoid participation in the opinion survey exercises.

Participation at Petticoat Lane is notably lower with only 30 responses compared to 50 responses at Camden High Street and Portobello Road. This can be

attributed to various factors including the time in which surveys combined with nature of the users of the site – mid-afternoon surveys possibly coincided with the majority of street users being local workers on limited lunch breaks. The low response rates can also be attributed to the users' comfort with their surroundings. This research suggests that customised environments are associated with improved wellbeing (Section 4.7). If true, the scores from those surveyed would be similar across all three case study sites in comparatively customised regions (null hypothesis,  $H_0$ ). If false, then wellbeing is more likely to be associated with the subjectivity of the street users, that can be partially confirmed through demographic analysis (alternative hypothesis,  $H_A$ ).

Conducting Fishers exact test (F-test) on satisfaction scores collected in case study region with customisation scores greater than 2 gives the following statistic:  $f \sim 2.17$ . Within a significance level of 10%, or the likelihood that only 10% of the observations will reject  $H_0$ , the acceptable statistical range for denominator degrees of freedom is between 40 ( $f = 2.44$ ) and 60 ( $f = 2.39$ ); the denominator degrees of freedom in this research is 42 and the  $f$  statistic is less than both distribution intervals. Therefore,  $H_0$  is accepted, where responses towards customisations are mostly similar across the three case studies despite the varied response rates. It is noted that strongest correlations between customisation satisfaction occur between average customisation scores of 1.5 and 2 at Camden High Street and Petticoat Lane (see Figure 87). Although, the negative correlation at Portobello Road is even more pronounced, it is in this score band that the highest customisation scores are noted (Figure 87). When scores range between 2 and 3.5, negative correlations are observed at each of these sites – scores can no longer be attributed to customisation but to individual preferences, note the highly dispersed data and low  $r^2$  values (see Figure 88). However, negative correlations are noted at Petticoat Lane and Portobello Road that confirm aversions towards increasingly customised environments – overly complex – among the survey sample.

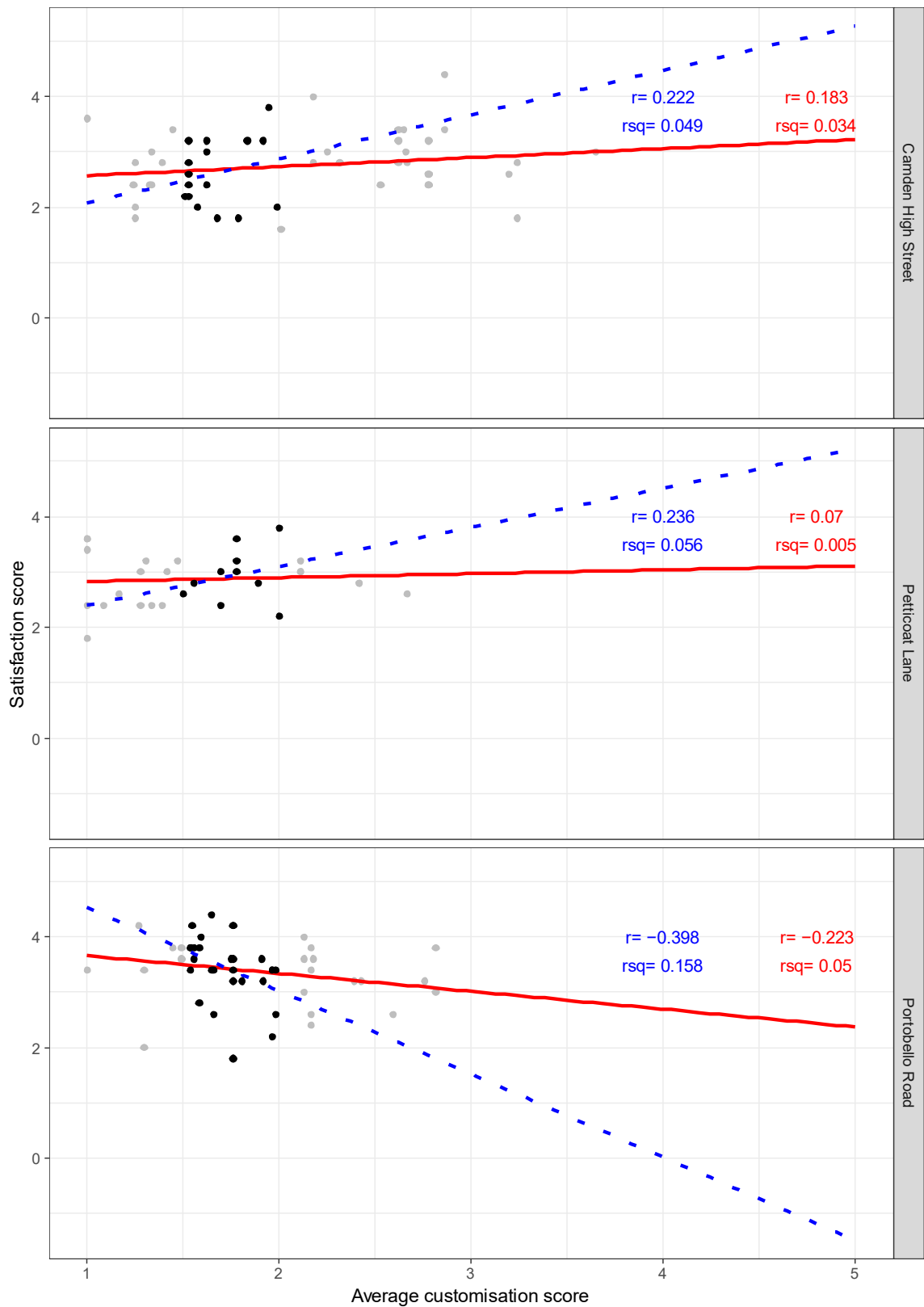


Figure 87. Correlations between average customisation and satisfaction scores per site. Correlations for average customisation scores ranging between 1.5 and 2 are shown as a blue line. Overall correlations are presented by a red line.

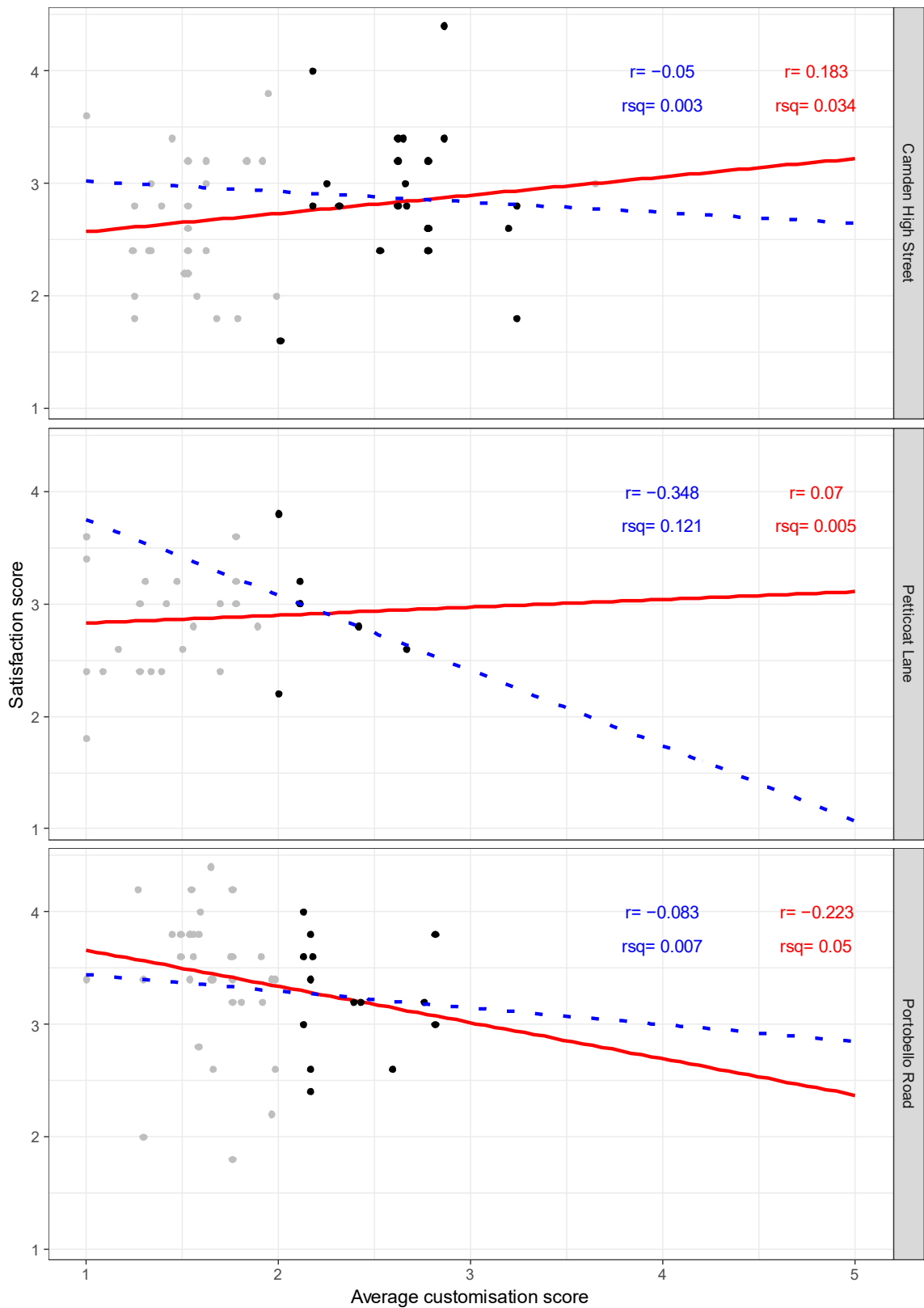


Figure 88. Correlations between average customisation and satisfaction scores per site. Correlations for average customisation scores ranging between 2 and 3.5 are shown as a blue line. Overall correlations are presented by a red line. Note: each isolated correlation is negative.

The distribution of survey participants corresponds with distribution of static activity densities. Although the number of survey samples is small compared to

the total number of observations of static activities, their locations give a fair representation of attitudes towards customisation. Figure 89 shows the frequency for pedestrian responses that can be compared with Figure 58 (also see Appendix VI).

Although this comparison can be made, when opinion scores of 2.5 and higher are examined (the dotted black line in Figure 89), it is observed that participants were more likely to express satisfaction with their immediate surroundings in regions that have customised. The exception is Portobello Road where scores are generally high throughout.

While survey participation drops with satisfaction scores becoming closely aligned to the overall frequency distribution, the activity of 'standing to look at an activity' increases alongside customisation. A possible explanation for this occurrence can be aligned with Stevens' (2007) and Shaftoe's (2008) discussions on the influence of play activities in the overall favourable perceptions of spaces. A similar pattern is detected for the activity of 'standing to eat'. Whyte indicates that the presence of food vendors is associated with livelier urban spaces, endorsing this manifestation of informality (1988).

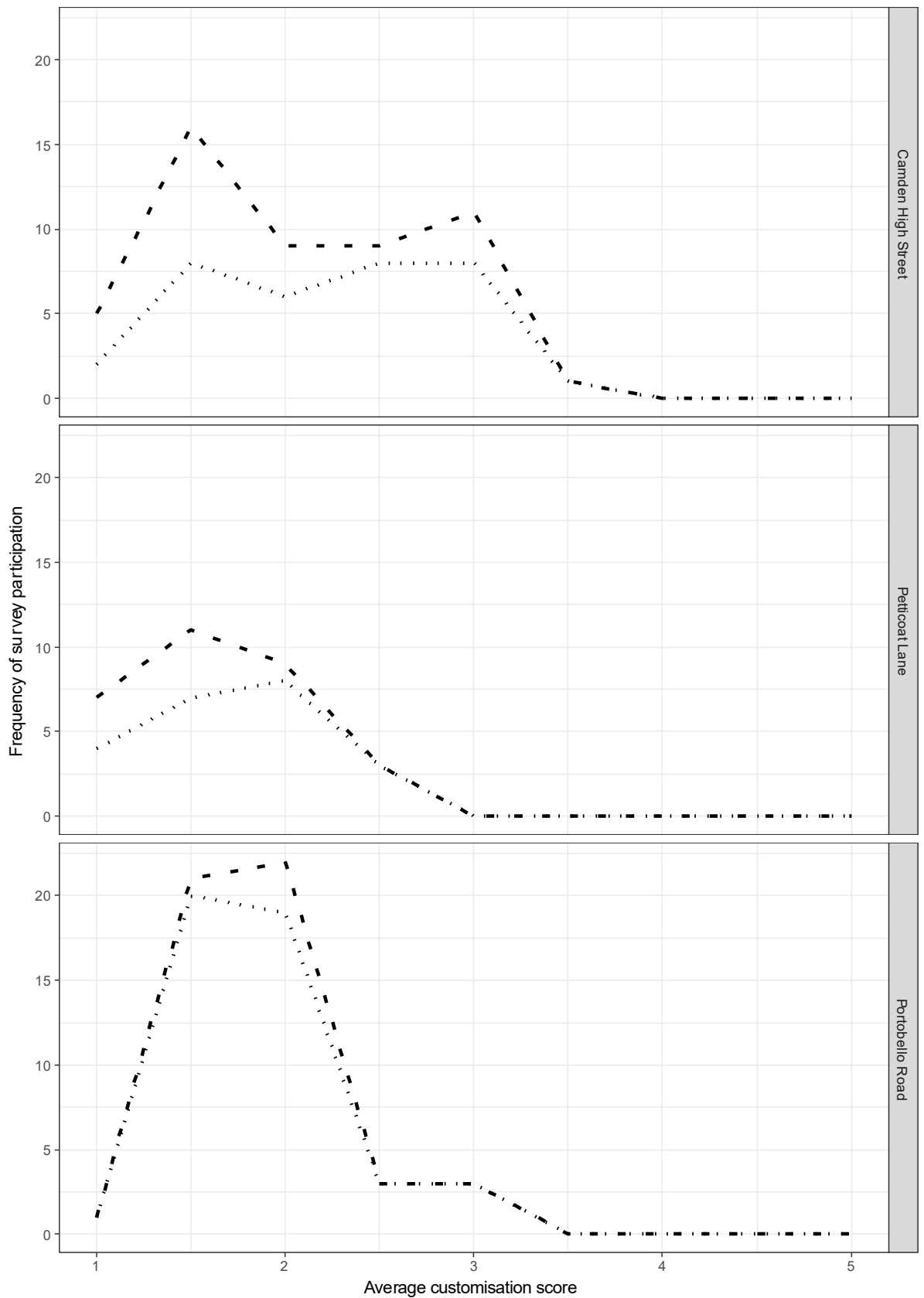


Figure 89. Distribution of static activities and survey participation vs. customisation. The black dashed line represents survey response rates; the black dotted line represents survey response rates for satisfaction scores > 2.5

The bulk of core activities occur in regions exhibiting a degree of customisation with standing activities being most frequent in regions with customisation scores of 2 and higher, and sitting activities occurring in regions with scores of 1.5 and higher.

The main finding from this section is that there is a clear relationship between opinion scores and customisation in regions with customisation scores approximating 1.5. This trend is most profound at Camden High Street which exhibits both negative and positive correlations. Scoring at Portobello Road correlates negatively with customisation because of the generally higher satisfaction scores by survey participants. However, coefficient values are lower in regions scoring ~1.75 to ~2.3 (dissociation); however, this representation is weaker than that linked to the ~1.5 scores. All of the responses at Petticoat Lane are influenced by customisation with higher scores being directly linked to increased customisation. However, coefficient range/bandwidth is marginally positive. Additionally, weaker positive correlations are noted in regions with customisation scores of ~2.

The results from this part of the analysis indicates that there is an overall conscious preference for regions to only exhibit limited forms of customisation that have:

- No more than 2 cyclical colour hue transitions (in area of 50m<sup>2</sup>)
- No more than 2 interruptions in façade designs (in area of 50m<sup>2</sup>)
- Public art that has been contributed by a local authority based on successful implementation elsewhere
- No more than one occurrence of public art
- A single row of market stalls
- A single sign attracting pedestrians to local features
- New street furniture provided by the local authority
- An instance of guerrilla gardening
- An instance of grassroots sculpting
- An instance of urban knitting
- 0 to 1 street performers onsite
- 0 to 25% of the space possessed by grassroots activities



- 0 to 25% of the site exhibiting uses other than design purpose of the streetscape (high street)
- No more than once occurrence of a sui generis act of customisation

While these results agree with the theoretical threshold, they also indicate a higher satisfaction score as customisation increases posing a contradiction. However, the lack of surveys in the customised portions of the sites can be attributed to the lack of representation of customisation at the case studies, but also raises two possibilities:

1. Excessive customisation is a deterrent for static activities. It is possible that the decision not to enter into a customised setting is intuitive.
2. People located in customised regions consciously chose to be there.

Further to these findings, the streetscapes are dominated by A1 uses, where retail businesses aim to capture the attention of potential customers by using bright visuals and captivating decorations to draw the attention of street users, where a pedestrian will initially be engaged in their own objectives (i.e. purposive shopper). Such people are more inclined to notice something out of the ordinary than those who purposively explore the quality of their urban surroundings such as tourists. The results which demonstrate a close correlation to customisation can also be attributed to demographic underlying factors as demonstrated in the composition of the survey respondents.

As the case studies each have regions that are popular with tourists, it is possible that the dominant aversion to customisation can be due to the majority of the observed pedestrians having natural tendencies to avoid crowded areas.

Exploring the satisfaction scores further reveals that at all three sites Décor is the urbiscape feature most affected by the presence of customisation. This feature always correlates positively with customisation at all three case study sites. Additionally, customisation also correlates positively with the visibility attribute; however, in both cases the correlation coefficient values are low because of the high dispersion of the observations. Negative correlations are noted with the

remaining attributes of smell, air quality, and sound which correlate negatively with customisation at each case study.

The findings of this section offer fresh insights into actual street user perceptions of informality in the form of customisations made to streetscape. These supplement the results of the first analysis chapter that focused on behavioural reactions to customisation. However, the intentionally vague questions of the urbiscape hint at the peripheral acknowledgments of customisation interventions. It does not address whether people taking part in the survey deliberately preferred customised features over stock ones – as indicated by the data.

## 8.2 Conscious responses to customisation

To determine the extent opinions of spaces are formed based on either impulsive or premeditative responses, choice-based conjoint analysis (CBCA) is used to capture whether people consciously prefer customised over stock environments. The method is detailed in Section 5.3.2. Essentially, the process involved participants choosing between two fictitious sites which exhibited four key features – essentially, one has been customised while the other is stock. Their choices potentially reflect the subjective/cultural ideals. To validate the findings, participants were asked to repeat the process with sites with altered features. Another factor that potentially influences their decision-making is whether they are situated in a customised environment. To test this further regression analysis is necessary.

At each case study the first and second fictitious sites were examined that exhibit characteristics consistent with either ‘customised’ or ‘stock’ configurations. The choices were juggled for the validation data collection process (see Table 18).

*Table 18. CBC configuration per case study. CHS = Camden High Street, PBR = Portobello Road, PCL = Petticoat Lane*

	Fictitious Sites			
	1	2	3	4
<b>CHS</b>	Customised	Stock	Stock	Customised
<b>PBR</b>	Customised	Stock	Customised	Stock
<b>PCL</b>	Customised	Stock	Stock	Customised

For their initial choices, pedestrians were initially asked to choose between the following two spatial configurations, where they could choose either the:

Table 19. CBC first choices, Camden High Street

<b>Colours</b> You'd rather define these	<b>Performers</b> Street performers are allowed	<b>Colours</b> The council's choice is good enough	<b>Performers</b> Street performers are banned from the site
<b>Gardening</b> Plants are everywhere and left to grow	<b>Façades</b> Walls and features have their own individual charm	<b>Gardening</b> Planning provided and maintained by the council	<b>Façades</b> Walls and features are identical to each other and orderly

Table 20. CBC first choices, Portobello Road

<b>Colours</b> You'd rather define these	<b>Performers</b> Street performers are allowed	<b>Colours</b> The council's choice is good enough	<b>Performers</b> Street performers are banned from the site
<b>Street Furniture</b> You can move this to your satisfaction	<b>Public Art</b> Art created by a local resident	<b>Gardening</b> You cannot move it / fine as it is	<b>Façades</b> Art installed by a local authority

Table 21. CBC first choices, Petticoat Lane

<b>Colours</b> You'd rather define these	<b>Performers</b> Street performers are allowed	<b>Colours</b> The council's choice is good enough	<b>Performers</b> Street performers are banned from the site
<b>Public Art</b> Created by a local resident	<b>Façades</b> Walls and features have their own individual charm	<b>Public Art</b> Created and installed by a local authority	<b>Façades</b> Walls and features are identical to each other and orderly

The criteria discretely differ at each site as indicated in three tables above. The reason for this was to ensure that participants were asked questions that immediately concerned their surroundings.

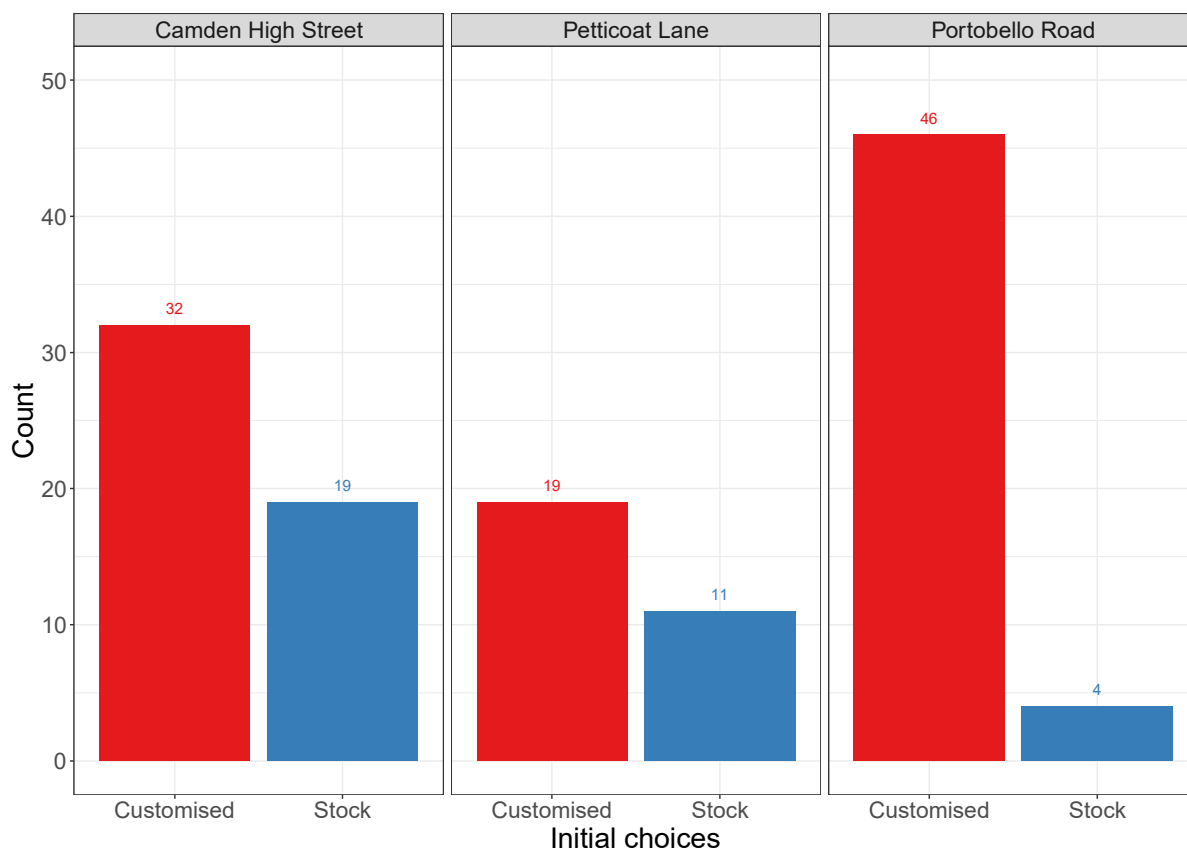


Figure 90. CBC analysis of participant initial choices for fictional sites

Figure 90 shows the findings of initial choice preferences. Despite slight differences in the choices presented, pedestrians consciously chose customised surroundings first. This is most apparent at Portobello Road where 92% of the participants preferred customised sites, followed by Camden High Street participants ~63%, and 63% at Petticoat Lane. This evidence indicates that, of the surveyed pedestrian users of the spaces, there is a dominant affection towards informal interventions having the potential to enhance the quality of the urban realm.

The format of the secondary categories differed at each site, but again the differences between the criteria were discrete, relating to features that can be found in the respective case studies. The choices were as follows:

Table 22. CBC second choices, Camden High Street

<b>Paths</b> Paths and routes are laid out by the council	<b>Street furniture</b> Benches, planters, etc. are fixed	<b>Paths</b> Paths and routes are defined by local communities	<b>Street furniture</b> Benches, planters, etc. are mobile
<b>Signs</b> Signs point towards key landmarks and destinations	<b>Uses</b> Nothing out of the ordinary / predictable	<b>Signs</b> Direct people to local attractions	<b>Uses</b> Unpredictable / extraordinary

Table 23. CBC secondary choices, Portobello Road

<b>Planting</b> Impromptu wild gardens maintained by the local community	<b>Graffiti</b> This occurs at random by local artists	<b>Planting</b> The council's choice is good enough	<b>Graffiti</b> This occurs in designated areas (graffiti walls)
<b>Sculptures</b> Landmark created by a local resident	<b>Uses</b> Everyday showcases different events	<b>Sculptures</b> Landmark created / installed by the council	<b>Uses</b> Every day is the same

Table 24. CBC second choices, Petticoat Lane

<b>Paths</b> Paths and routes are laid out by the council	<b>Street Furniture</b> Benches, planters, etc. are fixed	<b>Paths</b> Paths and routes are defined by the local communities	<b>Street Furniture</b> Benches, planters, etc. are mobile
<b>Signs</b> Signs point towards key landmarks and destinations	<b>Uses</b> Every day is the same	<b>Signs</b> Direct people to local attractions	<b>Uses</b> Every day showcases different events

Even with increases to variations between the measured components at each case study, there is still a dominance of pedestrians choosing customised over stock sites with the exception of Camden High Street data (see Figure 91).

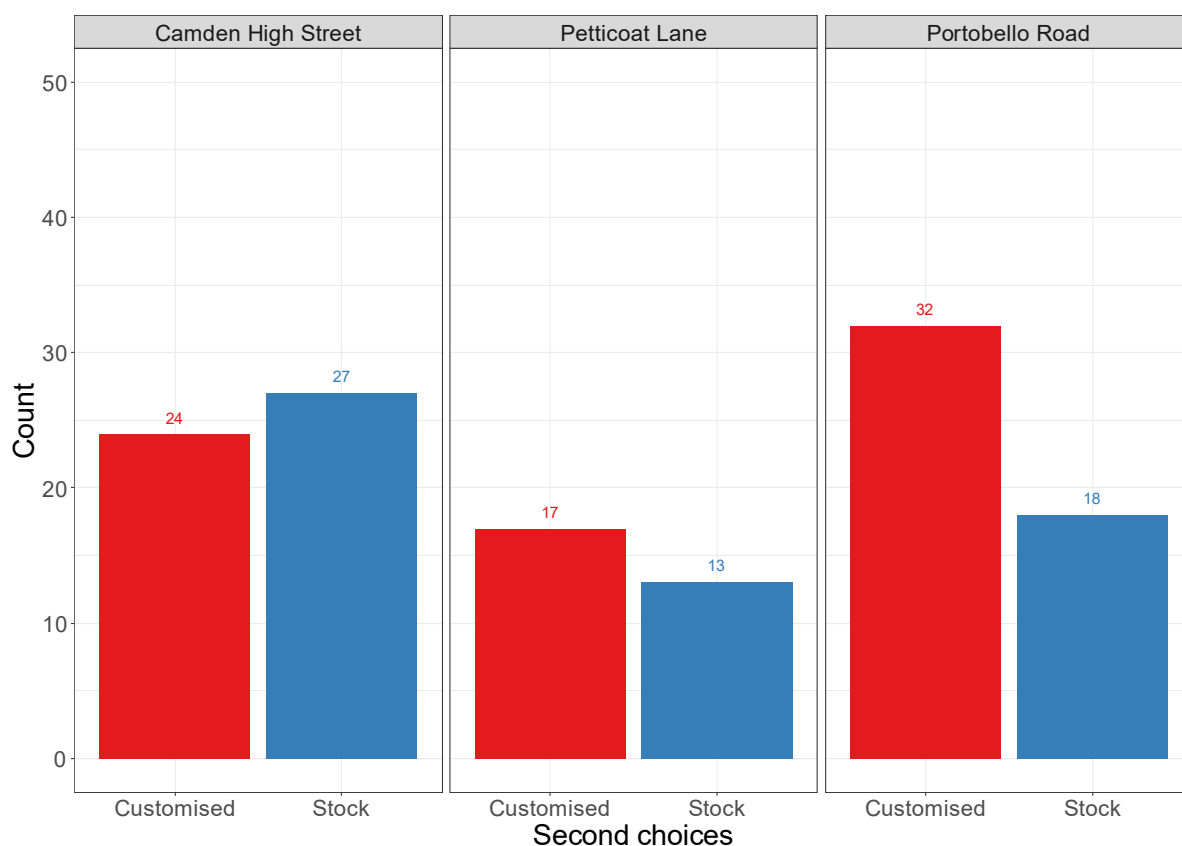


Figure 91. CBC analysis of participant second choices for fictional sites as recorded in settings of three case studies.

At Portobello Road, 64% of the participants preferred customised sites as their second choices, while 57% have a similar response at Petticoat Lane. Only 47% of the responses at Camden High Street prefer the customised features presented, equivalent to a margin of three responses.

Taking into consideration the overall first choices and using the results to project the likelihood of certain second choices, there was the expectation that secondary choices would be ~7% for those having chosen stock features, to make the same choice a second time. There was the expectation that 19% of those initially choosing stock would choose to modify their second choice. 19% of the total participation sample who initially chose the customised configuration would choose the stock option as their second. There was a 54% expectation that those who chose customised sites would repeat their choices a second time. For the calculation of these percentages, please consult Appendix X.

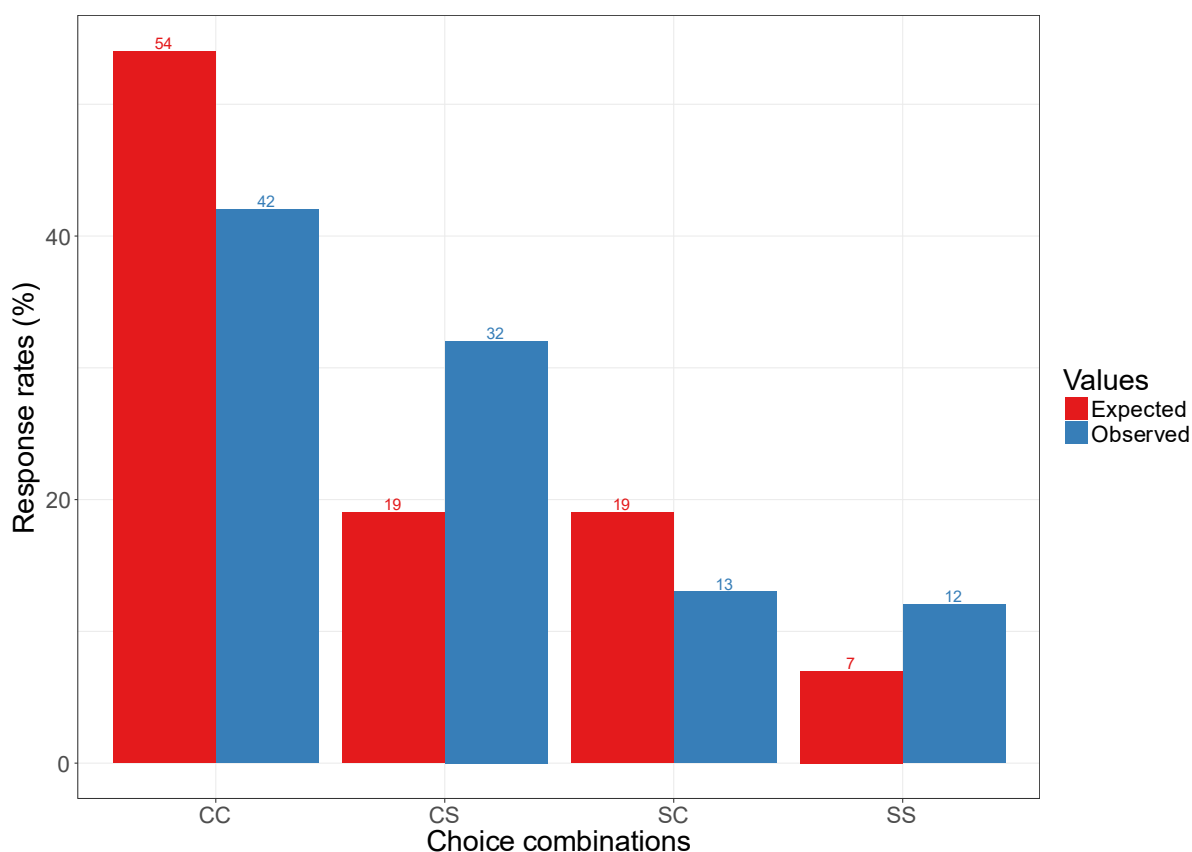


Figure 92. Distributions (%) of pedestrian first and second choice combinations. CC = customised-customised, CS = customised=stock, SC = stock-customised, SS = stock-stock. Red line = expected values, blue-dashed line = observed values. Aggregated data for all three case studies.

Lower than expected observations were made with pedestrians choosing customisation as their second choices with higher gains for stock second choices. However, the dominant second choice was to switch towards customisation (61%, see Figure 92).

A notable exception to this distribution is noted at Petticoat Lane, where 58% of survey participants who initially chose the customised configuration, repeated this preference as their second choice (Figure 93).

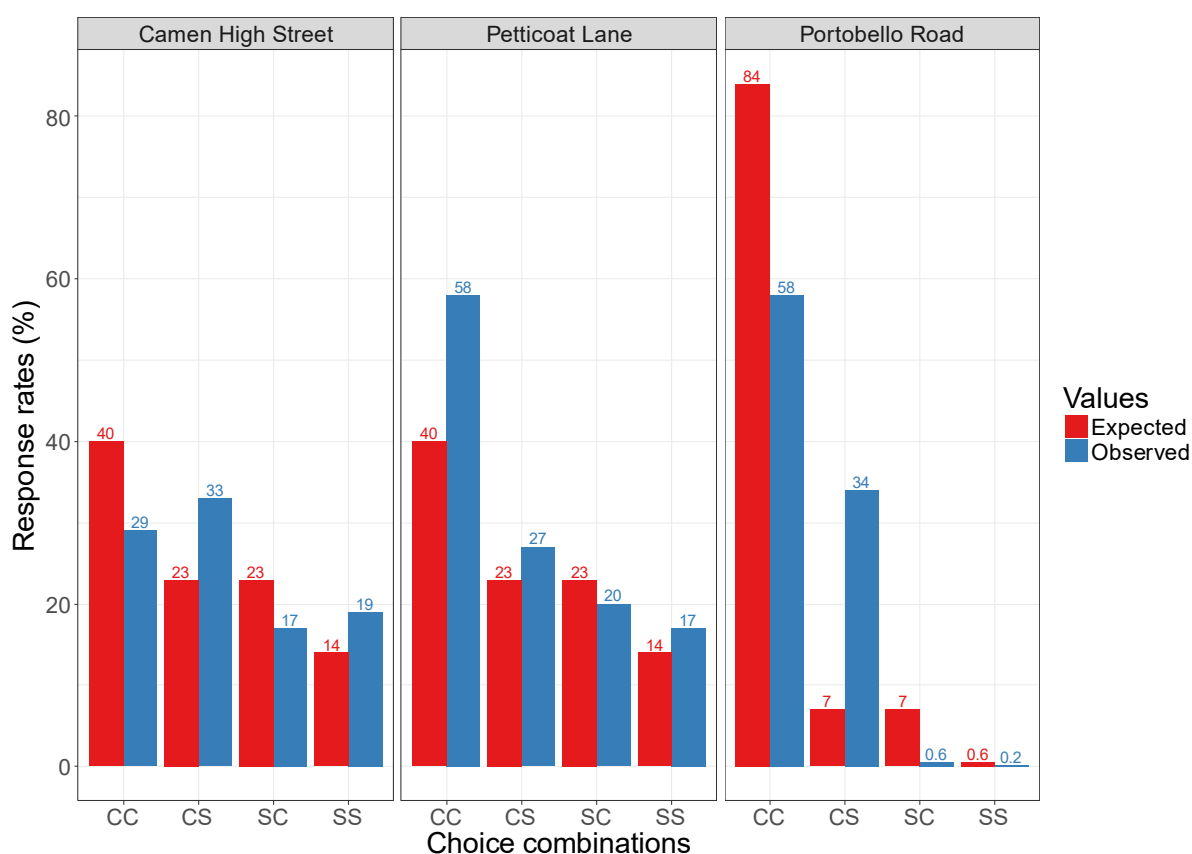


Figure 93. Distributions (%) of pedestrian first and second choice combinations per site. CC = customised-customised, CS = customised=stock, SC = stock-customised, SS = stock-stock. Red line = expected values, blue-dashed line = observed values.

The expectation that participants will opt for customised site configurations is not apparent at each case study. For those who initially selected customised features, secondary choice preferences for customised features fall below the expected percentage threshold at each site. Similarly, those initially choosing stock features also had a lower than expected preference for customised ones at each site.

This result contradicts the earlier findings but can be attributed to the randomness of the sample, highlighting the individualities of the participants. This can also be attributed to extreme nature of the customised featured offered by the CBC choices – not one spatial configuration attempted to envision a site with combined stock and customised characteristics.

With regards to the customised configurations, it can be noted that an aversion to the customised configurations can be due to them depicting an over complicated



urban setting, leading to the validation of the theoretical threshold for customisation as discussed in section 4.3.

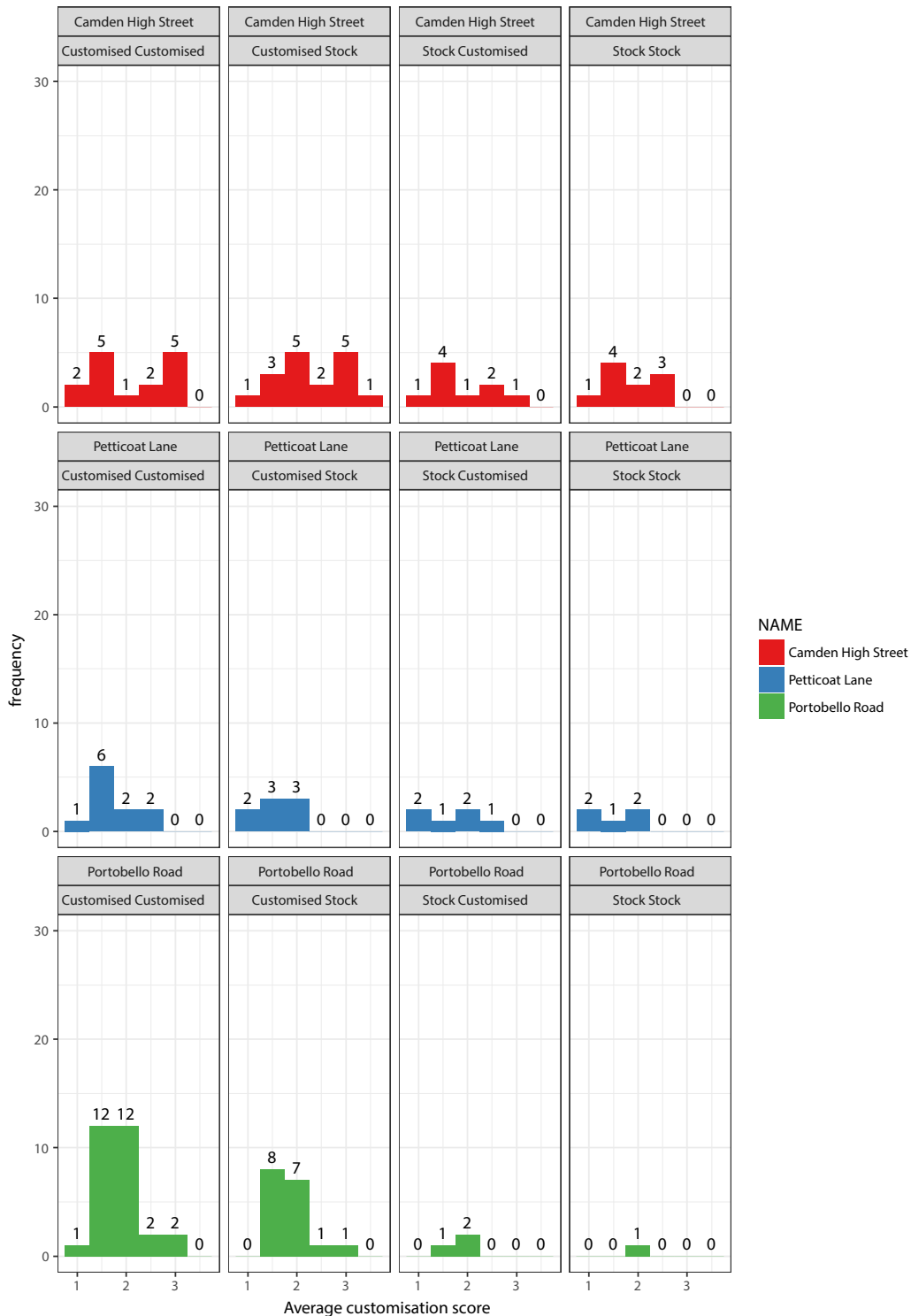


Figure 94. Distribution of second choices in relation to customisation

In relation to customisation (Figure 94), the distribution of choices is random at Camden High Street. For example, there is an even distribution of participants choosing customised configurations in both customised and stock regions of the

case study. However, the distribution skews to the right at Petticoat Lane and Portobello Road for people choosing customised configurations as their first and second choices. The turnout for these choice combinations is among the highest made by participants across all three sites.

Participants who chose a stock configuration followed by a customised configuration present gentle right skews at Camden High Street and Petticoat Lane – the majority of pedestrians making this decision were located in regions with low customisation presence. Although there is the potential for a left skew at Portobello Road, the regions where participants answered in this way do not have customisation scores exceeding ~2, with a maximum of 3 participations (of 50).

Participants choosing customised followed by stock configurations were unevenly distributed at Camden High Street; the randomness potentially reflects the higher participation rates and subjectivity associated with the samples collected. However, left skews at Petticoat Lane and Portobello Road seemly suggests that participants were more likely to make this decision when situated in stock surroundings.

For pedestrians preferring stock configurations as their first and second choices, the distribution is again Random at Camden High Street with a roughly left-skewed shape that exhibits bi-modal peaking. This indicates that aspects of stock environments may be influencing the participants' perception of space which connects this research to studies on sensory perception (Pink, 2008; Wunderlich, 2008). When a region achieves a customisation score of ~2.5, the penchant for purely stock features increase slightly, complimenting the distribution noted for customised-stock preferences. However, this choice combination is associated with the smallest number of participants (~11% of the total number of survey participants). A similar distribution was recorded at Petticoat Lane, but with far fewer participants with observations only made in regions with customisation scores ranging between 1 and 2. Only one observation was made at Portobello Road in a region with a customisation score of 2.

Some of the support for stock configuration can be attributed to the triviality of the composite attributes. For example, the banning of buskers at Camden High Street was viewed as a positive move by some local groups who agreed with the councils' perspectives of the activity being dangerous and a nuisance that disrupts the flow of pedestrian traffic (Manifesto Club, 2014). On the other hand, such views also resonate with the negative correlations between sound, smell, and air quality noted in section 8.2. However, from this evidence, the main conclusion is that the majority of participants exhibited an affiliation towards spaces that showed evidence of customisation within the constraints of the theoretical threshold.

### **8.3 Attitudes towards customisation**

Following the CBCA survey, pedestrians were given the further choice to write a sentence directly expressing their thoughts on their immediate surroundings. Responses were gathered at Camden High Street and Portobello Road, but not at Petticoat Lane. The participants at Petticoat Lane generally expressed the most reluctance to engage in the survey with most expressing that they 'didn't have the time'. Those who filled in the survey did so quickly, avoiding the optional sentence entirely.

Responses at Camden High Street occurred in regions with customisation scores ranging between ~1.5 and ~2.8, with the majority of responses within areas with customisation scores exceeding 2 (see Table 25). Here, comments only occurred where opinion/satisfaction scores exceed 2.5. In regions with customisation scores of less than 2, pedestrians were 33% more likely to feel unsafe, with 67% commenting on the diversity of Camden (and not on the built environments present at the site). In regions with customisation scores exceeding 2, 40% were inclined to comment positively on the features present, a further 40% commented on the diversity of the site, and the remaining 20%, positively on the safety of the site. These confirm the key findings of the CBCA at Camden High Street that demonstrates a satisfaction with customisation at this site.

At Portobello Road 50% of participant comments occurred in regions with customisation scores below 2. The customisation range for the comments is approximately between ~1.2 and ~2.1 (Table 25).

## Chapter 8. Customisation and Pedestrian Satisfaction

Table 25. Comments accompanying participant survey responses. No comments recorded for Petticoat Lane.

<b>Average satisfaction score</b>	<b>Relative average customisation score</b>	<b>Comments</b>
<b>Camden High Street</b>		
3.4	1.44445	Different kind[s] of people, nobody is a stranger
2.6	1.5277801	Unsafe area - safety not good
3.2	1.62037	Diversity of the area ([Camden] is known for this)
2.8	2.17593	Good people - [I feel] safe
3.4	2.64815	There are so many attractions in the Camden Town area
2.8	2.6666701	Diversity of people, very populous 'friendly'
2.6	2.7777801	Everyone is different
3.2	2.7777801	I enjoy the restless creative [energy] of [Camden], namely in the street performers and the music venues
<b>Portobello Road</b>		
4.2	1.26852	More seating needed for the public - visitors who are strolling in the area
3.8	1.53704	Individual nature of shops is good
4.2	1.7592601	I enjoy most about this location the atmospheric friendliness [of] the passers by
3.6	2.1296301	Everything :) local community
4	2.1296301	it's a good vibrant area and lots of different peoples and cultures I love it
3.8	2.1666701	More variety in stores needed

In regions with customisation scores of less than 2, 33% of the comment responses were about the individual nature of shops, 33% on friendliness of passers-by (people focused), with the remaining 33% complaining about the lack of seating facilities; this indicates the strong desire to modify, observed in the CBCA. In regions with customisation scores in excess of 2, 33% of pedestrians commented on the lack of variety of shops, and 66% on the diversity and the local community – this comment, ‘Everything \*smiley\* local community’, can be applied to the physical realm, however as local community is mentioned, it is interpreted within the social context rather than the environmental. The Portobello Road comments were strongly orientated to people using the site rather than the applications of customisations to the streetscape; this finding may justify the constantly high scores throughout the site. The comments on the features present were mostly negative and contributed to the negative correlation between static activities and customisation at the site.

## 8.4 Demographic considerations

### 8.4.1 Age

Participant age vs satisfaction score

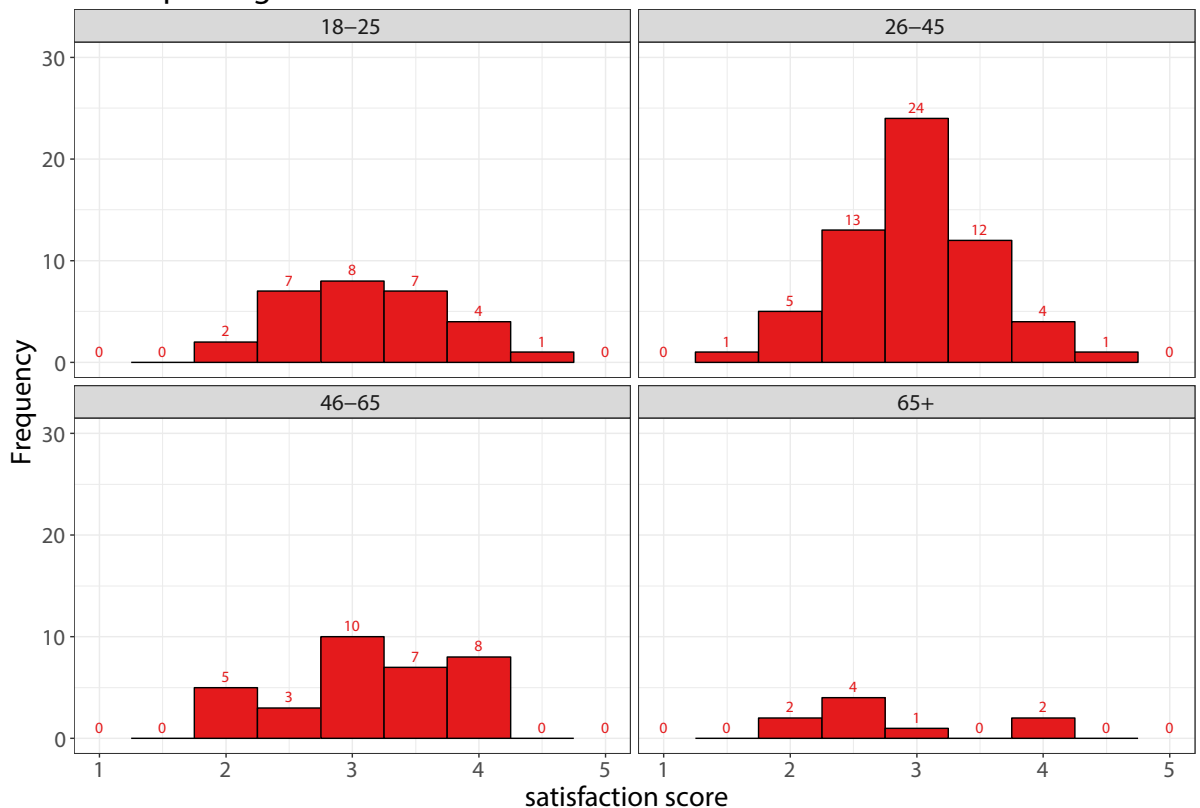


Figure 95. Satisfaction scores vs age (all case studies)

Across all three sites, the most populous age group was the 26-45 year olds who account for approximately 46% of the completed surveys (Figure 95). They were

closely followed by 46-65 year olds who account for ~25%. The 18-25 year olds represent ~22%, while 65+ year olds ~7%. The scores for both 18-25, 26-45, 46-65 year olds peaked slightly above 'average' score allocations (3), whereas the 65+ year olds appeared to mostly assign scores towards the average bracket.

Exploring the trend at Camden High Street shows that participants falling within the most populous age groups were evenly spread throughout the case studies (see Figure 96).

At Portobello Road, 18-25 year olds were mostly located towards the north of the case study, while participants aged 26-45 were located towards the south, although there was a fairer representation of them a little further north of where the 18-25 years were surveyed. There were moderately even distributions of 46-65 and 65+ year olds throughout the site with a tendency for 46-65 year olds to be located towards the northern end of the site, while 65+ year olds were located towards the mid/south (see Figure 97).

Petticoat Lane saw the 26-45 year olds, the dominant group, evenly distributed throughout the site (Figure 98). Only one observation was made for 65+ year olds.

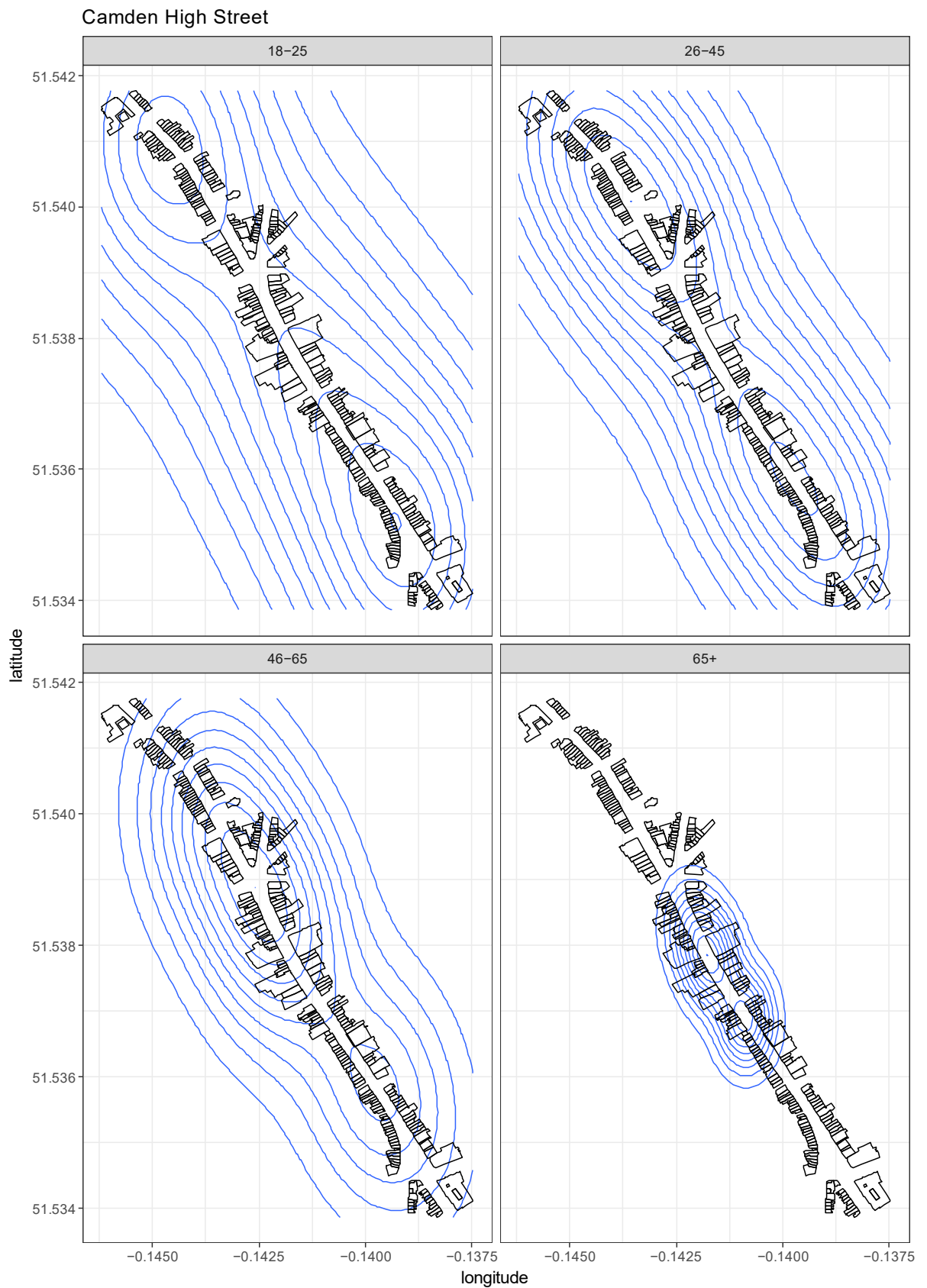


Figure 96. Distribution of survey participants per age band, Camden High Street. The blue contour lines give an indication of where participant grouping are most concentrated – inner most bands indicate higher concentrations of a particular respective age band.



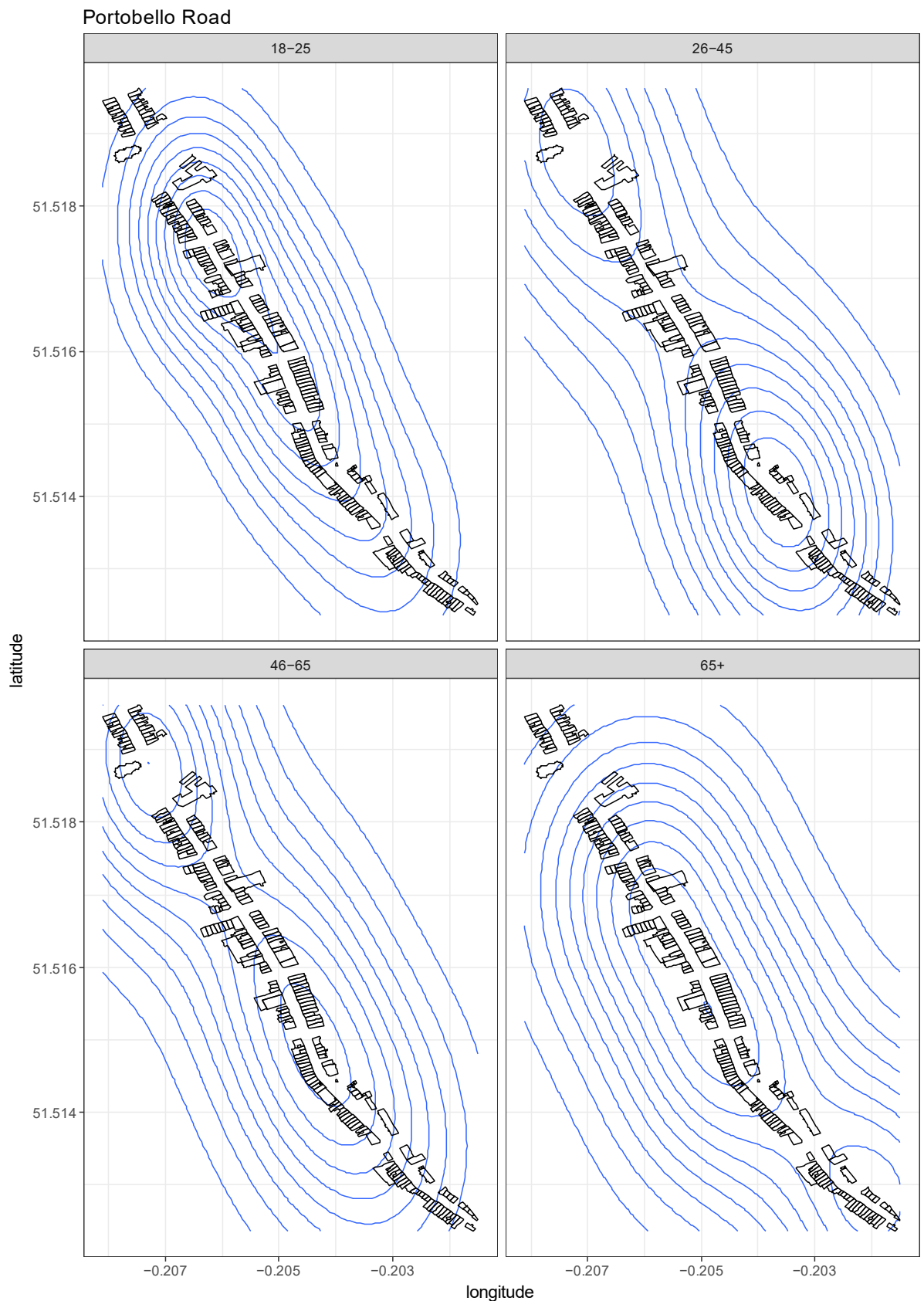


Figure 97. Distribution of survey participants per age band, Portobello Road. The blue contour lines give an indication of where participant grouping are most concentrated – inner most bands indicate higher concentrations of a particular respective age band.

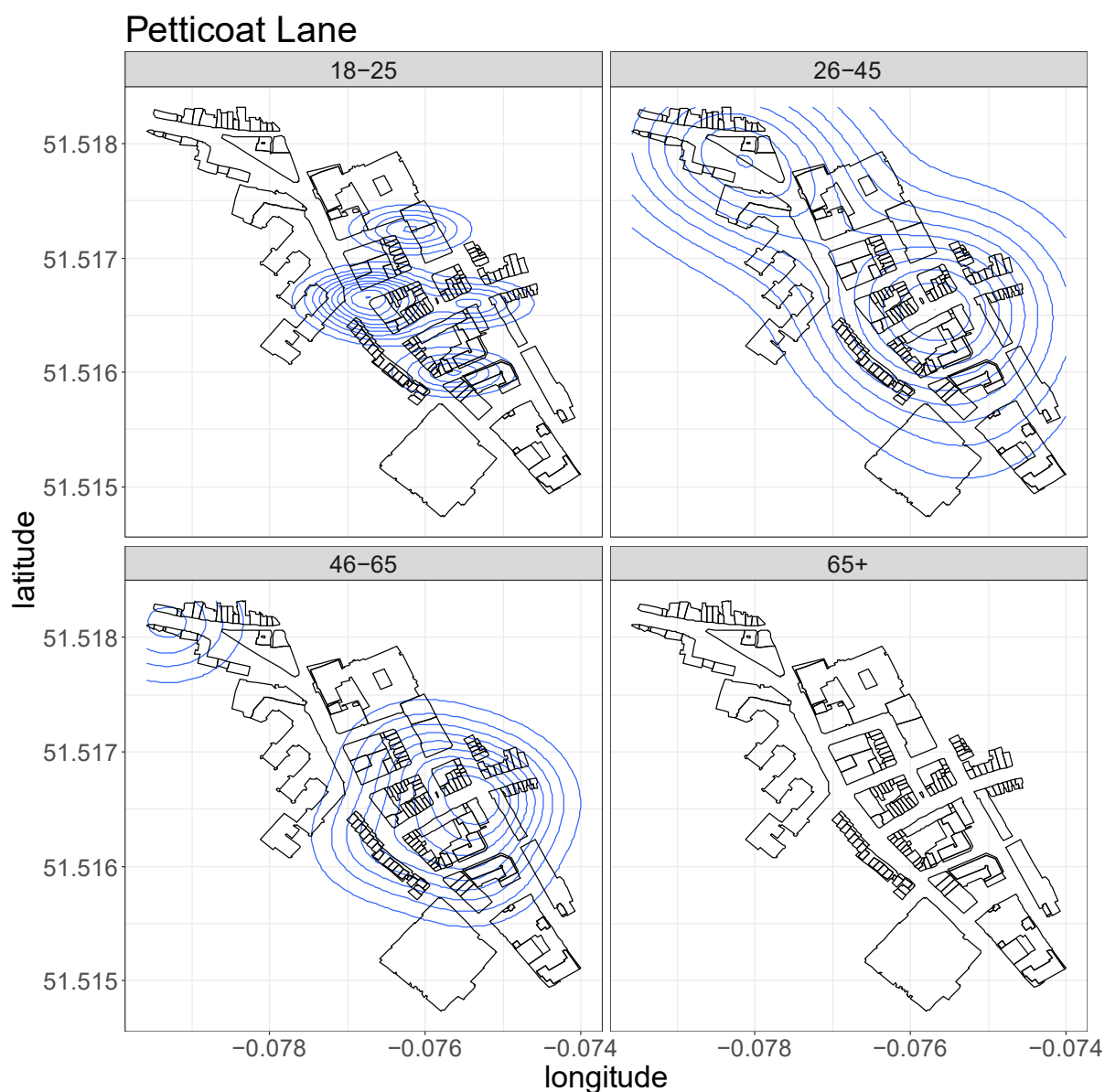


Figure 98. Distribution of survey participants per age band, Petticoat Lane. The blue contour lines give an indication of where participant grouping are most concentrated – inner most bands indicate higher concentrations of a particular respective age band.

The distribution and density of these age bands are Random and can be partially attributed to the presence of customisation.

Although the overall dispersion of 18-25 year olds at Camden High Street was evenly spread, there is a moderately strong positive correlation with their satisfaction and the presence of customisation ( $r = 0.46$ , Table 26). A similar correlation is observed with 26-45 year olds at Portobello Road, albeit with a weaker coefficient of  $r = 0.06$ . The 46-65 year olds correlate negatively with

customisation at this site ( $r = -0.12$ ) compared with the 65+ year olds with a strong correlation of value of  $-0.71$  (Table 26).

Table 26. Average customisation scores vs. Age bands. Correlation  $r$  and  $r^2$  values (see Appendix VII for accompanying scatter plots)

Case study	Age Bands							
	18-25		26-45		46-65		65+	
	$r$	$r^2$	$r$	$r^2$	$r$	$r^2$	$r$	$r^2$
<b>Camden High Street</b>	0.46	0.21	0.06	0	-0.12	0.01	-0.71	0.51
<b>Petticoat Lane</b>	-0.22	0.05	0.06	0	0.12	0.01	0	0
<b>Portobello Road</b>	0.22	0.05	-0.45	0.2	-0.05	0	-0.63	0.4

The distribution of participants shown in Figure 96 are relatively loose for the age bands of 18-25, 26-45, and 46-65 but are tight for 65+ year olds at Camden High Street. People less than 65 years old are more likely to use the entire length of the high street, while 65+ year olds are concentrated towards the mid (least customised) sections of the high street. It is noted that concentrations of participants ages 46-65 are also located further away from customisation hotspots than the younger age groups. Later analysis will seek to determine whether this pattern can be attributed to an aversion of customised features in older groups. However, it can be speculated that these groups either prefer to avoid the crowds associated the customised regions or, in the case of the 65+ year olds, are not mobile enough to reach the customised parts of the high street or have concerns for personal safety.

At Petticoat lane, weak correlations are associated with customisation. Unlike Camden High Street and Portobello Road, the 18-25 year olds here were less likely to assign high scores to customisation present at the site ( $r = -0.22$ ).

However, positive correlations are apparent in surveyed 26-45 year olds and 46-65 year olds (see Table 26). Only a single participant is aged over 65+ years old so a correlation cannot be derived.

The distribution of participants shown in Figure 98 mostly occur in regions that have been recognised as exhibiting obvious evidence of customisation. The exception is for those aged 18-25 who appear to be randomly dispersed throughout the site. However, the small size distorts the reality that 4 of 6 participants were located in regions exhibiting some degree of customisation (scores of 1.3 or greater, see Table 27) – this distribution appears to also be unaffected by whether or not a participant is a local or visitor to the site, strengthening premise that customised environments are more attractive. No 65+ year olds were interviewed at Petticoat Lane.

*Table 27. Customisation scores relative to the position of surveyed 18-25 year olds at Petticoat Lane.*

<b>Participant Age</b>	<b>Status</b>	<b>Relative customisation score</b>
18-25	Visitor	0
18-25	Visitor	1.08333
18-25	Local	1.38889
18-25	Visitor	1.4722199
18-25	Visitor	1.7777801
18-25	Local	2.6666701

Again, a similar observation is made at Portobello Road for 18-25 year olds whose satisfaction correlates positively with the presence of customisations ( $r = 0.22$ ). However, negative correlations are noted with the remaining age categories, the strongest being for the 65+ year olds ( $r = -0.63$ ). These trends are visualised in Table 26.

From Figure 97, the distribution of pedestrians at Portobello Road are loosely distributed along the length of the case study. However, the majority of 65+ year olds were located towards the centre of the site where, like Camden High Street, the more commercial land uses are located, where customisation scores at their weakest. 18-25 year olds are located towards the northern in of the site that comprises of more aesthetic customisation than southern portion of the site that comprises more of the traditional antiques markets. The 26-45 year olds are located at both the north and south regions of the site, but so much towards the middle – an indication that they are attracted to customisation. 46-65 year olds

are located towards the centre of the case study but are slightly more southwards of the concentration of 65+ year olds indicating an attraction towards the antiques markets and maybe their respective aesthetic, physical, and functional customisations.

This data shows that pedestrians are generally more likely to respond to specific forms of customisation.

Exploring the overall the trends reveals that the satisfaction levels of 18-25 year olds are more likely to correlate with averaged aesthetic and physical and functional customisations. However, the correlations are weak to neutral, meaning that customisation isn't playing a significant role in their attitudes towards the quality of a built environment (see Table 28).

*Table 28. Average customisation scores vs. Age bands – split by the implementation of customisation (environmental intervention). Correlation r and r2 values (see Appendix VII for accompanying scatter plots)*

	Age Bands							
	18-25		26-45		46-65		65+	
<b>Environmental intervention</b>	<b>R</b>	<b>R2</b>	<b>R</b>	<b>R2</b>	<b>R</b>	<b>R2</b>	<b>R</b>	<b>R2</b>
<b>Aesthetically customised</b>	0.43	0.18	-0.11	0.01	-0.04	0	-0.35	0.12
<b>Physically customised</b>	0.1	0.01	-0.03	0	-0.1	0.01	0.54	0.29
<b>Functionally customised</b>	0.57	0.32	-0.42	0.17	-0.38	0.14	0.5	0.25

Table 28 also reveals strong correlations for 65+ year olds. From the evidence presented, they are more averse to aesthetic customisations (colour variance, variance in façades, and street art). In contrast their satisfaction scores rise with the physical customisations which include pathway subdivisions and guerrilla gardening. Similarly, a moderately strong correlation is associated with functional customisation and this age group's satisfaction scores – the more present (i.e. street performers, informal changes of uses, possession), the higher their opinion scores.

Negative correlations are recorded for 26-45 year olds for aesthetic and functional forms of customisation, however, a neutral relationship is noted for physical forms of customisation that do not have a bearing on their scoring.

For 46-65 year olds, all forms of customisation appear to yield an overall negative relationship with satisfaction scores.

It is probable that mid-ranged age groups (26 – 65) are more likely to respond negatively to customisation and move away from it. However, 18-25 and 65+ year olds are more likely to respond positively to customisation and assign high satisfaction scores.

Table 29. Average customisation scores vs. Age bands – split by customisation components. Correlation *r* and *r*<sup>2</sup> values (see Appendix VIII for accompanying scatter plots)

Customisation component	Age Bands			
	18-25		65+	
	<i>r</i>	<i>r</i> <sup>2</sup>	<i>r</i>	<i>r</i> <sup>2</sup>
<b>Aesthetics</b>				
Colour	-0.29	0.03	n/a	n/a
Uniformity	0.27	0.02	n/a	n/a
Public Art (Quantity)	0.3	0.06	n/a	n/a
Public Art (Quality)	0.26	0.04	n/a	n/a
<b>Physical</b>				
Street Interruptions	0.62	0.14	1	0.35
Wayfinding/Signage	0.34	0.03	-0.07	0.004
Reconfiguration	0.43	0.01	1	0.24
Guerrilla Gardening	0.07	0	0	0
Sculptures/Structures	0.34	0.02	0	0
Urban Knitting	0	0	0	0
<b>Functional</b>				
Performances	0.01	0	0.02	0.03
Occupation/Possession	0.36	0.06	0.74	0.37
Change of use	0.04	0.06	0	0
Other	0	0	0	0

Focusing on instances where regression analysis results in correlation coefficient values in excess of +0.3, evidence of weak-positive correlations suggest that the most influential form of customisation among 18-25 year olds is public art. The

more informal an art piece is (quality), the more likely a young participant is to assign a higher satisfaction score (Table 29).

- Block and street alignment. Informal subdivisions of streetscapes, resulting in more exploratory walking, is linked to higher satisfaction scores, an indication that such interventions are connected with a conscious appreciation of environmental factors similar to those recorded by Wunderlich (2008).
- Wayfinding and signage. This age group appears to appreciate informal signs that direct them towards local attractions.
- Sculpture and structures. The power of informal sculptures and structures to as props (Stevens, 2007) is realised when observing responses in the youngest participant groups (Table 25).
- Possession and occupation. 18-25 year olds favour spaces that appear to be dominated by informal uses that intentionally enhance the quality of the public realm.

As noted in Table 28, satisfaction scores in 65+ year olds do not improve with increased aesthetic customisations. Like the 18-25 year olds, they do not respond to colour; however, they also do not respond to public art interventions and varied façade designs. From the participants of the survey, it is apparent that 65+ year olds do respond positively to informal streetscape subdivisions – evidenced by the clear positive correlation ( $r = 0.35$ ) between increased occurrences and satisfaction scores.

In a similar way to the 18-25 year olds, the 65+ year olds respond positively to occupation and possession. Although based on comparatively few observations, the correlation here is strong. An extended study might reveal that older people do indeed enjoy informal acts of possession that enhance the original functions of streetscape, interventions like food vendors, antiques and clothes markets. This particular attribute is associated with the block and street alignment attribute, informal subdivisions to a pedestrian footpath.

The neutral to negative correlations associated with the most populous groups may also become apparent in the younger and older generations in extended

studies. However, from the data presented here, an explanation for this despondency can be associated with the fact that 26-45 and 46-65 year olds are possibly using the streetscape purposively and not discursively. Past studies have shown that people approaching middle age are more likely to be economically active and more engrossed in ensuring that their decisions enhance their position in their eventual old age. Unlike younger people, who are perceived as risk takers, this generation is more likely to home in on topics that concern them directly – omitting superfluous details. Older generations (retirees) are able to enjoy life once more and take in their surroundings. However, they are less accommodating of change and appreciate features that they see as enhancing their urban experience.

As the dominant population is despondent, it can be broadly assumed that satisfaction scores are not directly influenced by age, but by environmental factors. It can also be assumed that a conscious response to customisation is mostly neutral, although the ability of informal interventions in influencing the attractiveness and subsequent liveliness of a site should not be ruled out.

### 8.4.2 Status

Status refers to whether a survey participant defines themselves as a ‘visitor’ or a ‘local’ to a respective case study. In several instances, pedestrians required help from the researcher in order to choose a category. In broad terms the following criteria were assigned in order to help determine the status of a participant:

#### **Visitor**

- Tourist
- Visits the site infrequently (less than once a month)

#### **Local**

- Lives within the case study region or nearby
- Works in the area
- Frequently visits the site (more than once a month)

The distribution of visitor interviews isn’t consistent across the three case studies. At Camden High Street, 64% identified themselves as being ‘local’ to the area; at Portobello Road, 58% of the participants are local. However, the marginal



majority of participants considered themselves to be visitors to Petticoat Lane (53%). See Figure 99.

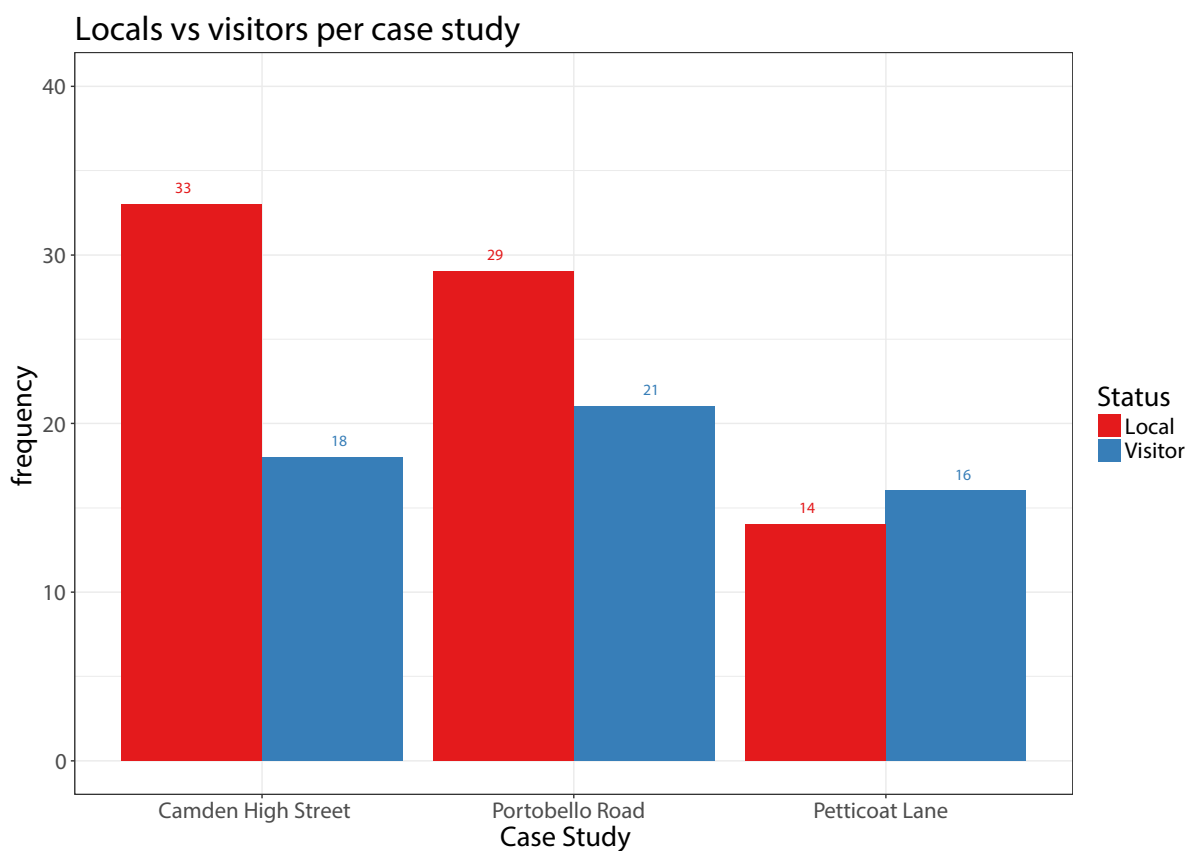


Figure 99. Locals vs. visitors per case study

The locations of the participants distinguished by status demonstrates a clear dichotomy between locals and visitors. At Camden High Street (Figure 100), visitors were mostly centred towards the start of the market areas, while locals were more evenly distributed throughout the site.

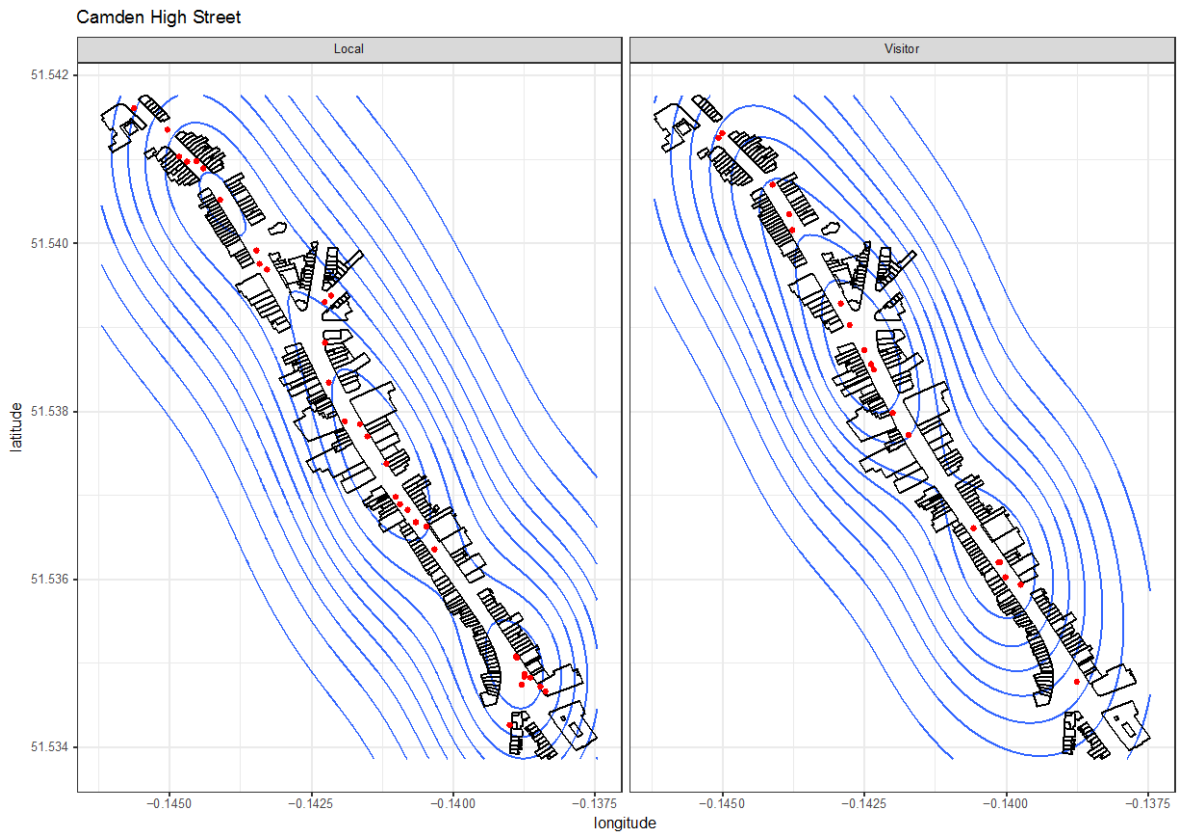


Figure 100. Distribution of local and visiting participants, Camden High Street. Densities are shown with blue contour lines – higher densities are the inner most rings. The red points show the actual locations of participants.

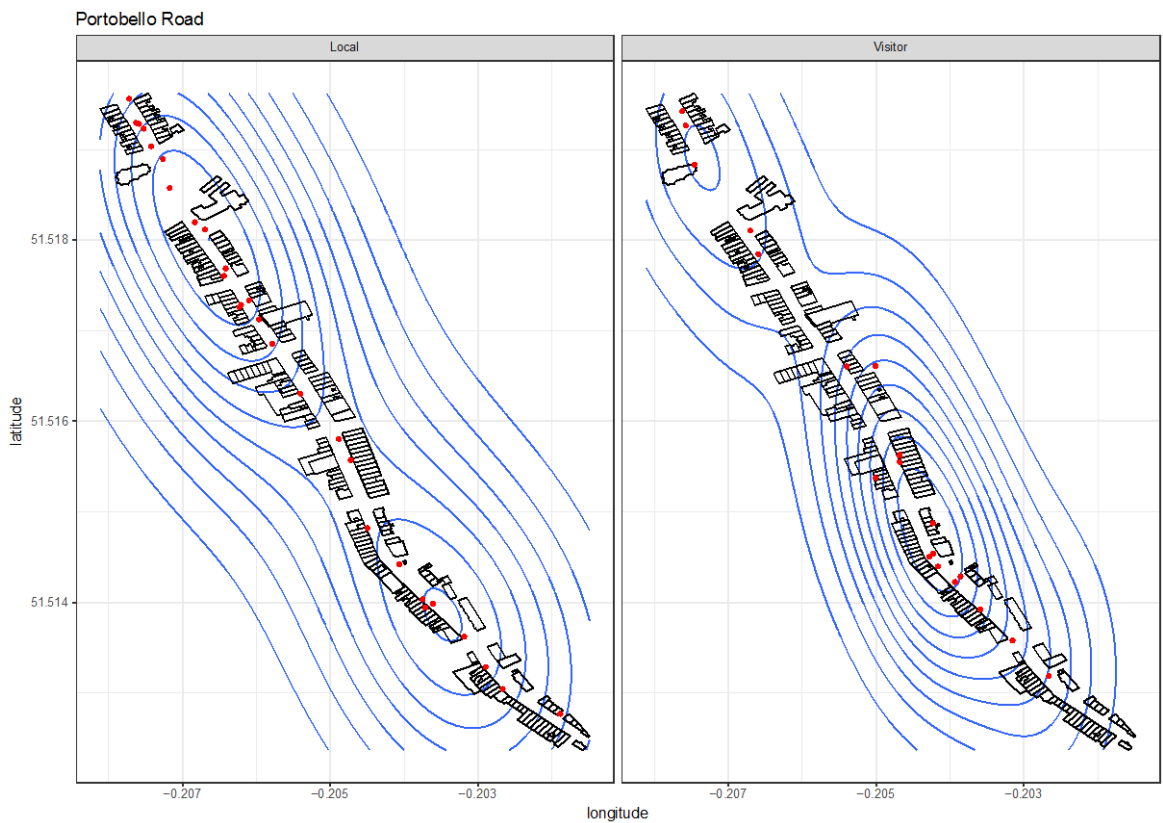


Figure 101. Distribution of local and visiting participants, Portobello Road – higher densities are the inner most rings. The red points show the actual locations of participants.

Similarly, at Portobello Road (Figure 101), visitors were mostly located in one particular region of the case study, while locals were more evenly spread – the pattern repeats for surveys collected at Petticoat Lane (Figure 102).

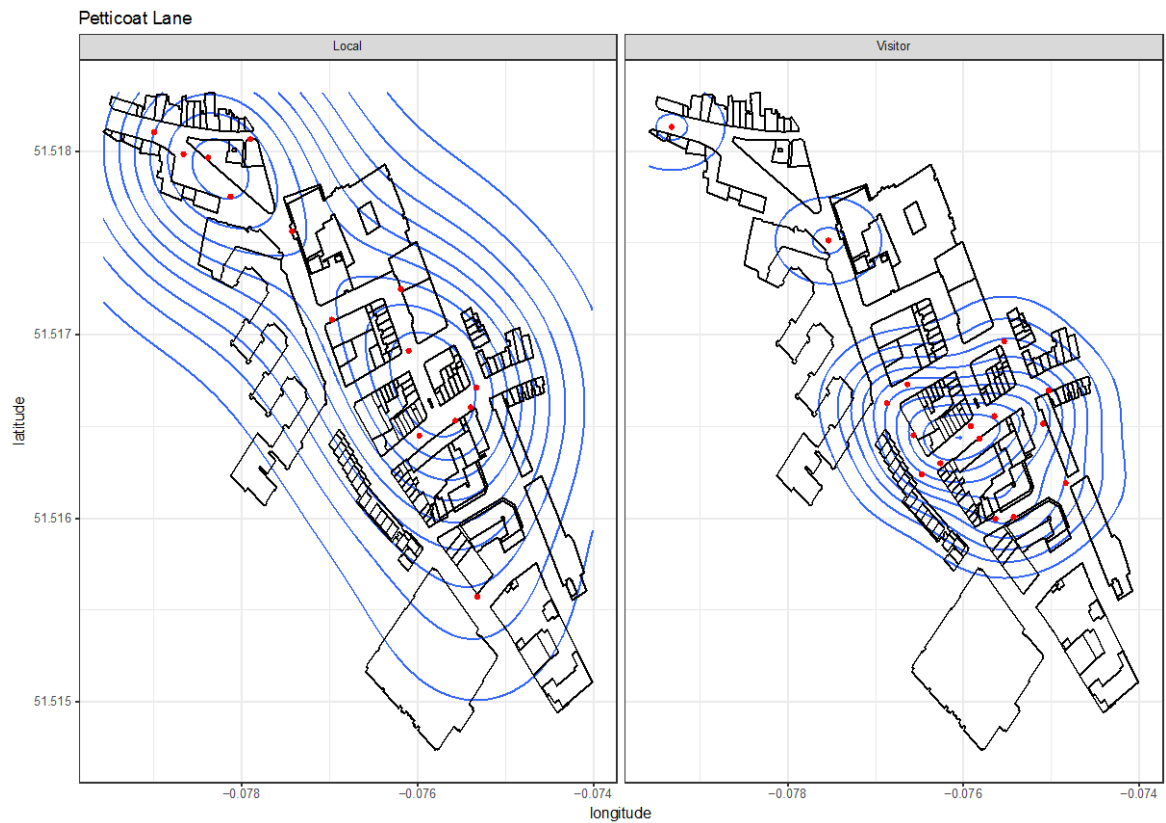


Figure 102. Distribution of local and visiting participants, Portobello Road – higher densities are the inner most rings. The red points show the actual locations of participants.

Responses towards customisation at each site are comparable between locals and visitors at Camden High Street and at Portobello Road. Satisfaction scores uniformly increase with customisation at Camden High Street, however, they decrease at Portobello Road (see Figure 103).

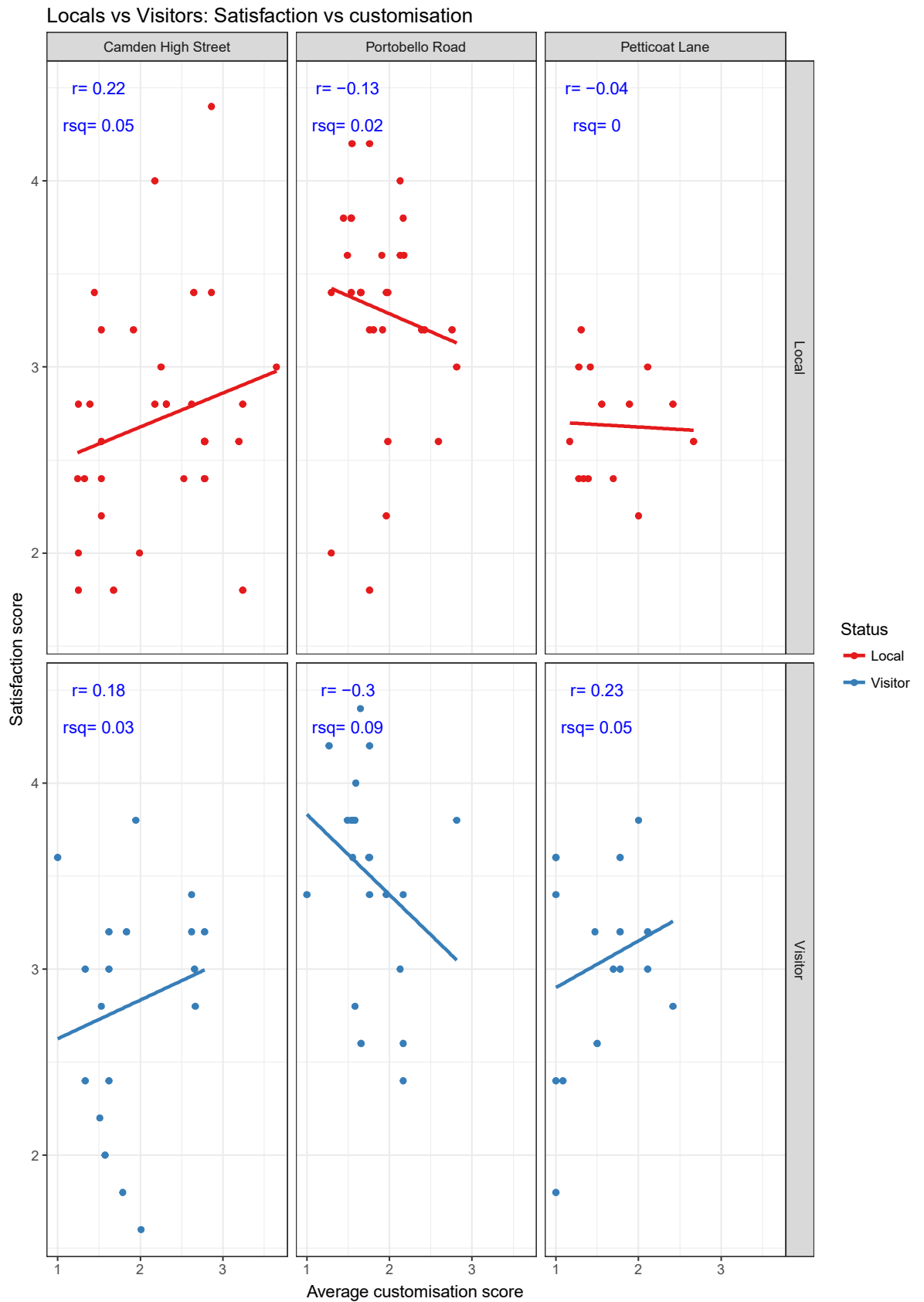


Figure 103. Customisation scores vs satisfaction by participant status

Apparent in Figure 103 is a positive correlation between customisation scores and visitors at Petticoat Lane, with locals more likely to assign higher scores to regions exhibiting little evidence of informal interventions. The strongest positive correlations are noted at Camden High Street for both locals and visitors, while a relatively strong correlation is noted for Petticoat Lane's Visitors.

Expanding on this finding reveals varied responses to different customisation interventions. Correlations between aesthetic customisations and satisfaction suggest that locals are more appreciative of colour and uniformity variance as well as informal street art installations at Camden High Street and Petticoat Lane. However, the opposite is true for visitors at the same location (see Figure 104).

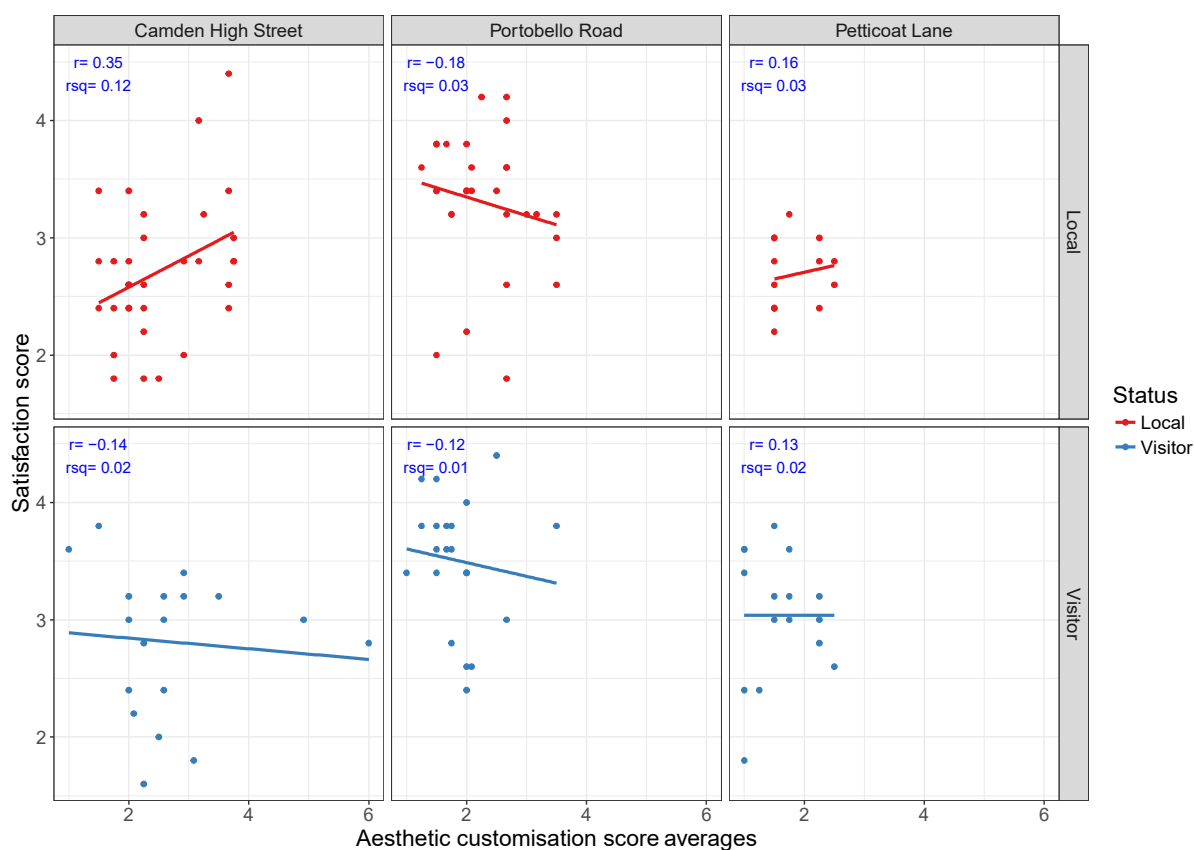


Figure 104. Average aesthetic customisation scores vs satisfaction by participant status

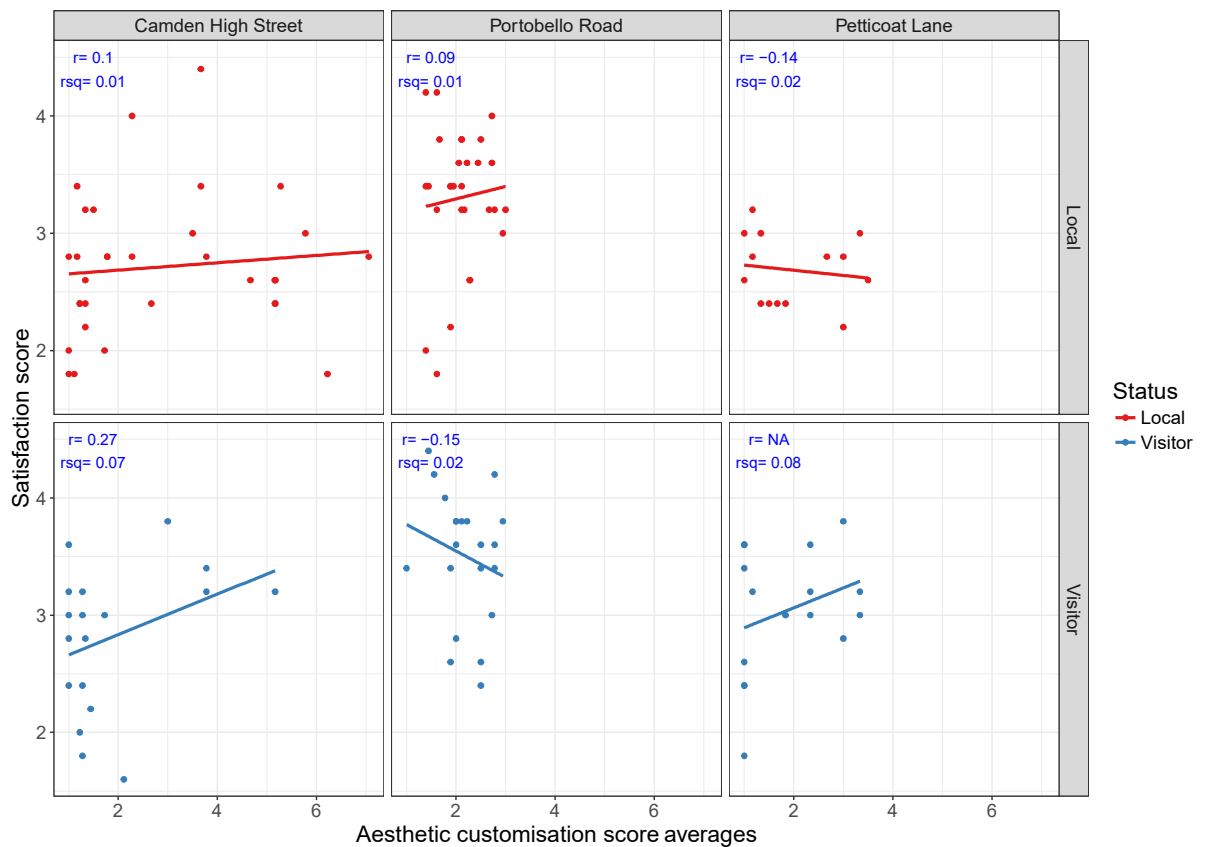


Figure 105. Average physical customisation scores vs satisfaction by participant status

Physical customisation scores appear to correlate positively with satisfaction scores for both locals and visitors at Camden High Street although most of the visitors were located in regions with minimal physical customisation presence. The visitors of Petticoat Lane also appear to exhibit a positive correlation, where the  $r$  and  $r^2$  values generated within R, are erratic (see Figure 105).

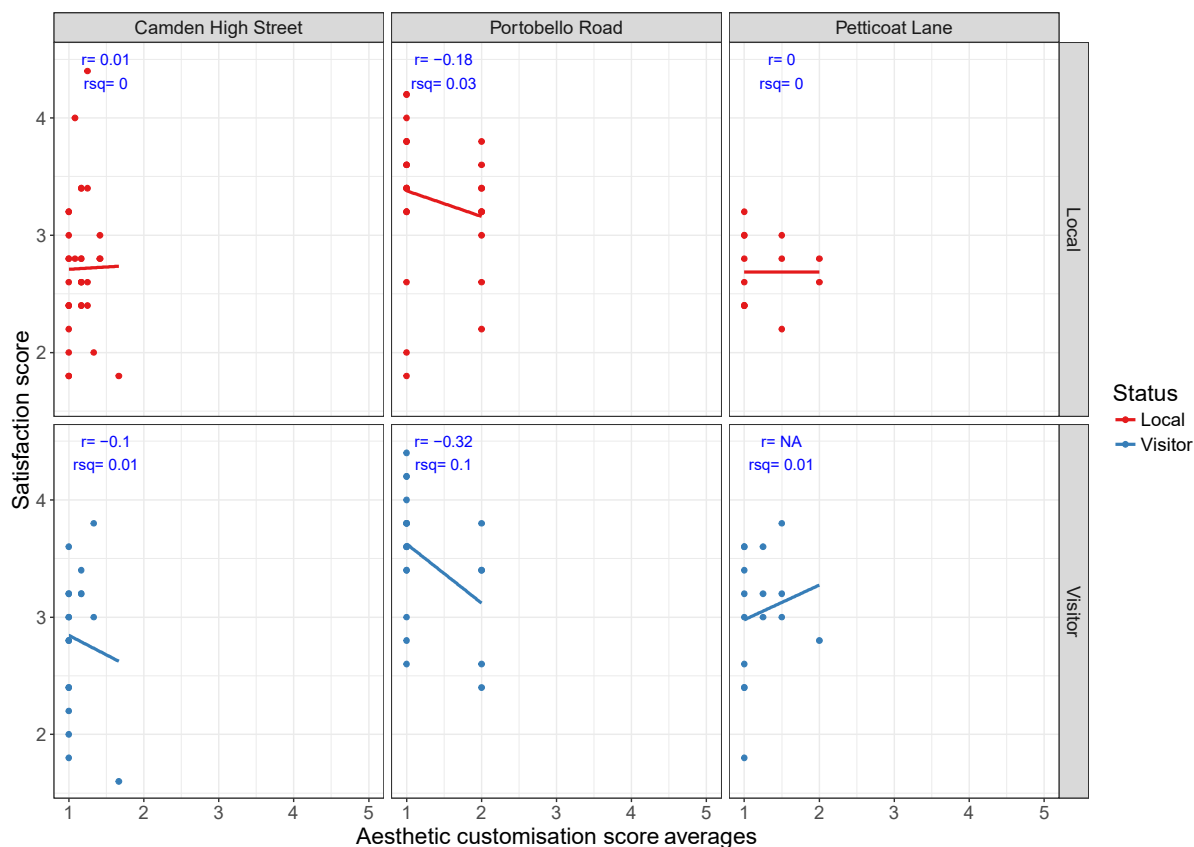


Figure 106. Average functional customisation scores vs satisfaction by participant status

Figure 106 demonstrates the minimal impact of functional customisation on the opinions of static pedestrians, mostly because their locations exhibit low scores in this regard. The satisfaction scores of visitors to Petticoat Lane visually appear to correlate with increases in functional customisation at the site. This pattern is reversed for the remainder of observations concerning functional customisation, with the exception of the locals at Camden High Street where a marginally positive correlation is observed, which is subject to distortions as indicated by the  $\sim 0$   $r^2$  value. It is probable that locals appreciate the presence of functional customisations; these trends somewhat echo the findings presented in Section 8.2.

This brief section indicates that responses to customisation are random and subjective where there is no particular distinction between the opinions of local participants and visitors. At Camden High Street, where positive correlations were noted for both locals and visitors, locals were more likely to respond favourably to aesthetic customisations, whereas, visitors were more likely to

appreciate physical customisations situated in settings with increased physical customisation presence. Responses towards functional customisations yield mostly negative correlations, with the exception of locals at Camden High Street and visitors at Petticoat Lane. The distinctive differences in the spatial distributions of locals and visitors is potentially connected to the facilities and amenities present at each location – some of these catering specifically for visitors.



## 9 Discussions and Conclusions

### 9.1 Discussion

There is a general acknowledgement that the flexibility offered by a product that can be altered after it has left the factory, results in something that holds more value to the end user. To understand whether similar circumstances in urban design also result in the development of desirable urban spaces, this thesis sought firstly to identify spatial components that can be customised post-construction and introduced fresh methodical approaches that capture the distribution of static activities in relation to the presence of customisation. Specifically, this research investigated whether a relationship exists between increases in the popularity and satisfaction of an urban space and increases in the presence of features that have been informally modified by businesses and residents that fall within a specific locality. Customised urban spaces are those that have been informally modified post-construction. This research has highlighted, with existing literature, several ways in which a space can be adaptively customised using the examples of:

- Folk Art and graffiti
- Guerrilla gardening
- Urban Knitting

In these three manifestations of customisation are discussions that reference comprehensive studies carried out in parallel academic fields that discuss the impact of environmental quality on subsequent human behaviours in empirical/objective studies. For example, Hanes' 2005 study on the conditions that resulted in prisoners decorating their jail cells goes beyond the personality traits of individual prisoners to focus only on the themes conveyed by the cell artist. Hanes' study's contributes to lab studies carried out by Mahnke who finds that, when placed in a bland environment, people become creative. Building on qualitative studies concerning reactions towards customised urban fabrics, this thesis uses studies by academics like Hane's and Mahnke to establish expected generic reactions towards customised urban spaces. Discussions on Guerrilla Gardening, where people informally introduce flora and fauna to distinctively urban areas, are similarly linked to previous academic studies concerning

biophilia. Although there are no recorded instances of urban knitting recorded in the analysis of this research, the foray into recent literature reveals a strong connection to its artist expression and feelings of 'joy' or 'connection'/association with an urban space – increasing the meaning and place value of an urban space by its users.

Further scrutiny has revealed several forms of scarcely documented customisation that can be described as influencing the aesthetical, physical, or functional properties of an urban space. For example, an urban space can be customised based on the presence of activities that deviate its use from its originally intended purpose. Customisation is also regarded as the possession and occupation of an urban space, including performing acts and the presence of market stalls. To test whether customised environments are directly linked to increases in the popularity of urban spaces, this thesis looked at three London streetscape settings, all of which incorporate street markets, and each with distinctive socio-economical characteristics (geographies and demographics).

The findings are conveyed in the previous three chapters that address the research questions of:

- What is the influence of customisation on the occurrence of static pedestrian activities?
- What are the influencing factors, other than customisation, that determine the location of static pedestrian activities?
- Do apparent positive/negative correlations correspond with distributions of street user satisfaction?

In the findings, customised environments are attributed to 'communities' of end-users comprising of local independent business owners, local entertainers, and local residents who feel the need to enhance the quality of the built environment to best suit their purposes. Cumulatively, these enhancements result in unintended deviations in the intended aesthetic, physical and functional qualities of an urban space.

### **9.1.1 Summary of findings**

Theoretical answers to the research questions are established in chapters 4 and 5 which found overall responses towards customised environments being appreciation and affection. These informal changes to the built environment are linked to altered cognitive processes and received messages that are drastically different to perceptions of comparatively stock environments (see Carmona et al, 2010, pp. 117 - 118) – indifference and/or self-centredness. Authors such as Gehl and Svarre (2013), go further to measure the liveliness of spaces based on the numbers of pedestrians present. Shaftoe (2008) and Stevens (2007), go further to suggest that certain spatial conditions, including informal interventions and unexpected events, stimulate conviviality and discursive behaviours (Wunderlich, 2008) that also lead to the attaching of meaning to an urban space.

The findings presented herein provide quantitative evidence that substantiate such claims using statistical analysis, so that a clear case is made either for or against the reimagining of urban spaces, with a deliberate allowance for informal design interventions as forms of customisation in the development of well-used/successful urban spaces. These are summarised in Table 30. For the purpose of this research, a selection of static activities was used to baseline the popularity of an urban space that was distinguished by whether a pedestrian was engaging with or ignoring (disengaged from) their immediate urban surroundings. The key finding is that customised portions of streetscapes are linked to an increased presence of static activities, where this trend is more pronounced with people interacting with features in their locality (engaged activities). However, certain forms of customisation, including colours, street interruptions (e.g. market stalls), and performances, were more likely to yield this result over others.

## Chapter 9. Discussions and Conclusions

Table 30. Summary of main findings

Chapter	Research Question	Hypothesis	Findings
7	<b>What is the influence of customisation on the occurrence of static pedestrian activities?</b>	The presence of customisations influences the distribution of static activities. However, in situations where high proportions of an urban environment has been customised, this catalytic effect subsides - a theoretical threshold.	<ul style="list-style-type: none"> <li>Numbers of static activities increase with the introduction of customisation. However, the correlation is weak. This is because of the 'theoretical threshold'</li> <li>Between customisation scores of 1 and 3, the correlation is positive</li> <li>Between customisation scores of 3 and 5, the correlation is negative</li> <li>Aesthetic customisations possess the strongest correlations with static activities followed by physical and functional</li> <li>Performances were not key attractors of static activities in these high street settings as anticipated from the literature review</li> </ul>
8	<b>What are the influencing factors, other than customisation that determine the location of static pedestrian activities?</b>	Factors including land use, street configurations, streetscape features and the popularity of smart devices play powerful roles in the distribution of static activities. However, customisation acts as a catalyst in all instances.	<ul style="list-style-type: none"> <li>The identified external influencers are attributed to higher levels of static activities</li> <li>Correlations between static activities and externalities are strengthened with the introduction of customised fabrics (a synergetic relationship)</li> <li>4G network connectivity, utilised in Wi-Fi connectivity, is not a key determinant in the distribution of static activities. However, higher signal strengths are associated with activities that were previously aligned to the aesthetics of urban environments</li> </ul>
9	<b>Do apparent positive/negative correlations correspond with distributions of street user satisfaction?</b>	Based on the findings presented in chapters 7 and 8, increased satisfaction will be associated with increased customisation	<ul style="list-style-type: none"> <li>People typically assign average scores to urban environments - expressing neither satisfaction or dissatisfaction with their surroundings.</li> <li>People are also more likely to participate in surveys with moderate customisation scores in respect to modal customisation scores at each case study</li> <li>From correlations between Urbiscape scores and customisation scores, it is evident that satisfaction does increase with customisation. The exception are results extracted from Portobello Road where high scores are recorded throughout</li> <li>Geographically weighted regression demonstrates that stronger correlations are apparent at Portobello Road's more customised north end</li> <li>People consciously prefer to have the ability to change the look and feel of their surroundings in initial responses to customisation. However, their decisions to opt for stock characteristics in the majority of their second choices indicates natural inclinations to avoid overly complex urban environments, preferring to relate to environmental conditions related to their moderately customised surroundings</li> </ul>

Chapters 7 and 9 found that, regardless of geographic location or demographic character, apparent increases in the presence of customisation did lead to the increased popularity of an urban setting. However, the highly dispersed data coupled with weak correlations between pedestrian counts and customisation indicated that other environmental aspects or conditions are likely to impact on a site's apparent popularity. These results are in harmony with the work of previous academics who seek to examine responses and attitudes towards such interventions, possessing informality in design innovations. Past studies have hinted at a general affection towards customisations but were often vague and few in number. Therefore, this research is a novel attempt at quantifying and expanding on these earlier studies and, indirectly, tests their validity. It primarily achieves this by modifying methods that measure the performance of architecture/urban design statistically, with the intention of gathering concrete evidence concerning the validity of using customisation in urban design as an effective tool for the development and/or regeneration of urban environments.

Isolated roles of specific forms of street furniture, land uses, and 4G network connectivity in the subsequent popularity a street setting were also examined as possible key determinants to the occurrence of static activities at the three case studies. Chapter 8 found that while, in many cases, these externalities did correlate positively with the overall popularity of an urban location, and correlations were strengthened with the introduction of customisation. Customisation acts as a form of catalyst. For example, a restaurant boasting vernacularisms such as hand drawn signage (customised), is more likely to have a higher presence of static activities than a restaurant relying on corporate branding (see section 7.2).

William H Whyte (1980) provides evidence which Ewing et al (2015) recently used to justify the impact of street furniture on pedestrian flows, and even hints at the significance of pedestrians being able to move chairs. However, this thesis is the first attempt to prove, with empirical evidence, that the customisability of street furniture is crucial to its being fully used. A similar rule applies to shop (A1) and restaurant (A3) land uses that dominate most high street settings. This

research has presented evidence that those with customised features are more likely to coincide with greater numbers of static activities, where it is inferred that these businesses will experience higher footfalls than those exhibiting mostly stock characteristics. However, the presence of the theoretical threshold infers that this trend is only true up to a point, where over complexity results in reversed correlations (see section 4.3). This is confirmed in the visual analysis presented in section 7.2.

This thesis represents an early foray into the impact of 4G network strengths on the distribution of static activities along a street. There is a general conception that having access to strong mobile network is linked to an increased use of mobile phones and other smart devices that rely on such connectivity. Often, these users may stop in public spaces but not necessarily engage in activities. This research found disengaged activities heightened in the presence of increased network connectivity, but 4G moderately influential in the distribution of engaged static activities. These trends were further emphasised with the introduction informality in the design quality of the streetscape (customisation). Although this research does not identify specifically which customisations correlate strongest with 4G networks, it has laid out a template approach that can be used to extract such data.

The findings presented in chapters 7 and 8 are supported by qualitative evidence presented in Chapter 9. Here, the overall finding was that street user satisfaction does increase with customisation. However, a notable exception to this was the Portobello Road case study, where opinion scores were mostly high throughout – having no sensitivity to the presence/absence of customisation. Why this occurred here warrants further academic study which might, among other things, refine the age bands, consider other demographics of the survey sample, and/or increase the sample to broaden the chance for data heterogeneity. Furthermore, it is unclear as to whether different survey approaches might result in clearer outcomes, not only at Portobello Road, but also at Camden High Street and Petticoat Lane. However, exploring the trend further using geographically weighted regression did highlight the stronger chance that people situated in customised setting are more willing to assign higher opinion scores.

The results of the choice-based conjoint analysis suggest a tendency for people to deliberately opt for 'stock'/bland characteristics over the 'customised' ones. A potential reason could relate to studies that suggest that over complexity, leading to sensory overload – connected to variety in design, can in fact lead to an aversion towards customised features. This aversion, it has been said, could be physiological, as discussed by Mahnke (1996) or psychological (Pink, 2008). Nonetheless, this finding corresponds to higher concentrations of static activities in regions where customisation is descriptively moderate (see Figure 107 and Figure 108).

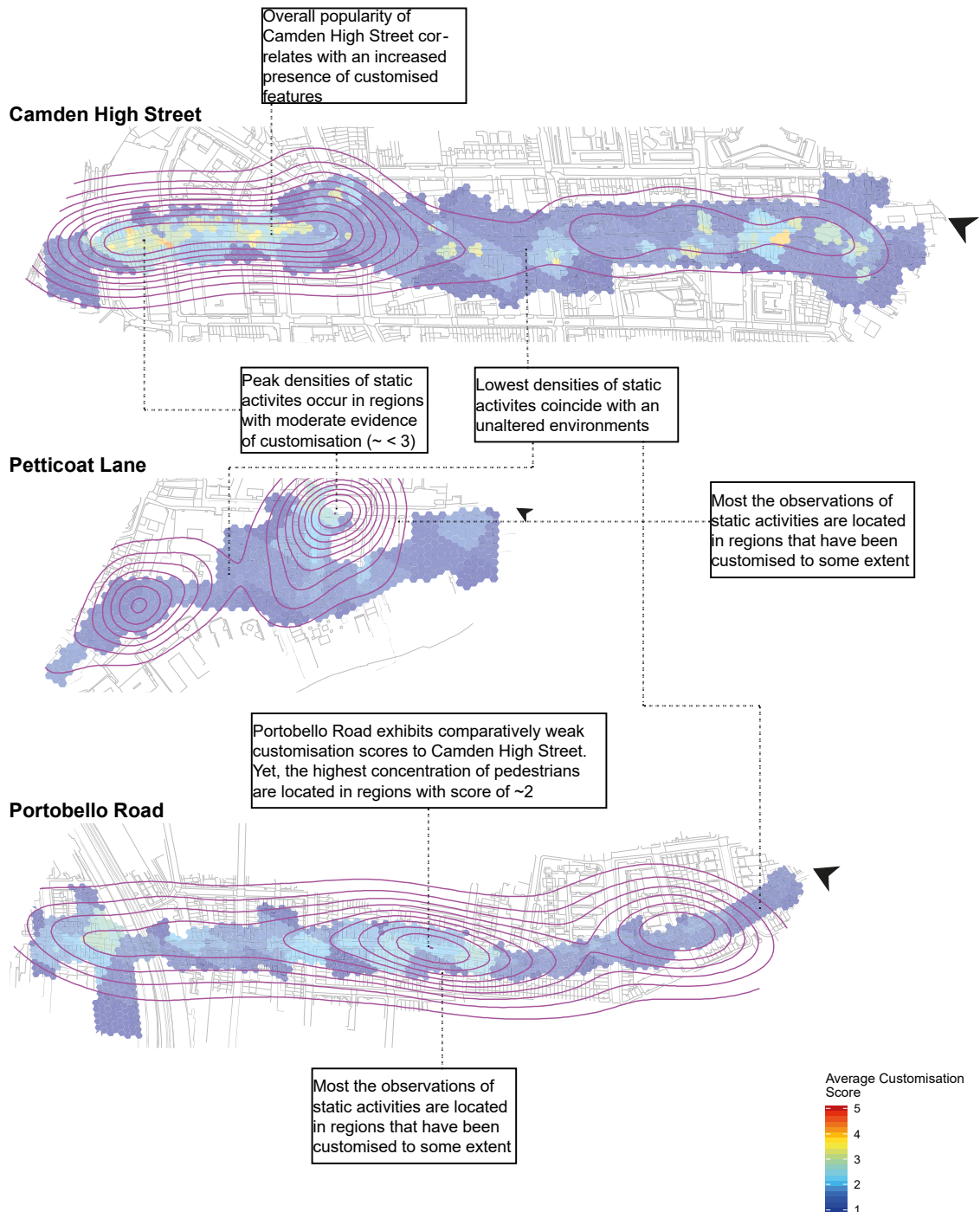


Figure 107. A map showing the distribution of customised features at the three case study locations and relative static activity densities, ultimately supporting the concept of a theoretical threshold. Note that peak densities for static activity observations do not occur in regions with customisation scores  $> 3$ . This graphic relates to the distribution of observed static activities.



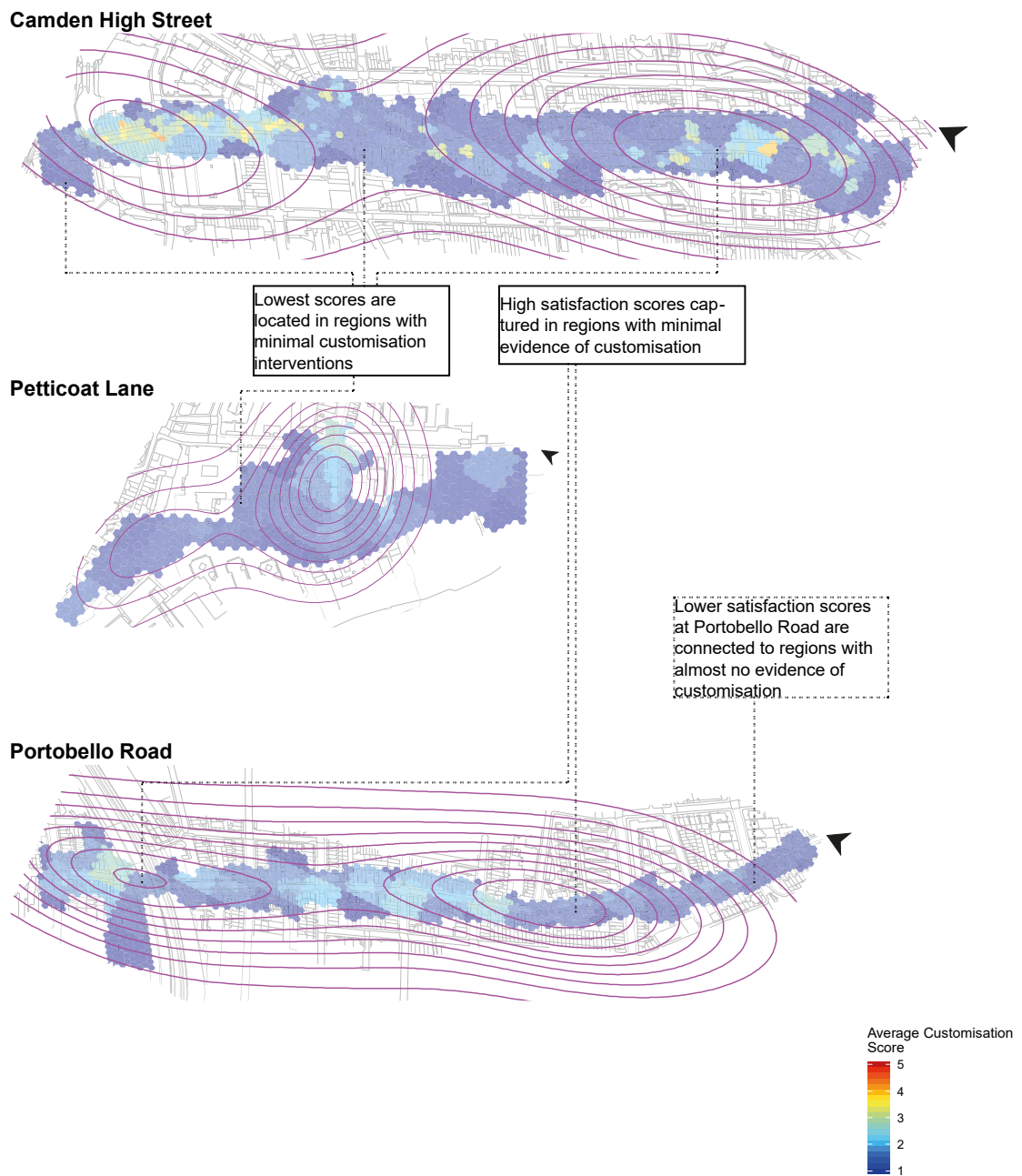


Figure 108. A map showing the distribution of customised features at the three case study locations and relative locations of satisfaction scores that are greater than 2.5. This graphic relates to the distribution of pedestrian opinion survey participants.

### **9.1.2 Customisation and its impact on urban design processes**

Urban design is described by Fishman as the ‘machine’ of urban planning in 1982 – the machine that primarily produces public urban spaces. However, this comparison was not a compliment, but the highlighting of the mechanical and rigid design process criticised as excluding the efforts of locally affected groups by Jane Jacobs (1961) and Alexander (1965). Alexander’s 2012 comparison of planning/design processes to mass production, follows the same logic as Fishman, suggesting that little has changed in urban design practices since their invention – it is still a largely closed system offering limited opportunities for local involvement (Jiang, 2015). To some degree, Alexander’s critique is an articulation of opinions shared by the majority of people who are subject to planning and design interventions (Moore, 2014).

With a focus on adaptive customisations, this thesis has reconsidered studies by Whyte (1980), Stevens (2007), Shaftoe (2008), and Wunderlich (2009) whose work has provided an alternative perspective on specific informal interventions. Outwardly, these interventions are chaotic and often end up being regulated (Shaftoe, 2008). However, academics such as Kostof (1991) and Marshall (2009) have demonstrated that there is no such thing as an unplanned space alluding to the concept of self-organisation (Porta and Romice, 2014). Deliberate efforts to plan an urban space typically fail because they are unable to effectively reflect the cultural vernaculars of its users, leading to discomfort and decreased time being spent while there.

This research has demonstrated that, when allowed, customisation of aspects of a design results in distinctive urban morphologies in terms of altered aesthetics, physical components, and functional operations of a respective urban space. These are captured using survey techniques resulting in these morphological changes being represented by heat maps. The temperatures of the heat map increase with recorded occurrences of specific acts of customisation, and composite quadrant values were correlated with recorded pedestrian activity details. Responses to regions that had been customised show increases in static activity densities as well as increases in the place-value – indicated by relative satisfaction scores captured by the qualitative study (see chapter 9). However, it

is noted that when certain forms of customisation are excluded from the composite average (see section 5.1.6), the correlations strengthen. Based on correlations between observed high resolution static activities and customisation sub-categories (referred to as Mark II in section 6.2). The influential forms of customisation were:

*Table 31. The hierarchical list of the most influential forms of customisation. Their correlation with overall increases in static activities are indicated by the corresponding r-values.*

<b>Mark II customisation</b>	<b>r-value</b>
Wayfinding and Signage	0.56
Occupation/Possession	0.47
Public Art	0.38
Colour	0.36
Street Interruptions	0.303
Performances	0.12

This research has demonstrated that increases in customisation scores in these areas results in an increased presence of static activities, specifically engaged activities that included ‘standing to look at something’. Static activities do drop in the presence of overly complex environments where, for example, increases in street interruptions can lead to an area being under-used because of it becoming un navigable or being perceived as too busy. In contrast, areas that were bland – remaining relatively unchanged since their construction – resulted in lower static activity densities and lower satisfaction scores. The notable anomaly to these results is the penchant for survey participants to prefer fictional sites with stock characteristics over those that had been customised. While this result can be attributed to the limited sample sizes, it was also noted that people were more likely to go for entirely stock sites over those that were exclusively customised. An inference may be made that a prerequisite to acts of customisation is the provision of a bland/blank urban environment, where survey participants deliberately chose to define the look and feel of a space themselves, rather than give this decision to a local authority (see section 8.2).

The evidence presented in this thesis practically tests the merit of self-organisation and its impact in streetscape settings, with the intention of building on Whyte’s initial observations on factors attributed to liveliness, being associated to informal uses (food vendors, performances, and art). Using methods inspired by Donald Appleyard’s study of the influence of traffic flows on pedestrian

movements in streetscape settings, it looked in more detail at the types of spatial interactions present against the presence of customisation instead of vehicular traffic. The core objective was to determine whether specific static activities were solely attributed to customisation or whether they were in tandem with other interventions. Furthermore, streetscapes were chosen because of their ability to interact with a series of different urban fabrics with varying degrees of informality. This research has found that when a space conveyed an initial inadequacy or failed to reflect a local vernacular, there was an increase in informal interventions taking the form of customisations that essentially 'improve' these parts of a streetscape. In comparison to the parts of the streetscape left unaltered, these customised regions were associated with increases in static activities. Notably, these activities were more likely to interact with the urban environment's customisations than with the stock features.

Customisations have the ability to draw people to an urban space; however, in themselves, they are considerably weak attractors. When combined with other recognised factors, including but not limited to street furniture, land uses, and phone signal strength, customisation appears to act synergistically, enabling those factors to attract specific pedestrian activities. This thesis therefore presents evidence that can be used to advocate the use of informal modifications to environments as an organic approach towards encouraging the creation of lively urban spaces. It has debuted a variety of methods to capture the impact of customisation on the distribution and nature of static activities. New methods were introduced as attempts to automate the recording and comparison of spatial datasets.

### 9.1.3 Heat mapping

Georgiana Varna's star model (2014) is a documented approach that measures the publicness of urban spaces. In this model she assigns scores that assess how 'public feeling' a space is based on the subjective analysis of several select criteria. However, her criteria, visually represented by Spider Diagrams, are good for a whole site but are not flexible enough to be applied to transitioning urban fabrics. Similarly, Nikos Salingaros' approaches to measuring life and complexity (1997, 2006) can only be applied on a building-by-building basis. He introduces a scoring system based on sums and averages, resulting in more honest scoring and a method from which variable intensities can be abstracted.

Essentially, the challenge for this aspect of the thesis was threefold:

1. Adapting Varna's publicness criteria to apply to customisation.
2. Enabling customisation to be analysable in quantitative terms.
3. Applying takes on these methods to compare transitions in customisation intensity throughout an urban space.

To tackle these points, mappable scaled 50 x 50 metre grid arrays and 10 x 10 metre polygon arrays were generated and applied to the case studies. Metadata was attached to these through a combination of automated and observed field data collection. Fourteen attributes relating to aesthetic, physical, and functional customisations were independently scored for each grid quadrant, with the exception of 'colour'. Finer analysis was achieved through geotagging customised interventions which helped to accentuate customisation hotspots. Ultimately, the 10 x 10 metre polygon array was used to map customisation in a fine-scaled choropleth, comparable to a low-resolution rasterised image, forming a heat map. The heat map essentially showed the placement and intensity of customisation that was subsequently correlated with static pedestrian activities. Thus, this approach has made it possible to conduct core regression analysis in relation to the presence/influence of an attribute/collection of attributes. Such an approach enabled the study of traditionally qualitative dimensions of urban morphologies in a quantitative way.

Some of the attribute scores were based on automated values, notably, colour. While colour changes can be discerned by the researcher, their perceptions

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might be different to other researchers or users who, for example, might be colour-blind. To compensate for this, dominant colours were extracted from images of facades falling within a 50 x 50 metre quadrant with the 12 dominant hues and values mapped radially allowing the researcher to determine cyclic changes in colours (i.e. clear reds, clear oranges, clear yellows, and so on). This was achieved by manipulating R packages, including ggplot2, to generate and populate the values. The only manual part of the process was the conversion of HEX colour values into HSV. However, this tool can be applied to studies involving the measuring or analysing of apparent colours or colour-based attributes, such as vegetation or sky, from still images.

The concept of a heat map is not new in urban planning or design where they feature in property databases and policy analysis. However, their applications are usually for purpose of visual analysis leading to proportional outcomes (for example, the London Development Database). The unique approach to heat mapping used in this thesis moves beyond visual portrayals of hotspots and data layers but combines the two attributes to produce metadata that from which hotspots can be rationalised. The resolution of the quadrants that drive the heat map exercises is large enough to enable the analysis of densities in relation to specific environmental conditions. The fourteen attributes for customisation can be replaced with other attributes such as number of glass façades, to produce other in-depth forms of spatial data analysis – in this case, the impacts of transparency on the popularity/interactivity of a specific shops or offices.

#### **9.1.4 Static Activities**

In their landmark book 'How to study public life', Gehl and Svarre outline a basic method for mapping pedestrian activities, including standing and sitting activities (2013). Their mapping techniques involve a researcher being able to view large sections of a site and draw them on to a paper plan. However, this approach has raised the following issues:

- In a streetscape, the mapping would have to be a combination of individual sites, where a significant amount of time would have passed in order to capture the locations of activities.
- The accuracy of mapping activities is compromised primarily by human error. The researcher might be standing at a position on a site to observe activities that results in misjudged distances of static activities, especially when their only resource is a 1:1250 ordnance survey plan with limited landscape details.

Noting the availability of a plethora of apps that utilise freely available GPS data to track movement and taking into consideration Gehl and Svarre's recommendation that GPS technologies can be used to track people (2013), this thesis has led to the development of an app called Parade™. Unlike Gehl and Svarre's application of GPS, Parade™ enables a researcher to record a predetermined activity at the touch of a button (Timmerman, 2016). This technology, with its adjustable category features, enabled the storing of an array of coordinates and their associated activities – static activities were effectively geotagged. Environmental conditions such as building heights, which are known to affect the accuracy of GPS data, were compensated by relying not only on data captured from the Google's maximum civilian 32 satellite array, but also, through the use of pre-cached GPS data – the kind of data that enables car drivers to still navigate a tunnel despite the loss of their GPS signal.

Data captured by Parade™ allowed for the provision of precise activity tagging that was later be correlated against the customisation heat map.

### **9.1.5 Mapping Satisfaction**

The mapping of satisfaction was inspired by Yodan Rofé's feeling maps (2004) which spatially mapped satisfaction by postal addresses. He applied a Likert scale that modelled wellbeing at a neighbourhood scale. This research has explored responses from random individuals across the extents of each case study with regards to the quality of their environment. Like Rofé, a Likert scale was used to measure opinions; however, Parade™ was repurposed to record the coordinates of the surveyed pedestrian so that they could be later compared with the presence of customisation or other external factors. This exercise provided data suitable for geographically weighted regression exercises and is an adaptation/reinterpretation of Rofé's work.

### **9.1.6 Enhancing an understanding of behavioural responses towards urban qualities**

Noted in the literature review are studies that parallel environmental conditions to specific behaviours. Environmental psychological studies correlated specific colour hues and patterns to predictable behaviours linked to varied levels in neural activity (Mahnke, 1996; Shine et al, 2005). However, a practical application of these studies outside of controlled environments is not made directly to behaviours in outdoor urban spaces. This finding ties in with recent research that challenge the role of colours on emotional responses in controlled settings, ultimately describing such attributes as having little effect on emotions and behaviours (see Genschow et al, 2015; Castell et al, 2018). This research bridges the gap between such environmental studies and behaviours recorded in urban design studies by dividing the attributes of urban spaces into measurable categories. These environmental features are primarily discussed within the context of aesthetics but also fall into functional and physical descriptions. The core determinant of variance in these attributes are related to informal interventions imposed by users of particular case studies.

Although situated in geographically and demographically different settings, each site – possessing transitions between 'stock' and 'customised' interventions – exhibited similar pedestrian behavioural patterns to variations in comparably altered urban attributes. Across all three sites, increases in the informality of



public art exhibited positive correlations with increases in static pedestrian activities, notably those of people ‘standing to trade’ or ‘standing to look at something’ (see section 6.2). Section 4.2 notes that informal interventions, including acts of customisation, typically occur in order to optimise a design. While previous studies have only hypothesised that increased informality leads to the increased popularity of an urban space, this thesis provides empirical proof that increases in vernacular expressions in the form of wayfinding and signage can result in increased trading and spatial interactions at an exponential rate – a constantly increased presence of pedestrians in line with introduced increasingly informal wayfinding and signage. Similar observations are made in relation to the presence of informal signs and wayfinding props across all three sites, and performances at Camden High Street and Portobello Road. Similar conclusions could not be applied to the 11 other customisation attributes. Instead they mostly peaked at mid-points of specific customisation interventions (see 9.1.1).

This pattern indicates that there are situations where over-complexity impairs the popularity of a location. This occurrence, referred to as the ‘theoretical threshold’ throughout this thesis, was previously documented from a combination of disjointed studies covering various design aspects and subjective opinions (Loos and Opel, 1998; Mahnke, 1996; Kalia, 2013). This thesis went further by quantifying this occurrence, not only in terms of the distribution of specific pedestrian activities, but also in terms of pedestrian opinions through use of regression. At each site, pedestrians were more likely to assign higher scores in regions with little to moderate customisation presence (see section 8.1).

In broad terms, William Whyte parallels specific pedestrian social behaviours to the presence of particular features within an urban space (1980). Focusing mainly on play, Stevens (2007) identifies specific props that stimulate specific behavioural responses. These playful behaviours create a crowd and the symptoms of conviviality – a condition explored extensively by Shaftoe (2008). Stevens identifies the presence of props but doesn’t explore their specific origins, only that they are a part of an environment and result in specific behaviours. However, Shaftoe argues that props that are sensitive to specific cultures are more likely to result in increased conviviality. Noting the creation of the

Chandigarh Rock Garden (Maizels, 2009), and the increased popularity of UK-based Muslim retailers who deliberately promote their culture (Nasser, 2005 – see section 4.2), this thesis has provided further proof of the power of vernacular design in increasing the popularity of an urban space. In this instance, vernacularism is represented by customised urban environments. Contextually exploring customisation in measurable terms, this thesis supports the conjecture of vernacularism being a key ingredient in the creation of rich urban fabrics. It does this by providing empirical evidence that general increases in the quality of customisation results in increased static activities that are engaging with an environment. To confirm this as being an independent agent to other externalities, this thesis has compared the impact of customisation on static activities in association with acknowledged attractors: street furniture, land uses and mobile (phone) network strengths

Although these attributes are connected to increased static pedestrian activities, it was discovered that customisation acts as a catalyst in the increased popularity of a site, specifically with regards to behaviours that are described as interacting with the urban environment (see Table 32):

*Table 32. Correlations of specific static activity density increases and influential customisation increases*

<b>Static activity</b>	<b>r-value</b>
Sitting to eat	0.8
Sitting to read	0.559
Sitting to enjoy life	0.5
Standing to look at something	0.424
Sitting to have a break	0.364
Standing to do something	0.338
Standing to trade	0.246
Standing to greet/talk	0.19
Standing to enjoy life	0.105
Sitting to supervise	0
Standing to quench thirst	0
Standing to eat	-0.271
Standing to look at an activity	-0.286

Table 32 demonstrates that the activities of ‘standing to eat’ and ‘standing to look at an activity’ do not correlate positively with increases in customisation. Given literary discussions concerning the power of street performers (for example,

Whyte, 1980), it was surprising that increases in street performances did not prove popular across all three case studies. Whether this pattern could be attributed to an externality other than those discussed is an area to be reserved for a future study.

Categorically, customisation plays a role in stimulating these activities and must be taken into serious consideration in future planning and design strategies which are set on bolstering the liveliness and social cohesion of an urban space.

### **9.2 Conclusion**

The intention of this research was to address the problem that today, despite the facilitation of participatory planning, urban planning and design processes are still frequently associated with the creation of dead spaces. It was acknowledged early on that people are creative and have a natural inclination to modify aspects or features of their environments. This thesis explores the impact of changes made to urban spaces that have been allowed to accumulate, unhindered, varying degrees of informal aesthetic, physical, and functional alterations. While there is a plethora of subjective discussions on the impact of informality on subsequent attitudes and some behaviours towards the quality of an urban environment, studies exploring the topic objectively are scattered and nestled in parallel academic fields such as environmental psychology. Past studies have highlighted the need for the scientific testing of applied methods to urban design, and this research is a venture to do so by quantifying theories that purport to result in lively urban spaces through contributions exclusively made by their local communities.

To test the validity of these theories, this thesis has compared the existing planning and design processes to standardised and documented forms of mass-customisation, where it finds that the process of adaptive customisation isn't acknowledged in practical urban planning and design. This informal mode of customisation that gives distinctive minorities (local businesses and local residents to an area) the ability to tweak and refine an end product occurs in planning but is suppressed by regulations and enforcement which lead to the creation of stock/artificial/sterile places. The impact of this form of customisation

requires scientific testing to prove whether, like with the optimisation of an end product, street users are able to optimise a plan post-construction leading to its eventual success.

To test this premise, the methods strived to explore the impact of environments that had been customised, on the distribution of static activities and levels of satisfaction. This thesis used three London-based case studies to explore these impacts: Camden High Street, Portobello Road, and Petticoat Lane.

The core theoretical framework of this research was based on initial answers to the first two main research questions:

1. *What is the influence of customisation on the occurrence of static pedestrian activities?*
2. *What are the influencing factors other than customisation, which determine the location of static pedestrian activities?*

First, the literature review chapters (2, 3, 4, and 5) identified that a problem existed in the subjectivity or qualitative nature of limited studies that explored impact of informality on pedestrian behaviours in public spaces. It also highlighted studies that have quantitatively measured traditionally qualitative aspects of buildings (Salingaros, 2006) and public urban spaces (Varna, 2014). Salingaros applied the principles of thermodynamics to measure the harmony and temperature of buildings towards measuring their life and complexity. He achieved this by replacing the commonly acknowledged components of temperature with characteristics associated with architectural form such as 'perceivable detail', and 'curvature of lines and forms' (Salingaros, 2006, p. 107). Varna measured the publicness of space by identifying core variables that determine how public or private a setting feels, these included quantitative counts of CCTV cameras, and sadistic street furniture (Varna, 2014). From these studies, a core method was produced that measured the extent to which a space had been customised. The first method established a new approach to quantifying informality in urban spaces using a heat map that worked utilised a combination of scored qualitative spatial attributes and quantitative counts of customisation. In brief, the heat map provided a polygon base within which points

of activities could be counted and used in regression analyses; it's flexibility in application to other urban studies is demonstrated in chapter 8.

This method expanded on Salingaros and Varna by evaluating sections of a site instead of its full extent. It also went further by inserting attributes that directly related to the extent to which a site had been informally customised. The application of a grid and later polygon mesh enabled the visualisation of the extent to which parts of a site had been customised or modified – crucial in the empirical recording of both temporary and permanent manifestations of features which are often relegated to specific urban contexts and that are critically subjective. Exploring the three case studies of Camden High Street, Petticoat Lane, and Portobello Road, it was found that each site had notable variability in the presence/non-presence of customisation, previously an unknown/undiscussed spatial characteristic of urban spaces.

The second method acknowledged that there were existing methods that recorded the spatial distribution of static activities in urban settings but found that these techniques were flawed for the purpose of studying the length of a high street. They:

- Relied on a surveyor standing at a vantage point, estimating the location of static activities, and plotting them onto a base map against recognisable urban features. The scale of 1:1250 used by Ordnance Survey results in many street features being omitted, making it difficult to plot the locations of static activities in this way.
- Are time consuming. The process of marking a map on site, especially a streetscape, requires the acknowledgement of an activity and then the physical act of scanning a map and then marking a point. By the time a point is marked, the researcher might have already missed several other static activities and will have a significantly reduced dataset.
- Are inaccurate. The process of marking a map is approximation. Even if a map is subsequently scanned and imported into a GIS package for precision plotting, the quality of the scanner might lead to misplaced points for activities – in situations where a cluster of activities are recorded (with

different symbols), deciding the centres or nature of an activity becomes problematic.

To counter these issues, the second method commissioned the creation of Parade™. This Android-based app took advantage of Google's 32-strong consumer GPS satellite array and cached data to enable the accurate plotting of a location at the touch of a button. Indeed, buttons were assigned for each of the categories (see section 5.2).

Previous studies that record the location of static activities (Whyte, 1980, Appleyard, 1987, Gehl and Svarre, 2013), were explored. The methods used by these authors sought to visualise points as constants where pedestrians spatially congregate, as evidence towards proving the impact of a spatial variables in their distributions. However, their methods are rudimentary and inaccurate from a geographic perspective and took too long to capture activities along the length of a high street. The precision points and metadata collected from Parade™ were ultimately matched against the heat map. The value of this exercise is the ability for a researcher to quickly record a static activity in such a way that the survey durations are significantly shortened, and precision increased.

The theoretical framework up to this point resulted in a method that quantitatively tested the impact of informal design interventions in the distribution of specific pedestrian activities. The ability for the heat map base to take on other spatial variables was demonstrated in the exploration of externalities as part of the practical answer to the second main question. Polygon intersections with street furniture features, distances from dominant land uses, and 4G network signal data were all attached to the heat map, making it possible to determine whether or not customisation did play a key role in the popularity of these features. While past studies have highlighted that those features do sway pedestrian activities (Whyte, 1980; Kelly et al, 2012; Ewing et al, 2011; Hampton et al, 2010), this research has demonstrated that such trends cannot be attributed solely to these features, rather they are enhanced when discrete modifications are put in place that reflect the vernacularism of a particular local community.

The third research question introduced an abstract dimension to the theoretical framework which essentially argued that, if customised features present in urban spaces, and correlate positively with static activities, the intricate detail of customised environments are either obvious or consciously acknowledged by street users. The question that was asked was:

- *Do apparent positive/negative correlations correspond with distributions of street user satisfaction?*

The role of this question was to test the validity of the outputs of the two main questions. Although it was found that an increased presence of customisation did lead to increased satisfaction in a sampled portion of street users, it was also noted that participants preferred stock features over customised ones. This unexpected result substantiates research exploring the negative impacts of visual complexity that are typically conducted in controlled environments and most notably in experiments that occurred over 10 years ago (Mahnke, 1996; Shine et al, 2005; Shaftoe, 2008).

The final method provided qualitative data to support the empirical findings apparent from correlations made between the first and second method. Because of variances in the geographic location of customisation, geographically weighted regression was used to assess the strength of satisfaction responses towards customised features in urban environments across all three sites.

The findings of this research have revealed that as customised environments become increasingly informal, they also become increasingly popular; however, there is a threshold in relation to responses to environments that are perceptively over complex – in theory; an environment that is conceived entirely by informal interventions is perceived as disorderly/disorganised/chaotic. Optimal customisation scores obtained in this study were ~2.5 to 3, although there was an under representation of customised environments with scores in excess of 3. This thesis also found that people were more likely to express higher levels of satisfaction in customised environments than in those that were stock. However, when asked to pick out sites comprising either of customised or stock characteristics, they were more likely to opt to pick stock sites – this trend

potentially confirms previous studies that explore reactions towards over complex environmental settings.

This research offers three key contributions towards the enhancing human-environment relation in an urban context. Firstly, by way of empirical evidence, it is apparent that urban settings which allow for the natural inclusion of post-construction modifications and informality are livelier than those that are meticulously maintained and regulated. However, caution is to be exercised as unchecked interventions can quickly result in visual and other sensorial over-complexity. Based on the scoring criteria and data analysis, an optimal specification includes those that are a combination of features with customisation scores of 2 or 3 (see Appendix I). For example, an optimal spatial environment will have a single street performer, with two or more colours present, and a single row of market stalls.

Secondly, this research has highlighted that although external factors are in themselves influential in the distribution of static activities, customisation is a synergistic component. Shops and restaurants generally attract people, but their magnetism is increased with presence of customisation. Therefore, this thesis has provided information that can be of use to owners seeking to improve their business or local authorities hoping to improve the quality of a streetscape or urban space. In 2010, the manager of the Camden Locks Market was tasked with revitalising the Tooting Market in South London; the immediate response to the replication of Camden-style bohemia was adversity because of the lack of acknowledgement of the already-present local community cultures. Gradually, as the area gentrified, the market is becoming more accepted.

Finally, when faced with a choice between customised and stock characteristics, people choose stock. This result can relate to over complexity but, as this qualitative aspect goes against the quantitative findings, could be an errant attributed to the chosen methods of sampling. However, these findings support earlier research highlighting the dangers of over complexity, and studies that concern attitudes towards the ordering and organisation of spaces – people prefer order over chaos. The response of the pedestrians here could be down to



the fact that the spatial configurations were fictional and therefore fabricated, where there was a general understanding that order exists in nature and natural growth and that people were more likely to be drawn to naturally occurring order.

### 9.2.1 Critical evaluation

This thesis addresses an area of urban planning and design that is rarely covered - the impact of informal design interventions on the subsequent use of an urban space. However, the disjointed and scattered existing research in this area has resulted in an abstracted view of the design process that is comparable to production processes found in manufacturing. Even here, the available literature is limited and quite outdated. Over time, participatory planning and design have grown to become more mutually inclusive, as have production processes. Manufacturing's transition from mass-production to mass-customisation is well documented and catalogued. However, this is less clear in urban planning/design. This thesis has attempted to identify comparable components of mass-customisation in participatory design processes and found that one significant aspect was overlooked: adaptive customisation. However, literature exploring responses to adaptive customisation is scarce to non-existent and so it is not contextually covered. Hence, this thesis should be considered an initial attempt at exploring the roles and responses of post-construction informality (intentional/unintentional) on the creation of a lively urban spaces.

Although this thesis provides measurable proof that urban environments which have been customised are more likely to attract static activities, there are several factors that should be taken into consideration, mostly relating to the unexpected conscious preference of stock over customised fictional environments by the survey participants in chapter 9.

The sample sizes per site is small with 50 completed surveys by participants at Camden High Street and Portobello Road, and 30 at Petticoat Lane.

Consequently, there is the genuine likelihood that the results are skewed either demographically or in terms of overall perceptions of a site. Reasons for such a small sample size are attributed to:

- Time constraints in relation to the pace of this PhD. An extended study would yield more data – Ideally, 100+ participants will be surveyed at each site. A future study with more surveyors placed throughout the

case study sites can also lead to larger and more representative sample base.

- Pedestrians preferring not to be involved. Many potential participants declined invitations to participate in the survey because they were too busy. This response may be attributed to the case studies being streetscapes. It is possible that more participants would be willing to participate in a survey if the case studies were defined urban spaces such as a public square. It is also possible that survey engagement technique was an issue; however, this perception may vary according to the street users – some might find the approach too formal, others might be illiterate or unable to understand the survey, and potential participants might feel insecure whilst stopping in a busy street.
- The window for collecting surveys is too short. The use of high street sites peaks during lunch hours (mainly between 12pm and 2pm). A way to counter this could be to have more surveyors or extend the survey period – both of which are possible in a dedicated study.

Duly, there was an under representation of age groups between the ages of 18 and 25, and 65+ year olds, although it could be argued that the participants were a fair representation of the base line demographics of each case study.

Therefore, the evidence presented in Chapter 9 should be treated as an early exploration into the logic of decisions to stop in certain parts of a street in relation to customisation. Such a study may have to be justified with a parallel evaluation of general emotional states and other factors that influence perception of urban spaces, in addition to customisation. As with the findings in Chapter 8, it is possible that although there might be a negative correlation between customisation and actual environmental preference, it could be that the correlation's negativity weakens with increases in customisation presence. Further justification is needed.

Another point of consideration relates to the heat mapping process at the site. The method introduces a level of subjectivity. The following attributes were scored based on visual confirmations made by the researcher:

- Uniformity
- Public Art – Content Analysis
- Occupation/Possession

So, to an extent, there is the possibility for human error despite rigorous care is taken to be unbiased. However, unlike attributes based on counts or quantities or where algorithms can be used to calculate results, there is not a clear way of automating the collection of data for these properties, therefore this part of the process remains manual.

The resolution of the heat map began at 50m<sup>2</sup> per quadrant, and was then refined to 10m<sup>2</sup> per polygon – mainly to capture the spatial distribution of quantitative counts of customisations. The use of the 50m<sup>2</sup> heat map base created a generalised impression of customisation which could be connected to the loose correlations and weakened relationships observed throughout the analysis. If there was not a time constraint, each 10m<sup>2</sup> quadrant might have been assessed in terms to the same level of detail as the 50m<sup>2</sup> ones leading to a more accurate/refined heat map image (raster) that can later be used to assess the distribution of static activities or any other appropriate urban phenomena.

It has to be recognised that although the 14 attributes used to identify instances of customisation were intended to objectively record variances of customisation present along the length of a street, they embody a degree of subjectivity from the researcher. Another researcher might identify other modifiable attributes or add further indicators that could either compliment or challenge the findings presented by this research. However, the theoretical grounding of this thesis is in harmony with its findings; it can be speculated that an overall response towards customised features would remain that of attraction if the attributes comprise of the same visual-tactile qualities as those assessed in this thesis. The overall correlation would most-probably remain positive (see section 6.1). In the instance that auditory and olfactory indicators are exclusively studied in a similarly objective manner, it could be speculated that the correlations presented in this research may potentially reverse. For example, too many smokers in a multiunit housing development can lead to adverse perceptions and responses in units

most subjected to second-hand/third-hand smoke, than in those that are comparatively smoke free (see Rendón et al, 2017). A likely outcome of a repeated study with expanded or different attributes may be shifts in the occurrence of the theoretical threshold and stronger/weaker correlations. Nonetheless, it is hoped that the methodical approach used by this research that exploits automated experimental approaches in a bid to replace human-error with computational-error, would aid in the objectivity of future studies broadly concerned with the impact of spatial composition on human behaviours.

Finally, the case studies were limited to high streets in London. Although there was noted variance and regulation in the baseline regional demographics at each site, factors such as the micro-climatic conditions, the political climate, and even the commercial climate were constant between the locations. The time and cost constraints levied by the project's confinement to a PhD meant that repeating the studies in different cities/countries was not practically possible. Further, doing such a task would probably have resulted in aspects of the research being modified. For example, it might not be possible to use Parade™ in a country like China because of its blocking of google apps and devices – it is unclear as to whether the 32 satellite array would be accessible while in that country. Similarly, limited access to 4G networks in more remote cities such as Ouagadougou might result in erratic data returns from the app. Communication for participant surveys would require the facilitation of translators, which could lead to a gradual introduction of human error in misinterpretations by both the participants and the surveyor.

In summary, this study does answer the research question, but can be further refined to give an even clearer picture of the roles played by customisation in the distribution of static activities and satisfaction in a variety of urban spaces.

### **9.2.2 Further research**

Although the findings of this research can be taken as conclusive, several topics may be further developed based on the presented findings, such as the application of the heat mapping method to other types of urban spaces over an extended period of time, and with an extended representative sample of

pedestrians surveyed for their opinions regarding the development of the space. Throughout this thesis, it is generally acknowledged that, in every urban setting, a degree of customisation is apparent in its form and function. However, further studies can be applied that pinpoint the exact conditions that lead to the presence of customisations in urban spaces. This research has indicated that customisations are a response to the blandness of space, but further research exploration might reveal that they might be more prevalent in areas occupied by demographic compositions incorporating younger generations or those with artisan skills and the ability to richly enhance the quality of a streetscape or urban space. A future study can juxtapose responses to customised urban fabrics by exploring high streets situated in a truly homogenous culture/society against responses in a heterogeneous setting, to see whether responses towards such informalities are influenced by expanded demographic margins. Such a study can solidify the significance of the role of customisation in the enhancement of the popularity of an urban space. Furthermore, this research covered the study of particular streetscape types – each containing a market, and each located in a borough of London. So, a study comparing the performance of high streets in different cities in different countries will help to refine the most influential forms of customisation on the distribution of pedestrians and their overall satisfaction with an urban space.

Throughout this study, it has been casually inferred that customisations are the result of interventions by local communities. In broad terms, these are distinctive minorities that are presumably local businesses, members of local residential communities, and street performers. However, the specific characteristics of who these end users are not clearly identified in this thesis. This is because of the prospect of individuality leading to an uncontrollable variety of character attributes for those instigating customisations. This research can be further extended by identifying the specifics of individuals with a penchant to customise. For example, a possible study can introduce a diverse pool of people to a controlled virtual or real bland urban environment and observe their tendency to enhance it or leave it as it is; a questionnaire can be used alongside these observations in order to model common characteristics.

It is acknowledged that consumer GPS is constantly improving and that computational error for the triangulation of a position is duly reducing (Li et al, 2015). At the time fieldwork was conducted for this research, consumer GPS accuracy was ~2 to 3 metres. By the summer of 2018, the Live Road app boasted an accuracy of within less than 1.5 metres (Gitlin, 2018). A future study can test whether such improvements to GPS would result in contradictory or strengthened correlations between static activities and increases in the presence of customisation.

This study focused on 14 attributes of customisation that fell into the categories of aesthetic, physical and functional. In light of research exploring sensory perceptions of public spaces, a follow up study can be used to assess a further refined set of attributes that focus specifically on the impact of temporary customisations on the distribution of static activities throughout a site.

The criteria for assessing responses to urban spaces are limited to a set of actions initially defined by Gehl and Svarre (2013). To expand on this aspect, a future study can specifically look at neurological activity and heart rates to further quantify the impacts of customisations on the distribution of static activities to the effect of making a space perceptively lively.

The externalities covered in this research are limited to street furniture typologies, land use typologies, and 4G network coverage because they relate directly to the morphology of an urban setting. However, throughout the course of the study, it has been highlighted that sociological aspects also play a role in the use and popularity of urban spaces. A follow up study can test whether correlations between pedestrian densities and customisation can be offset by the presence of street crime, or the historic value placed on an area.

The results of this research show conditions associated with an increase in pedestrian use of urban spaces. In light of agendas seeking to improve the health of people in cities, a follow up study can explore whether correlations exist between increases in active life styles and increases in customisation. A particular area of interest relates to expansion of smart media and augmented

reality in urban spaces. Customisation need not be an aesthetic, physical, or functional intervention, but indeed can be virtual in nature. Flash-mobs are famously associated with Pokémon Go (Doumpa, 2013). In China, Unlimited Yihaodian, transforms derelict parts of urban spaces such as abandoned parking lots into virtual shopping malls (Doumpa, 2013). A study can explore whether the virtual customisation of an urban space would lead to increases in its popularity with minimal intervention from designers.

While the focus of this research has concerned the impact of customised urban environments on subsequent pedestrian behaviours and attitudes, it has only superficially explored the conditions that lead a space to become customised. There is evidence that the meticulous regulation of an urban setting can lead to it effectively becoming underused (Shaftoe, 2008; Varna, 2014); however, it is not clear whether this form of underuse is connected to informal design interventions. A follow-up study to this thesis can explore the actual impact of lax regulations in the enabling or suppression of customisation. It is likely that such a study will be time-based, possibly requiring the establishment of a medium to long-term academic project that tracks the changing urban morphology of urban spaces, while factoring in other externals such as demographic shifts. A short-term equivalent can look at the impact of design codes concerned with, for example, the unifying of building façades – looseness in implementations can potentially lead to a visually more attractive environment within the implied limitations of the theoretical threshold.

Throughout this thesis, customisation is regarded as a something that occurs naturally in any urban space. Its implementation is largely compared to adaptive customisation processes in manufacturing industries. The initial exploration of customisation presented in this thesis establishes a cursory understanding of how spaces can be customised and records the significance of customisations in the perceptibility of urban environments. A development on this arm of the research will be to further explore the processes of customisation including:

- Whether certain urban conditions are linked to certain types of customisation



- Whether approaches to customisation can be generalised in urban settings
- Which local businesses and local residents are most likely to customise an urban environment

This thesis has covered the role of local businesses and residents in the customisation of urban spaces in broad terms and didn't identify specific businesses or the personality traits of residents most likely to customise an urban area. An extension to this research can develop this area by establishing a typology of local businesses and residents synonymous with customised urban environments towards adding further clarity in who these creative space users are. Such a study will help to identify individuals who designers and planners can potentially empower in the effective regeneration of an urban space possibly identifying silent participants who normally don't take part in planning consultation events.

### 9.2.3 Implications for Urban Design

The main aim of this study was to establish whether informal design interventions, taking the form of adaptive customisations, applied to already-built urban fabrics, influence static pedestrian activities and opinions. This was explored through both the study of existing literature and from primary evidence collected through a series of bespoke observational and surveying tools.

The first major practical contribution presented by this research is in form of empirical studies in parallel academic fields that have been translated into an urban design context. This research records distinct parallels between product design processes that incorporate customisation strategies and participatory planning practices. While comparisons are apparent between most of the processes, adaptive customisation does not feature as a standardised practice in urban design. For example, urban design has participation strategies that include:

- Collaborations between urban designers and local communities during design processes (collaborative customisation, the participants work with the designer)
- The application of previously successful design ideas as part of consultation exercises (cosmetic customisation, the public are kept informed of changes and are offered limited opportunities to provide feedback).
- A plan is derived purely from spatial analysis (transparent customisation, the public are informed of changes but are not directly influential in the shaping of the final plan)

The missing step in the process is 'empowerment', where not only the final decision making is placed in the hands of the public (Stelzle and Noennig, 2017), but also its final implementation. This practice is comparable to adaptive customisation (Pine and Gilmore, 1997). In urban design, it has been found that achieving this degree of design devolution is typically regarded as an impossible feat, however, the process is already apparent in everyday urban spaces as is exemplified by the findings of this study of streetscape settings. Here, local businesses and residents personalise seemingly insignificant spatial attributes, changing colours and other aesthetic attributes and themes; collectively, these

contributions infuse a streetscape with a distinctive vernacular that morphs with the base communities present.

In isolated studies referring to forms of folk art and subsequent response, there is a common belief that people react favourably to features that bear some degree of informality. In his study on the social life of small urban spaces, William Whyte touches on this concept but also points out the importance of people watching (1980). While most studies expand on the importance of conviviality (Stevens, 2007; Shaftoe, 2008), very few expand on the impact and importance of informality in the popularity of an urban space.

Presently, there is a growing consensus that, in order to flexibly meet changing community expectations, high streets must possess the ability to quickly accommodate temporary and community uses (see Ministry of Housing, Communities and Local Government, 2018). A benchmark for the success of a high street in this regard is its subsequent popularity. While this flexibility can be synthesised following extensive spatial analyses, this thesis demonstrates that portions of high streets, with notable increases in post-construction customisation, correlate with increases in static pedestrian activities – a series of naturally well-used urban spaces which, to an extent, are self-organising. When apparent in the case study high streets, recorded customisations result in scores that rarely exceed beyond midway values indicating that such informal interventions are also self-regulating with regards to visual complexity. The apparent symbiotic relationship between informality and popularity, indicated by various findings within this thesis, volunteer further theoretical context to spatial analyses and design strategies related to the delivery of flexible, holistic, and lively urban spaces.

Secondly, based on the findings of this research, several policy implications arise that mostly concern approaches to end-user participation in design processes. With regards to practical approaches to participation, the evidence presented in this thesis suggests that, in situations where planners/designers, enable autonomic powers to the end-users of an urban space to self-determine the final aesthetic, physical, and functional properties of an urban space, the end result is

an urban space that is optimised for the end users – self-organisation. Additionally, as per the explored literature, such interventions are symbiotic with the installation of features that are appreciated by visitors to a site. Therefore, a revolutionary step in the urban design process is for designers to design modifiable urban spaces that, in some cases, may be initially conceived as unfinished; such an approach will theoretically result in such spaces being able to quickly and flexibly change with their base cultures and demographics. However, caution must be exercised as it is still unclear as to whether penchants for creativity are equal across changing socio-economic situations. For example, it can be speculated that a modifiable design built in a community with a predominately economically active community might not be quickly modified due to lack of time allocated to invest in micro-morphological changes. Also, the threshold for satisfaction might be lowered as sensory cues relating to the quality of the environment could be lesser worry as the perceived purpose of that space is connected to the ‘dormitory’ guise of the settlement in which it is situated.

With regards to participatory planning, this research demonstrates the impacts of spaces that have resulted from informal modifications applied to planned urban spaces – streetscapes. The overall result is an increase in the popularity and satisfaction of parts of streetscapes that have been customised when compared to those parts that remain relatively unchanged with little evidence of variation to their form and function following their construction. In this regard, an implication for urban design practice is a test of whether design consultation events are truly valid in the conception of lively urban settings. Suggested earlier in this research is that participatory design in urban planning and design are typically exclusionary and often set to take place at specific parts of a development cycle; the result is an inflexible space that doesn’t wholly meet the expectations of the community it is supposed to serve. The analytical chapters of this research show that urban spaces that have been left to grow without the intervention of urban designers and planners are, up to a point, more successful than planned spaces. Two considerations arise:

1. Design consultation practices should be revised or reinvented. By law, consultation events are necessary in the development of public spaces as they typically utilise taxes and affect certain groups. However, the idea of

empowering communities to design the finer details of their public spaces should be investigated. For example, people should be able to modify their surroundings and present cases for reimbursement based or tax subsidisation, within a financially appraised budget or excess, following initial spatial construction works. The specifics of this model are the basis for a future study.

2. Design consultation processes should not be conducted by urban designers or planners per se. Instead they should be handled by the communities of local businesses and local residents. In light of the quantification of the 'theoretical threshold', the role of the urban designer and planner should be to facilitate and regulate the extent to which an urban space is modified to ensure optimal levels of complexity and variety are retained. Again, this is a scenario-based consideration that will need to be further investigated within the context of socio-economic constraints in subsequent research in this area.

In the natural growth of an urban space, it is acknowledged that a degree of regulation is needed to ensure that spaces reflect the requirements and cultures of their respective users. The flexibility associated with modifiable spaces should be retained so that an urban space isn't fixed in terms of its aesthetic, physical or functional themes.

A third implication is based on the methods used to collect and analyse data. Those presented herein are mostly derived from well-known tools but expands on them in the interest of increasing accuracy, reducing time, and generating data specifically geared towards answering the research questions.

Urban Design analysis typically identifies human patterns of use and key landscape features in order to understand how an urban space works; they subsequently formulate design strategies based on this information. However, as described in section 1.1, the research problem, such methodical approaches can result in dysfunctional urban spaces through a loss of character associated with a setting. Design conservation strategies purposively attempt to ensure that key features are preserved; yet, an ignored or downplayed aspect is the role of built

environment composition in patterns of use. The heat mapping tool described in section 5.1, introduces a method that can be used flexibly to spatially applied multivariate analysis – situations where a variety of variable urban conditions are simultaneously analysed. The heat map geographically maps an aggregated customisation score based on individually assessed urban attributes. In this thesis, the emphasis of its application is to record the intensity of customised space. However, these attributes are interchangeable and can easily be replaced with such which concern the historic character of a streetscape, urban space, or similar environmental setting. For example, while conservation strategies are based on archaeological knowledge and historic information compiled by local authorities, such information in an urban design context, may be difficult to visualise in terms of how they interact with urban space or street users. The heat map can be employed to enrich current historic or heritage conservation strategies and development constraints analyses that aim to identify the character and/or the value of key parts of an environment, when used in tandem with static activities analysis and/or feeling map surveys (see Rofé, 2004).

Several parts of the heat mapping processes objectively analyse the composition of a streetscape. A notable method is the colour analysis described in section 5.1.4.1.1. This approach of analysing a single image towards determining the number dominant hues within a photograph relies on series of computational algorithms, where the only human error element is the photographic composition. As of 2009, the London Plan has called for local authorities to identify areas where greening can make a particular contribution towards the combatting climate change (see policy 5.10, Greater London Authority, 2009). Contextually, this methodical approach can be applied to aerial photography as an alternative way of recording the distribution of vegetation, denoted by green tones, subsequently forming the basis of a greening strategies or policy directives. Here, the approach potentially refines commonly choropleth techniques by incorporating a grid array, necessary in the generating of a more accurate rasterised output.

The overall score-based approach used in the heat mapping process expands on Georgiana Varna's assessment of spatial publicness. However, it does assess an

overall site, instead, it measures variance of the intensity of presence in urban spaces leading to a more detailed understanding of how an urban space works. This level of detail can potentially aid in urban analyses striving to objectively pinpoint a specific region of an environment that can subsequently be correlated with increased static activity instances. It is widely acknowledged that well-used urban settings are self-policed. Chapter 8 of the National Planning Policy Framework recommends that urban environments should promote social interactions and provide active street frontages (Ministry of Housing, Communities and Local Government, 2018). The refined scoring approach used in the heat mapping makes it possible to pinpoint conditions that are related to busier parts of a streetscape or an urban space.

When recording activities in urban spaces, a commonly used approach is the marking of a paper plan with hand drawn symbols (Gehl and Svarre, 2013) which can later be incorporated into GIS for digitisation. While such an approach is adequate for impressionistic studies, it is contentious when used in analyses dependent on precise location data because of the layers of human error introduced (summarised in section 9.1.4). The ability of a Parade™ user to navigate through an urban space and record an activity, from a range of predefined activities, at the touch of a button replaces human error with computational error. In theory computational errors are fixed and/or predictable so less likely to be as erratic and subjective as human error. The margin of error is further reduced by improvements in the accuracy of consumer GPS technologies or, in the case of this thesis, the Parade™ user's decision to opt to use cached data and/or the full 32 satellite array hosted by Google. This research demonstrates that the accuracy and time constraints of observational techniques, such as Space Syntax's static snapshots methods (Vaughan et al, 2001) can be drastically improved with the adoption of a geotagger such as Parade™. This app demonstrates that using a geotagger can be inexpensive with the app's compatibility with a wide range of portable android smart devices. Access to smart technologies is increasing as is the diversity of apps capable of conducting spatial analysis. Urban designers should actively seek ways of exploiting smart technologies in the conducting of everyday spatial analysis.

A further application of Parade™ could be to the established practice of feeling mapping, first introduced by Yodan Rofé in 2004. In essence, Rofé spatialises survey information based on the address points of participants (see section 5.3.1); Parade™ however, enables a researcher to expand their demographics by removing the constraint of a ‘fixed address’. For the purpose of this research, the urbiscape mapping process enabled the researcher to obtain the opinions of random street users along the length of a high street, giving crucial insights into how both locals and visitors to a site respond and react to informalities presented by customised parts of a street. Such an approach of geotagging a street survey not only accurately records the location of a survey, but also enables urban designers to carry out micro-morphological geographically weighted regression in order to understand the extent to which a perceived trend resonates with specific urban space/street user groups.

### **9.2.4 Closing statement**

Like most everyday products, urban environments are subject to end user actions that optimise their aesthetic, physical, and functional properties. However, there aren't rigid rules that determine how, for example, an office chair should be calibrated, rather there are guidelines. In most circumstances, such flexible products are those that are favoured over others. In an unregulated urban space, where a fabric is allowed to grow over time, evidence of end user modifications is apparent in its resulting urban morphology. This thesis provides empirical evidence that, in moderation, such alterations do result in livelier urban spaces. The suppression of such informality only harms, not helps, the success and life of a public space, where fresh approaches to participation in urban design processes should be considered in the creation of truly sustainable communities.



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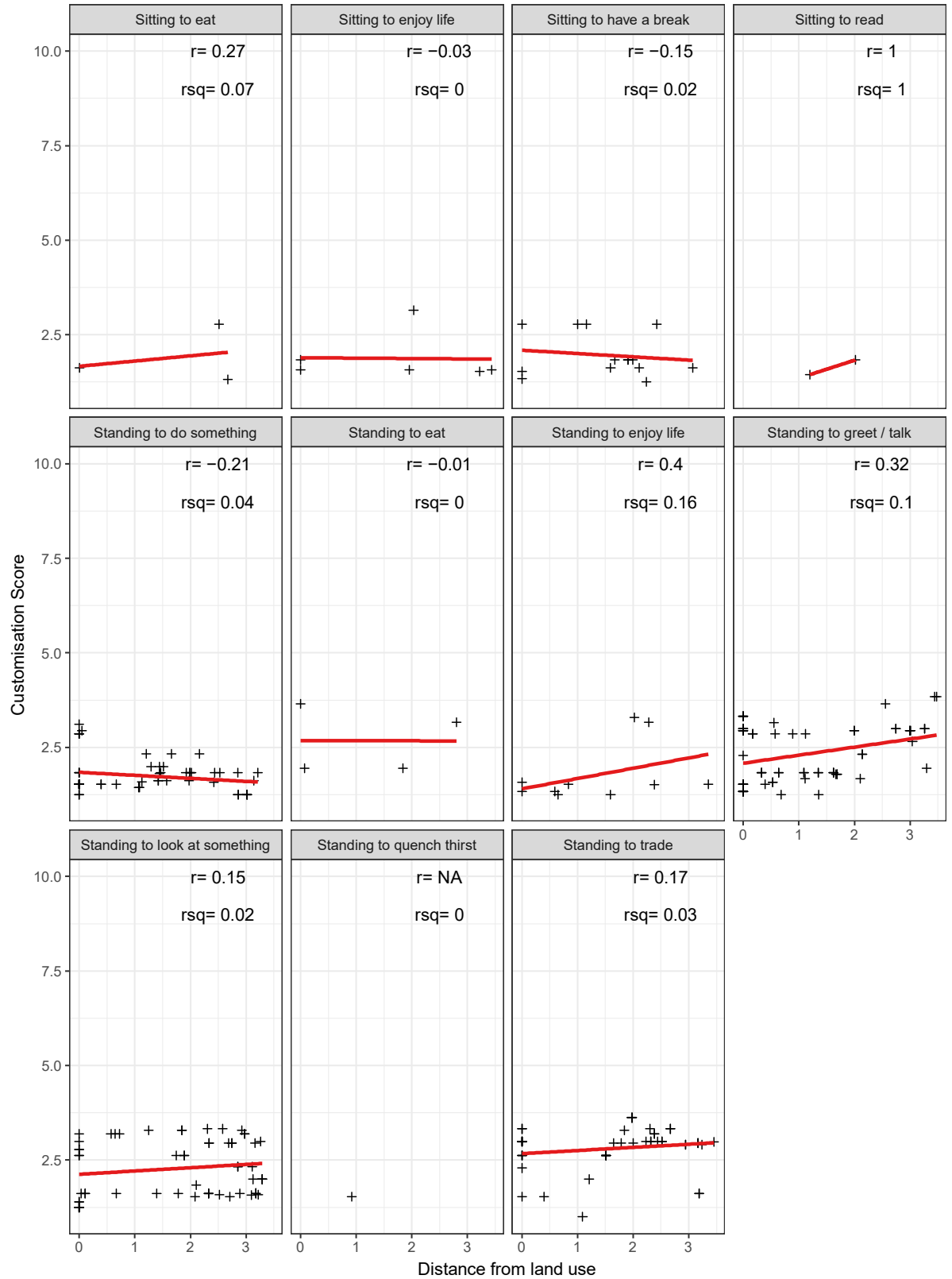
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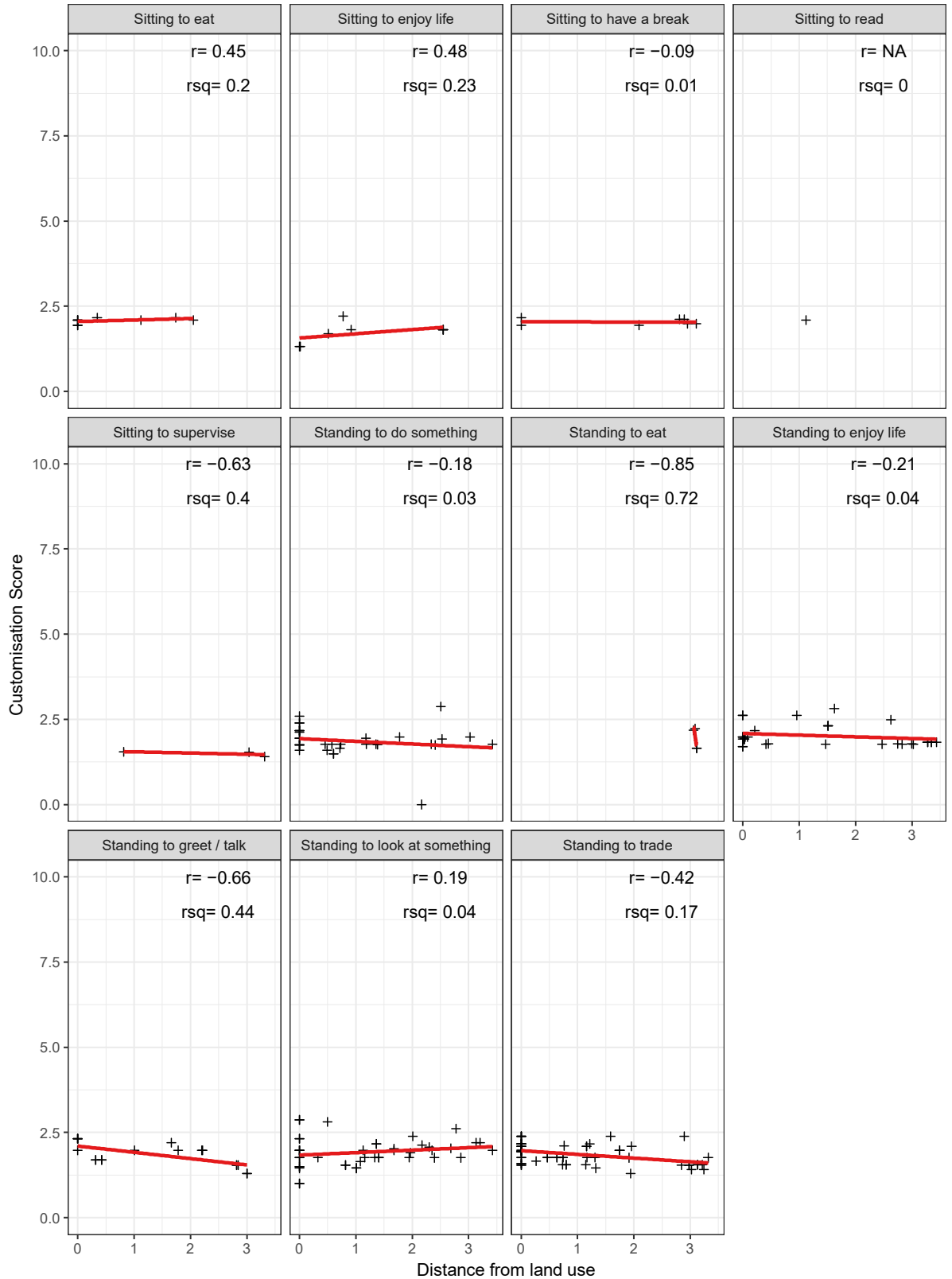
# 11 Appendix I

Camden High Street, A1 vs Customisation



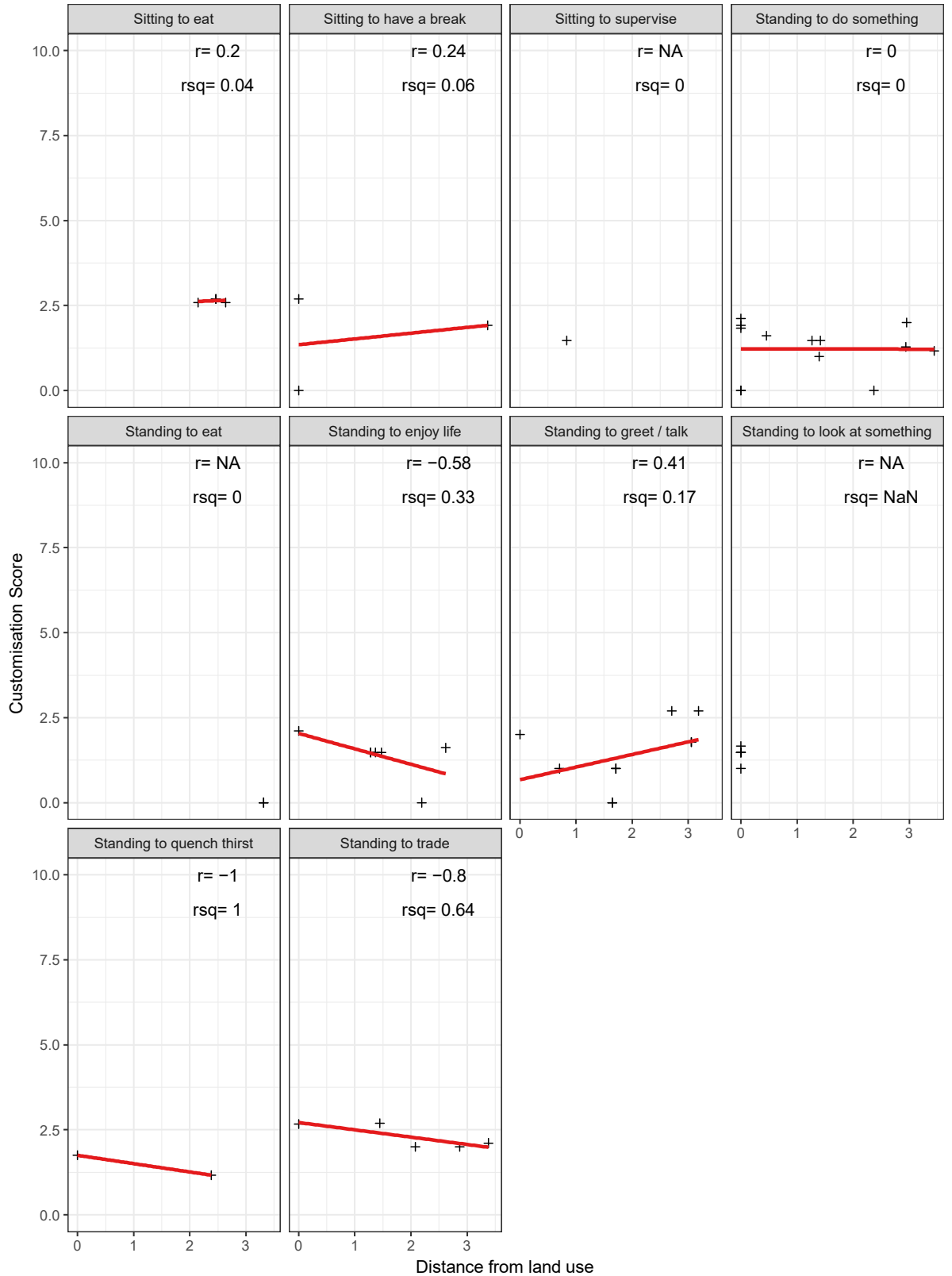
$r^2 = 0.0297, r = 0.28$

Portobello Road, A1 vs Customisation



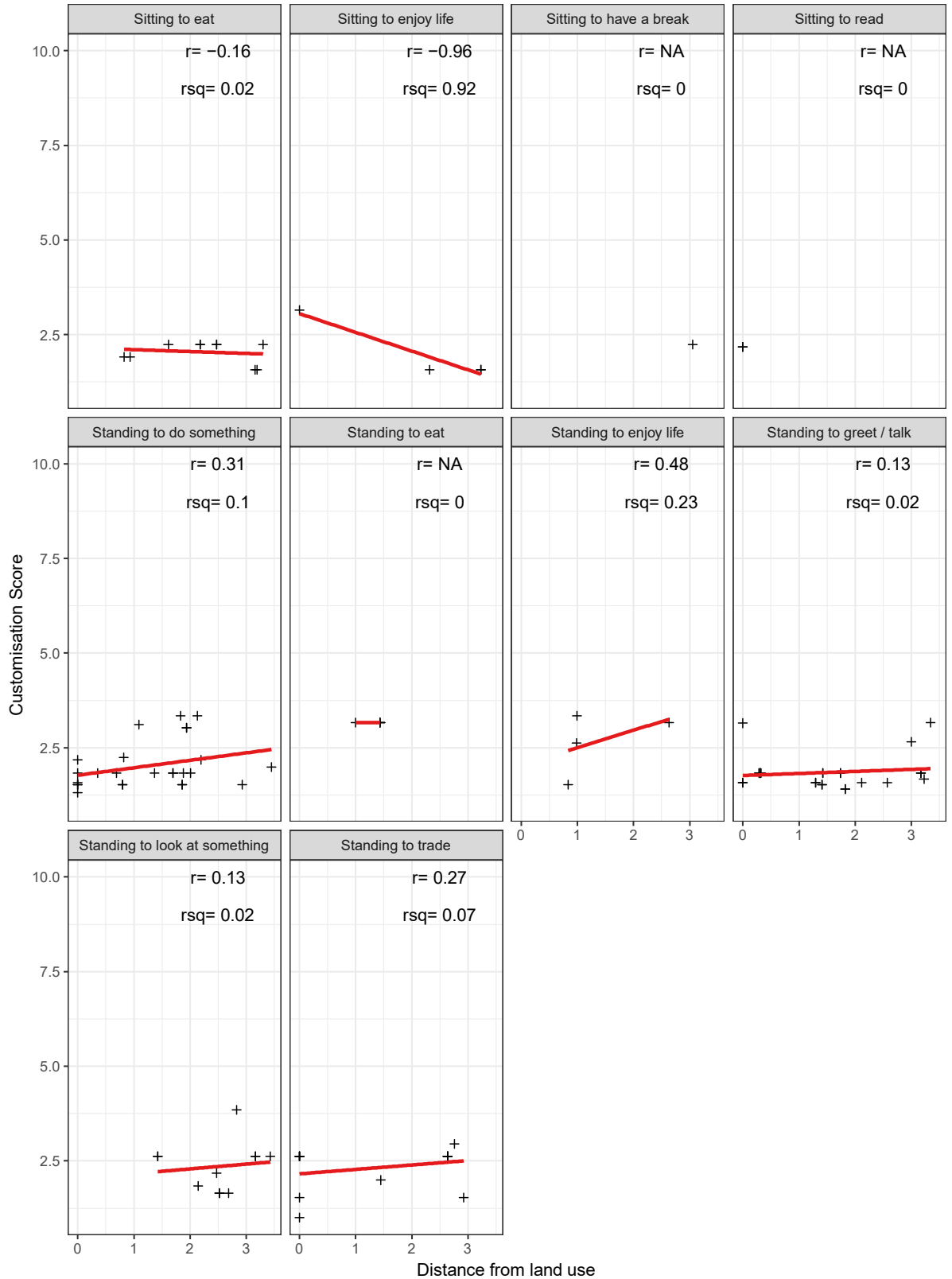
$r^2 = 0.0297, r = 0.28$

Petticoat Lane, A1 vs Customisation



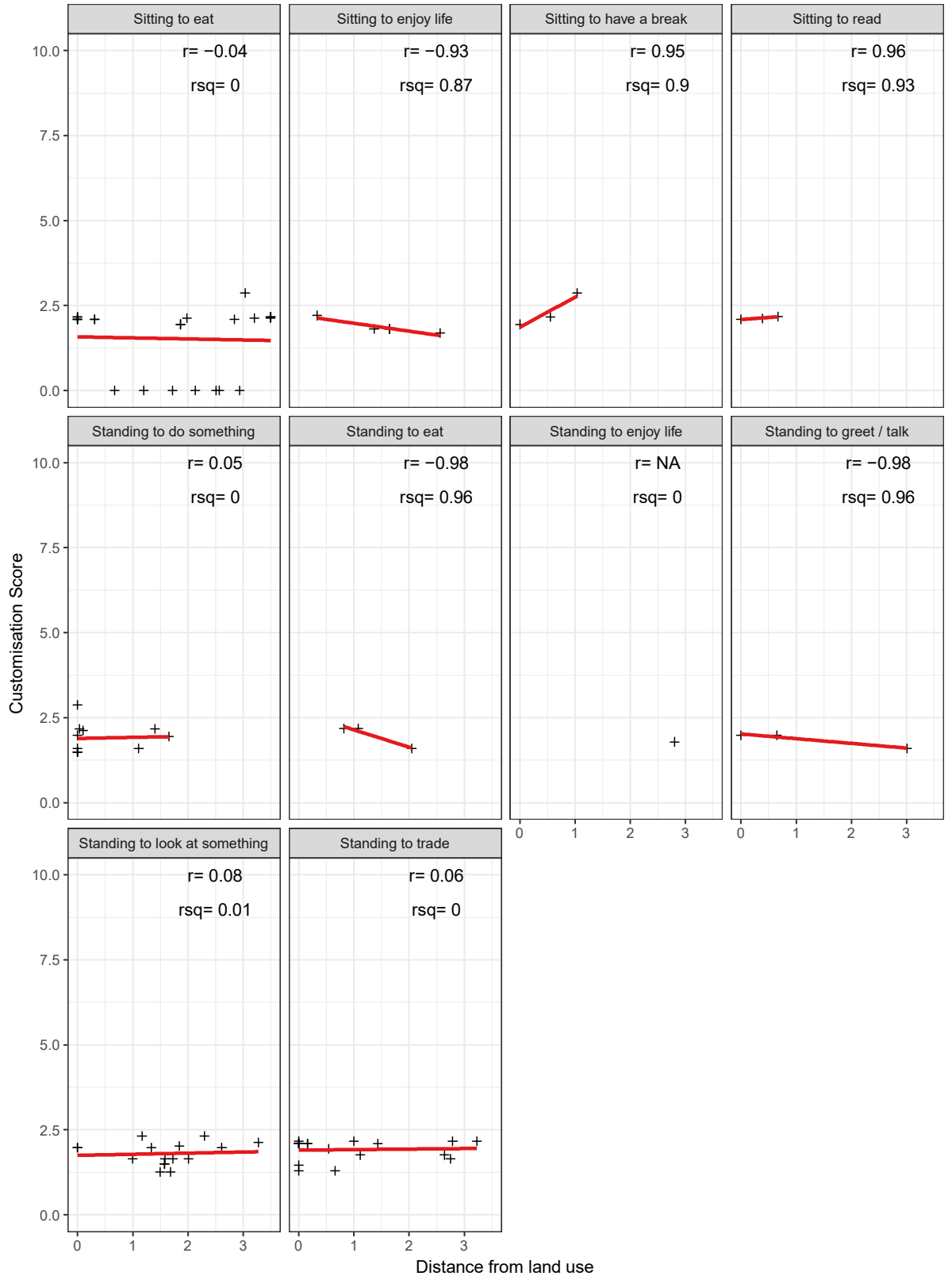
$r^2 = 0.0297, r = 0.28$

Camden High Street, A3 vs Customisation



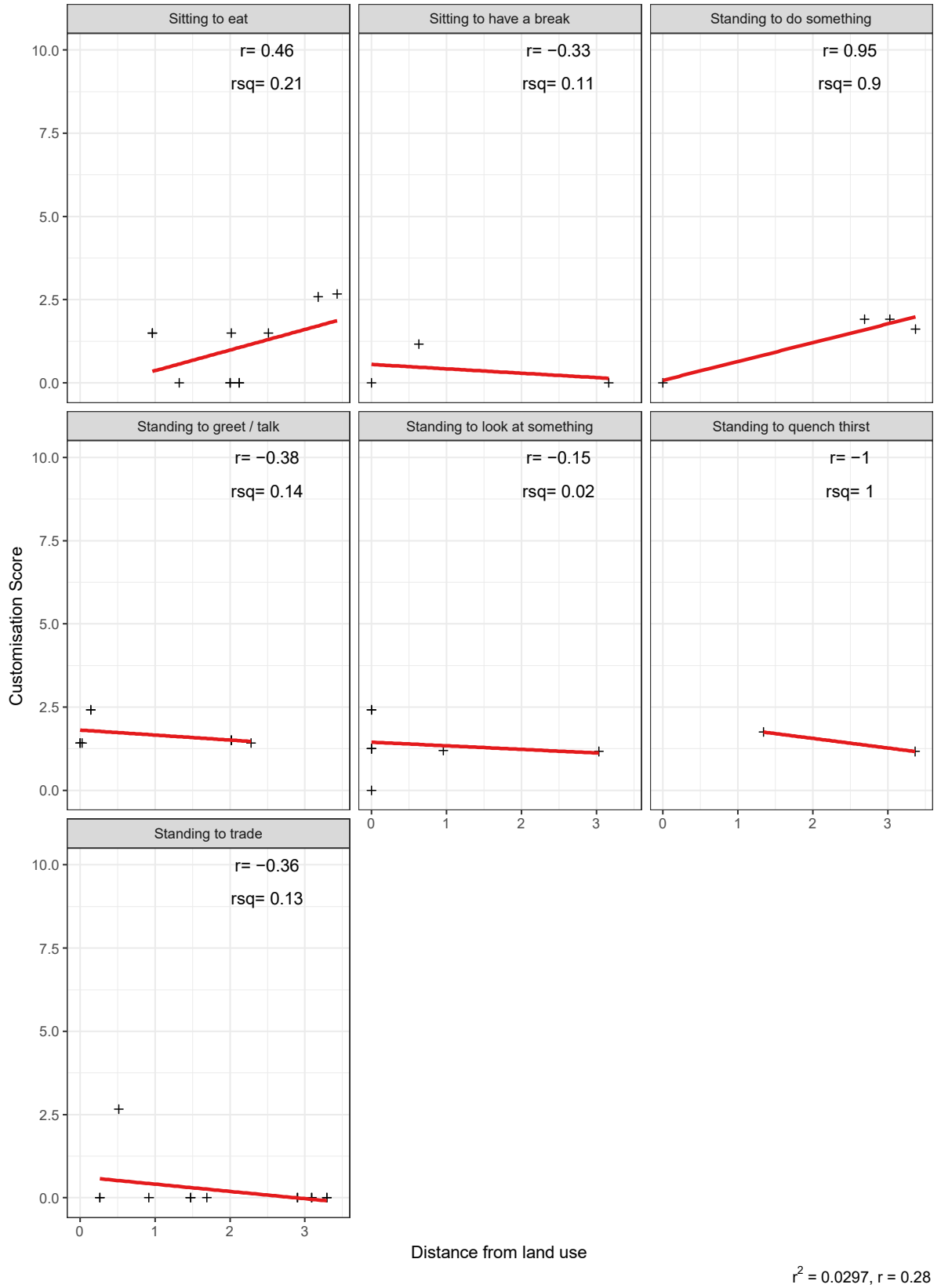
$r^2 = 0.0297, r = 0.28$

Portobello Road, A3 vs Customisation



$r^2 = 0.0297, r = 0.28$

Petticoat Lane, A3 vs Customisation



# 12 Appendix II

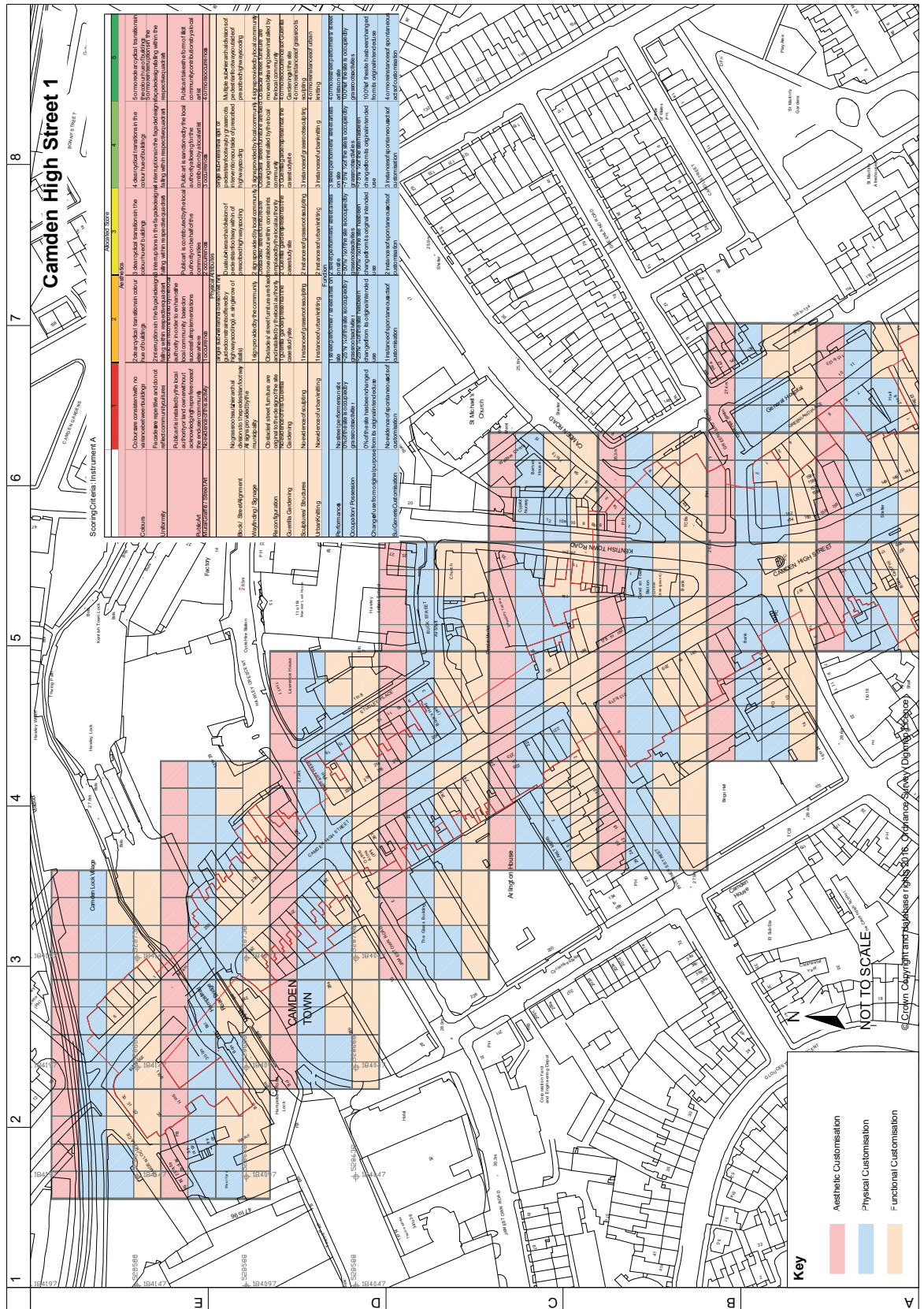


Figure 109. Customisation site survey sheet example (Camden High Street, sheet 1 of 3). Originally printed at A3. Identical sheets exist for Petticoat Lane and Portobello Road.

## 13 Appendix III

	Allocated Score				
	Stock	Stock Enhanced I	Stock Enhanced II	Customised I	Customised II
Colours	Colours are consistent with no variance between buildings	2 clear cyclical transitions in colour hue of buildings	3 clear cyclical transitions in the colour hue of buildings	4 clear cyclical transitions in the colour hue of buildings	5 or more clear cyclical transitions in the colour hue of buildings
Uniformity	Facades are repetitive and do not reflect community cultures	2 interruptions in the façade designs falling within respective quadrant	3 interruptions in the façade designs falling within respective quadrant	4 interruptions in the façade designs falling within respective quadrant	5 or more interruptions in the façade designs falling within the respective quadrant
Public Art	Public art is installed by the local authority or land owner	Public art is contributed by the local authority in order to enhance the local community - based on successful implementations elsewhere	Public art is contributed by the local authority on behalf of the communities	Public art is sanctioned by the local authority allowing for the contribution by a local artist	Public art takes the form of illicit community contributions by a community artist
Mural Graffiti / Street Art	No evidence of this activity	1 occurrence	2 occurrences	3 occurrences	4 or more occurrences



<b>Physical Attributes</b>					
Street interruptions (block / street alignment)	No grassroots sub-hierarchal divisions to the pedestrian footway	Single sub-hierarchal division within guided constraints offered by highways coding (i.e. single row of stalls)	Dual sub-hierarchal division of pedestrian footway within of prescribed highways coding	Single sub-hierarchal split of pedestrian footway by grassroots interventions outside of prescribed highways coding	Multiple sub-hierarchal divisions of pedestrian footways outside of prescribed highways coding
Wayfinding / Signage	All signs provided by the municipality	1 sign provided by the community	2 signs provided by local community	3 signs provided by local community	4 signs provided by local community
Reconfiguration	Obstacles / street furniture are original to the design of the site	Obstacles / street furniture are fixed and installed by the local authority	Obstacles / street furniture are moveable but within constraints emplaced by the local authority	Obstacles / street furniture are fixed having been installed by the local community	Obstacle / street furniture are moveable having been installed by the local community
Guerrilla Gardening	No evidence of this Guerrilla Gardening	1 guerrilla garden present at the case study site	2 Guerrilla gardens present at the case study site	3 Guerrilla gardens present at the case study site	4 or more occurrences of Guerrilla

					Gardening at the site
Sculptures / Structures	No evidence of sculpting	1 instance of grassroots sculpting	2 instances of grassroots sculpting	3 instances of grassroots sculpting	4 or more instances of grassroots sculpting
Urban Knitting	No evidence of urban knitting	1 instance of urban knitting	2 instances of urban knitting	3 instances of urban knitting	4 or more instances of urban knitting
<b>Functional Attributes</b>					
Performances	No street performers on site	1 street performer / street artist on site	2 street performers / street artists on site	3 street performers / street artists on site	4 or more street performers / street artists on site
Occupation / Possession	0% of the site is occupied by grassroots activities	~25% / ¼ of the site is occupied by grassroots activities	~50% / ½ of the site is occupied by grassroots activities	~75% / ¾ of the site is occupied by grassroots activities	100% of the site is occupied by grassroots activities
Change of use from original purpose	0% of the site has been changed from its original intended use	~25% / ¼ of the site has been changed from its original intended use	~50% / ½ of the site has been changed from its original intended use	~75% / ¾ of the site has been changed from its original intended use	100% of the site has been changed from its original intended use
Other Customisation	No evidence of spontaneous acts of customisation	1 instance of spontaneous acts of customisation	2 instances of spontaneous acts of customisation	3 instances of spontaneous acts of customisation	4 or more instances of customisation

spontaneous acts  
of customisation

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## 14 Appendix IV

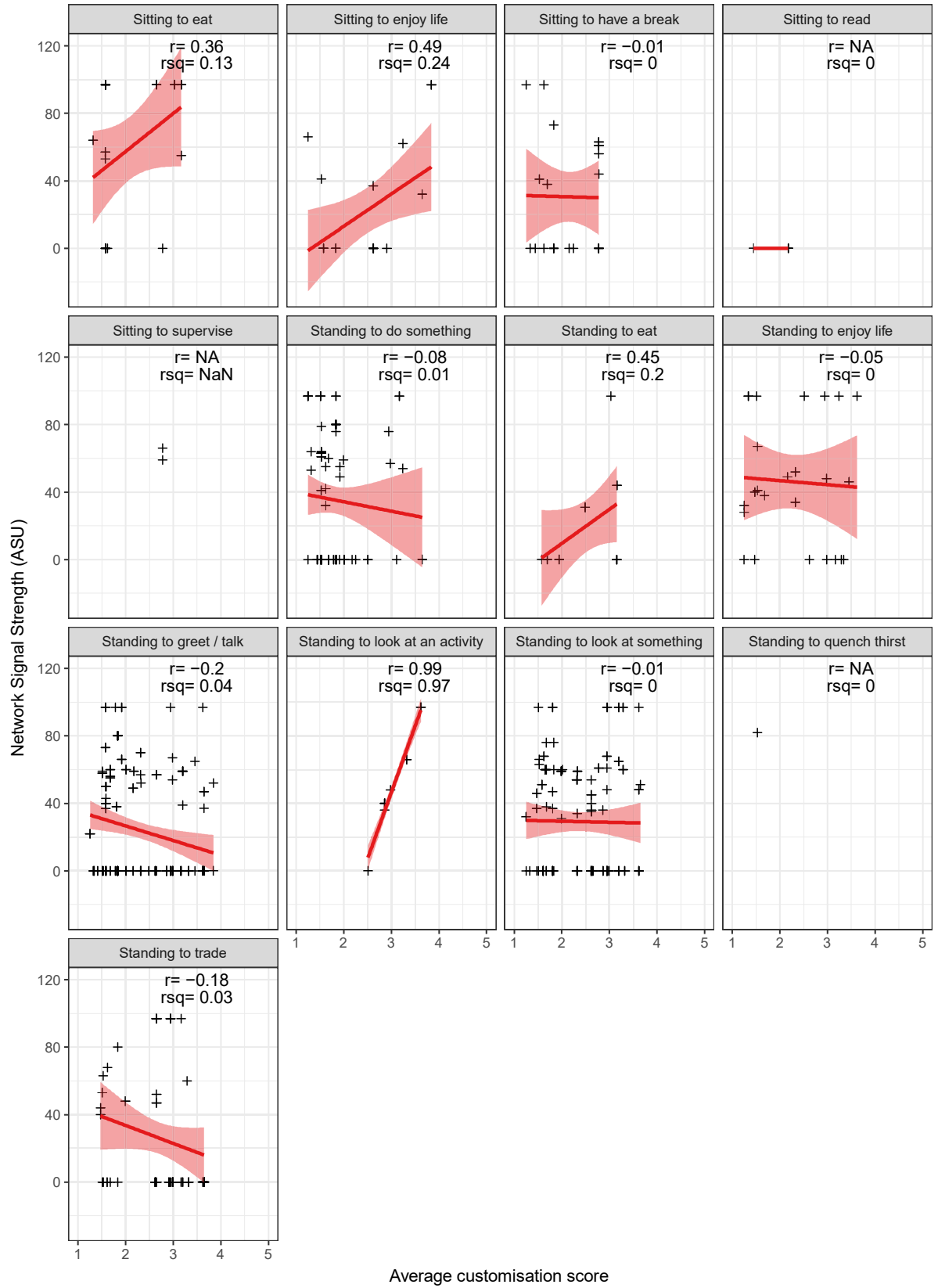
Table 33. Land uses as defined by the Planning and Compulsory Purchase Order 2004, sourced from: Planning Portal ([https://www.planningportal.co.uk/info/200130/common\\_projects/9/change\\_of\\_use](https://www.planningportal.co.uk/info/200130/common_projects/9/change_of_use))

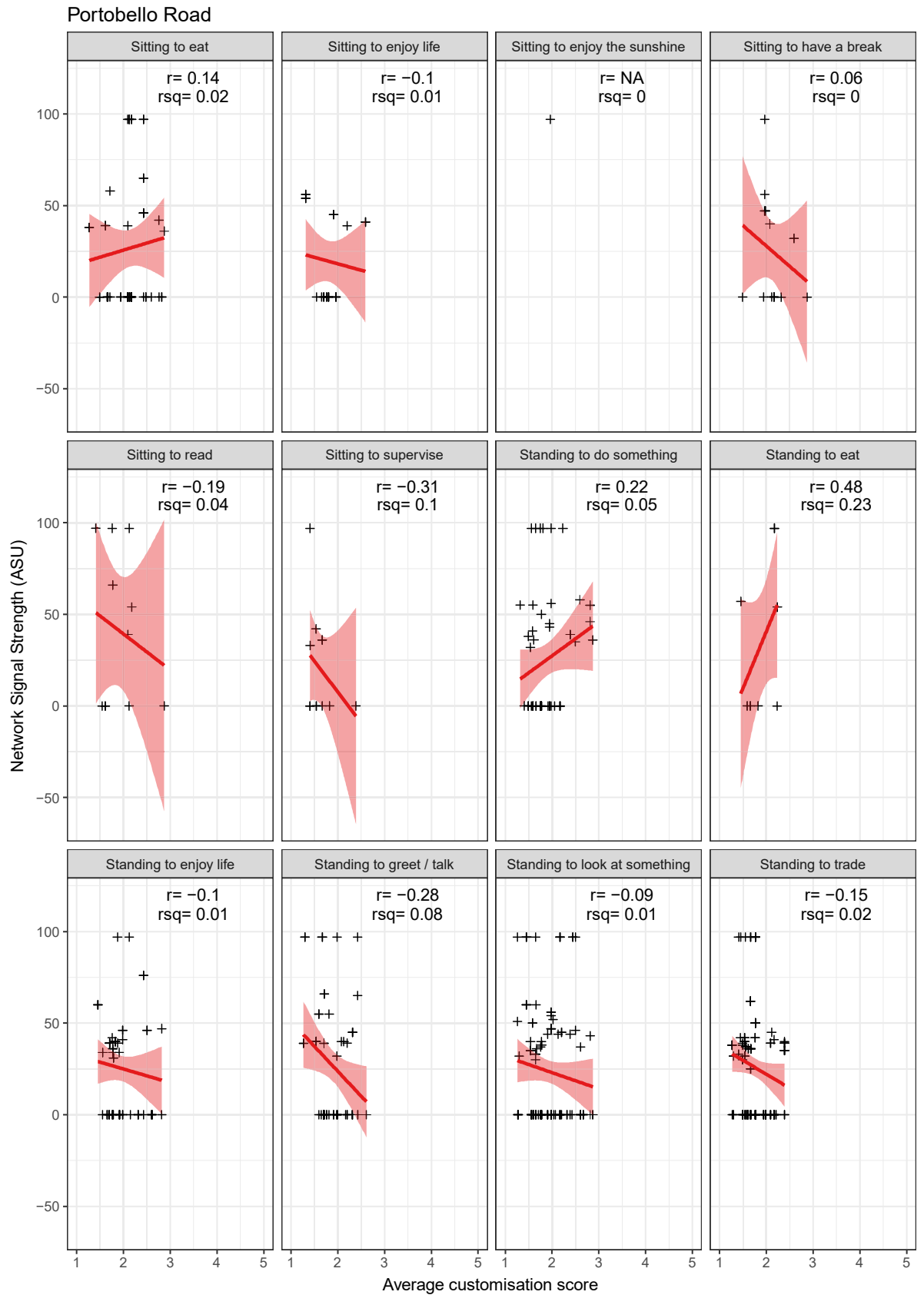
Code	Term	Description
A1	<b>Shops</b>	Shops, retail warehouses, hairdressers, undertakers, travel and ticket agencies, post offices, pet shops, sandwich bars, showrooms, domestic hire shops, dry cleaners, funeral directors and internet cafes.
A2	<b>Financial &amp; professional services</b>	Financial services such as banks and building societies, professional services (other than health and medical services) and including estate and employment agencies. It does not include betting offices or pay day loan shops - these are now classed as "sui generis" uses (see below).
A3	<b>Restaurants and cafés</b>	For the sale of food and drink for consumption on the premises - restaurants, snack bars and cafes.
A4	<b>Drinking establishments</b>	Public houses, wine bars or other drinking establishments (but not night clubs) including drinking establishments with expanded [sic] food provision.
A5	<b>Hot food takeaways</b>	For the sale of hot food for consumption off the premises
B1	<b>Business</b>	Offices (other than those that fall within A2), research and development of products and processes, light industry appropriate in a residential area.
B2	<b>General industrial</b>	Use for industrial process other than one falling within class B1 (excluding incineration purposes, chemical treatment or landfill or hazardous waste).
B8	<b>Storage or distribution</b>	This class includes open air storage.
C1	<b>Hotels</b>	Hotels, boarding and guest houses where no significant element of care is provided (excludes hostels).
C2	<b>Residential Institutions</b>	Residential care homes, hospitals, nursing homes, boarding schools, residential colleges and training centres.
C2A	<b>Secure Residential Institution</b>	Use for a provision of secure residential accommodation, including use as a prison, young offenders institution, detention centre, secure training centre, custody centre, short term holding centre, secure hospital, secure local authority accommodation or use as a military barracks.
C3	<b>Dwelling houses</b>	<p>this class is formed of 3 parts:</p> <ul style="list-style-type: none"> <li>○ C3 (a) covers use by a single person or a family (a couple whether married or not, a person related to</li> </ul>

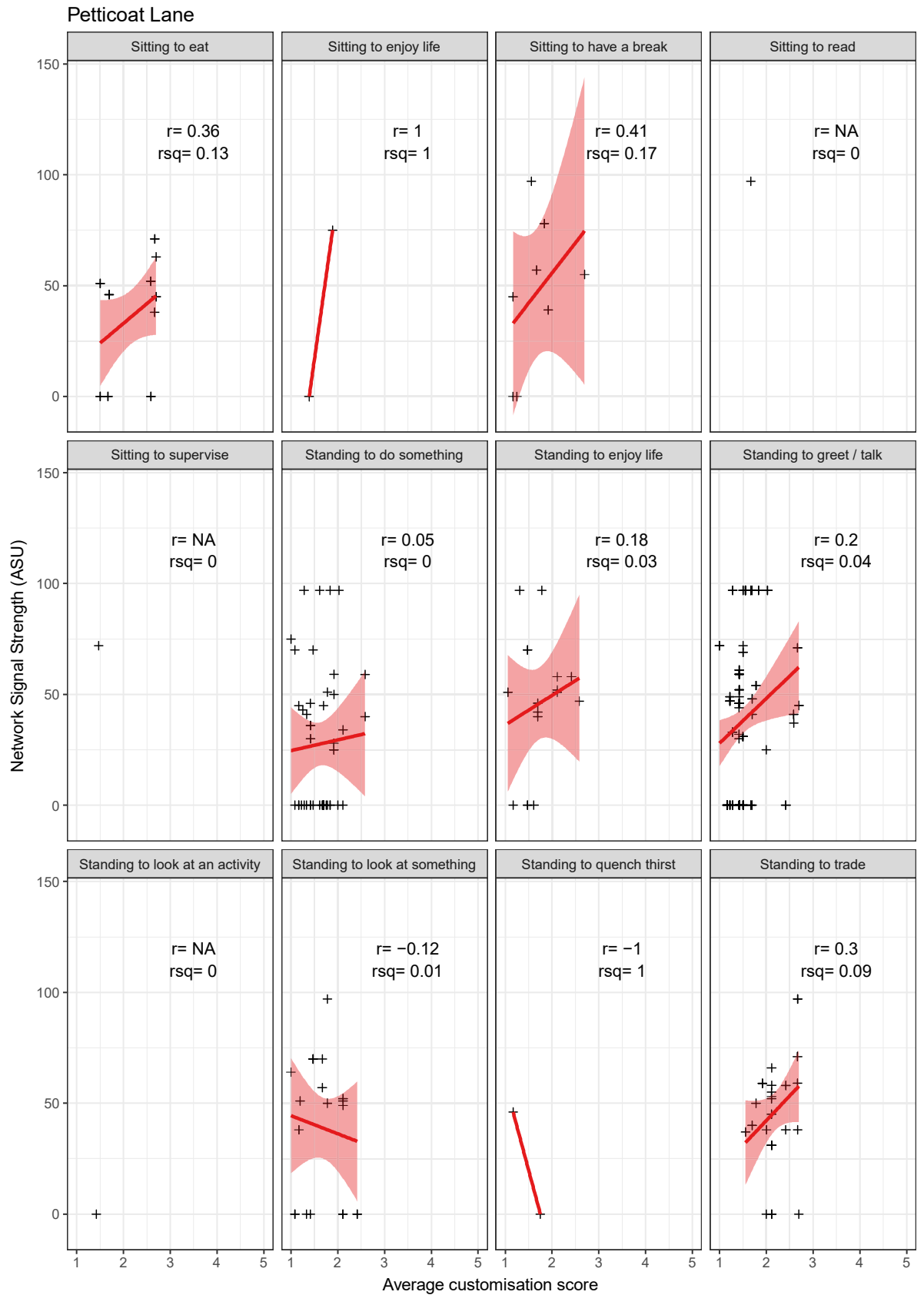
		<p>one another with members of the family of one of the couple to be treated as members of the family of the other), an employer and certain domestic employees (such as an au pair, nanny, nurse, governess, servant, chauffeur, gardener, secretary and personal assistant), a carer and the person receiving the care and a foster parent and foster child.</p> <ul style="list-style-type: none"><li>○ C3(b): up to six people living together as a single household and receiving care e.g. supported housing schemes such as those for people with learning disabilities or mental health problems.</li><li>○ C3(c) allows for groups of people (up to six) living together as a single household. This allows for those groupings that do not fall within the C4 HMO definition, but which fell within the previous C3 use class, to be provided for i.e. a small religious community may fall into this section as could a homeowner who is living with a lodger.</li></ul>
<b>C4</b>	<b>Houses in multiple occupation</b>	Small shared houses occupied by between three and six unrelated individuals, as their only or main residence, who share basic amenities such as a kitchen or bathroom.
<b>D1</b>	<b>Non-residential institutions</b>	Clinics, health centres, crèches, day nurseries, day centres, schools, art galleries (other than for sale or hire), museums, libraries, halls, places of worship, church halls, law court. Non- residential [ <i>sic</i> ] education and training centres.
<b>D2</b>	<b>Assembly or leisure</b>	Cinemas, music and concert halls, bingo and dance halls (but not night clubs), swimming baths, skating rinks, gymnasiums or area for indoor or outdoor sports and recreations (except for motor sports, or where firearms are used).
<b>SG</b>	<b>Other</b>	Certain uses do not fall within any use class and are considered 'sui generis'. Such uses include: betting offices/shops, pay day loan shops, theatres, larger houses in multiple occupation, hostels providing no significant element of care, scrap yards. Petrol filling stations and shops selling and/or displaying motor vehicles. Retail warehouse clubs, nightclubs, laundrettes, taxi businesses and casinos.

# 15 Appendix V

Camden High Street



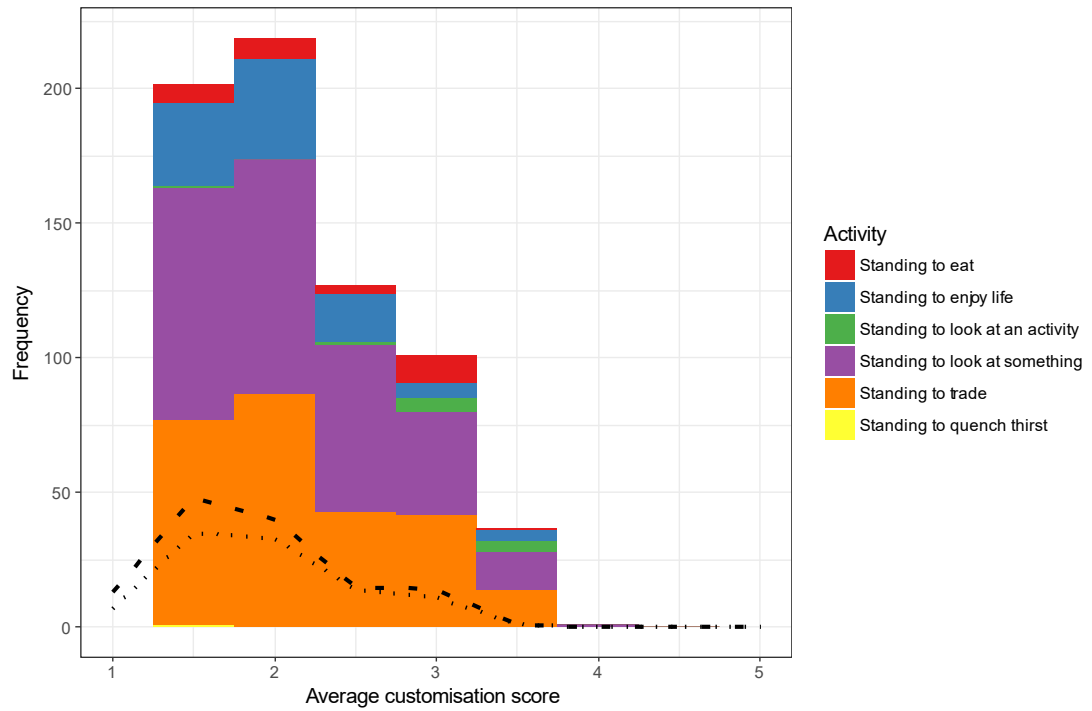






## 16 Appendix VI

Distribution of standing activities and survey participation



Distribution of sitting activities and survey participation

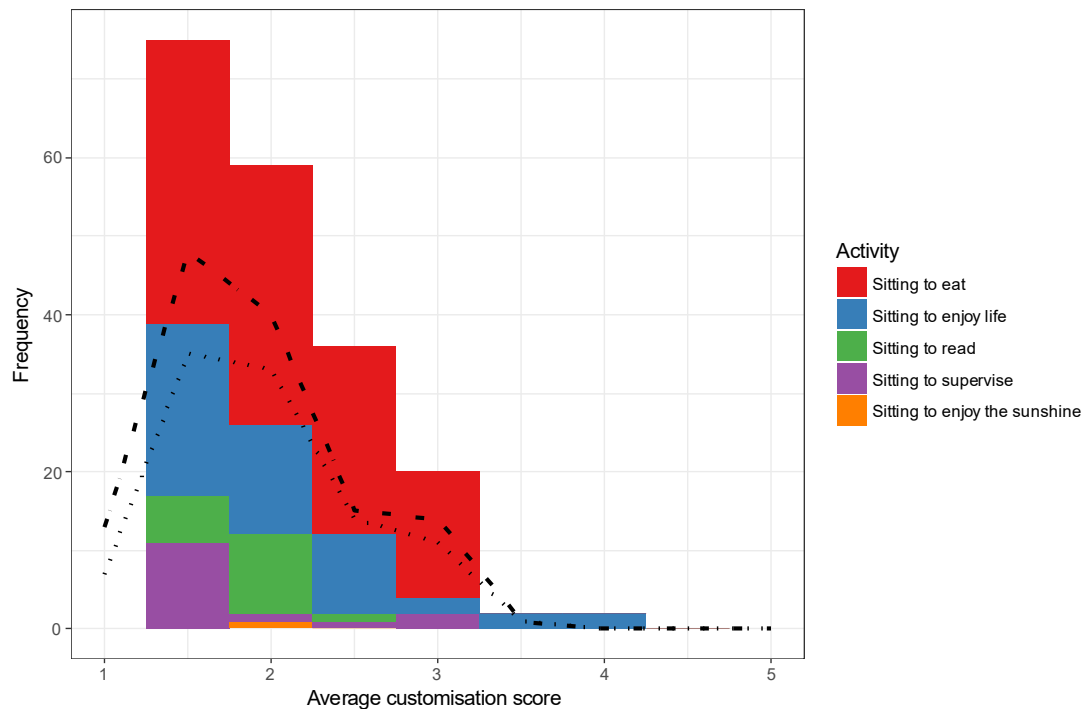


Figure 110. Distribution of static activities and survey participation vs. customisation. The black dashed line represents survey response rates; the black dotted line represents survey response rates for satisfaction scores > 2.5

## 17 Appendix VII

Average customisation by satisfaction score per age band, Camden High Street

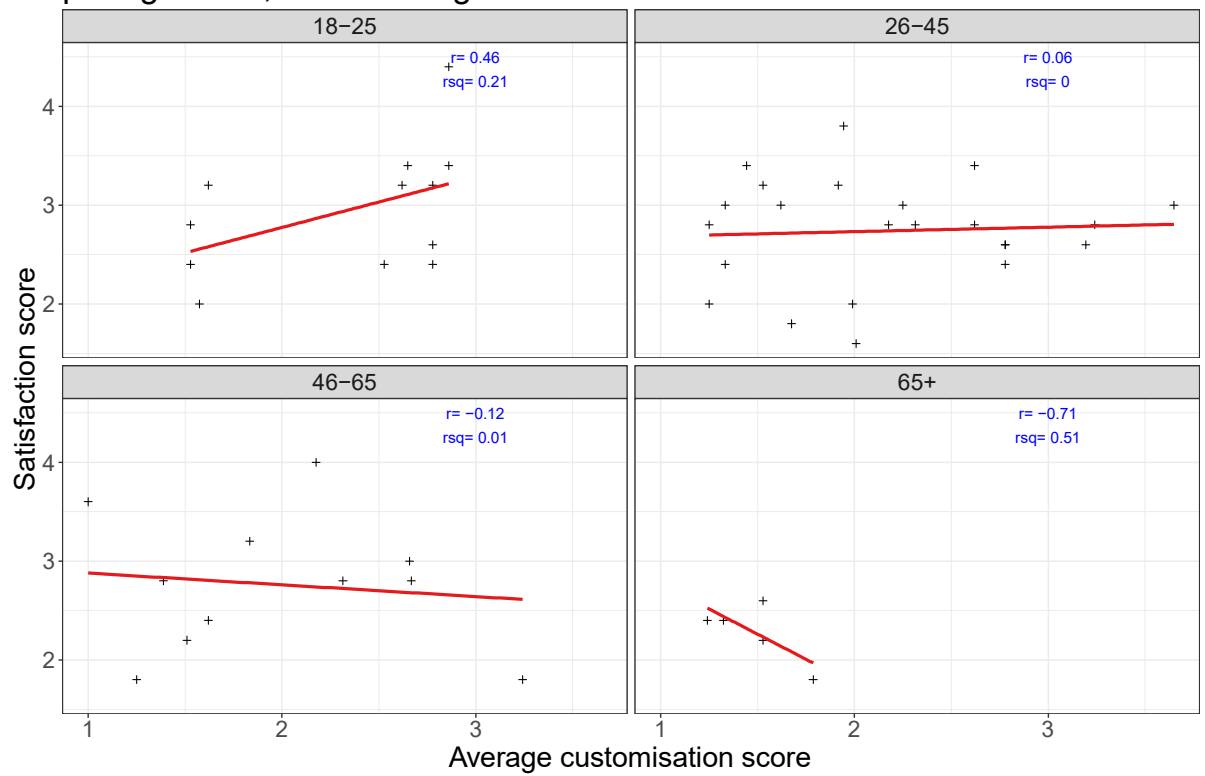


Figure 111. Average customisation score vs. satisfaction, Camden High Street

Average customisation by satisfaction score per age band, Portobello Road

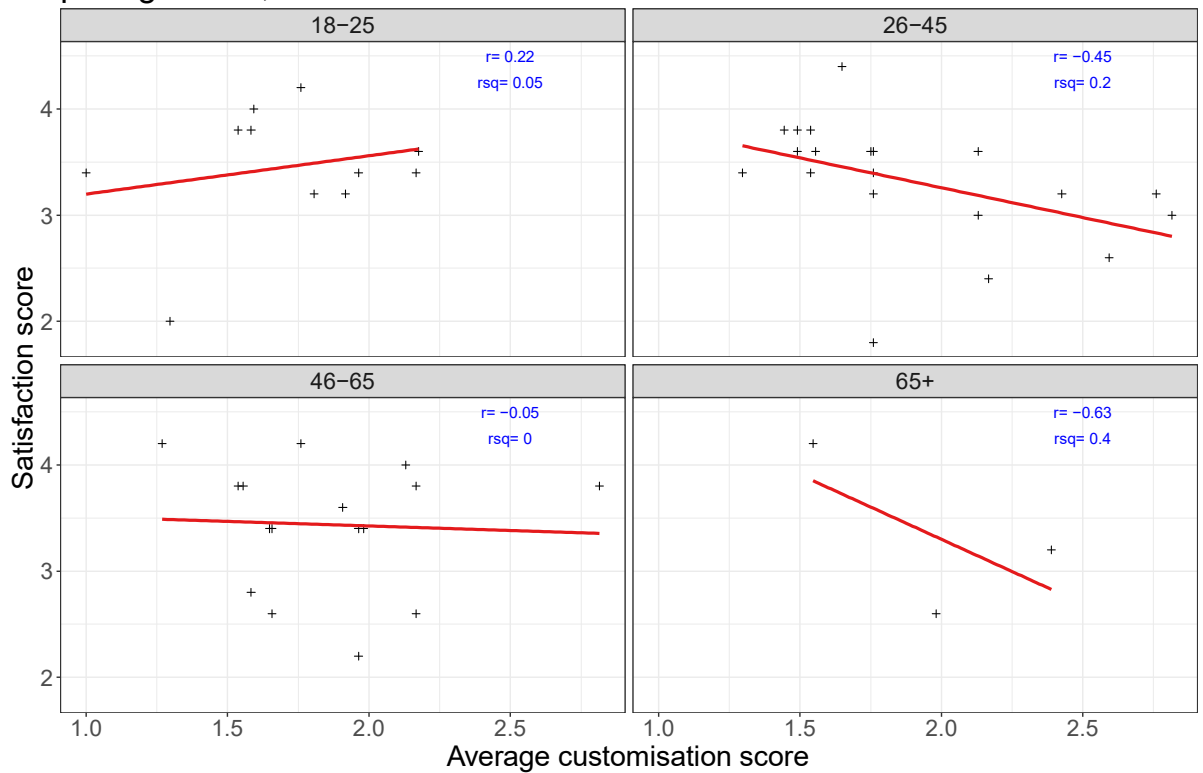


Figure 112. Average customisation score vs. satisfaction, Portobello Road

Average customisation by satisfaction score per age band, Petticoat Lane

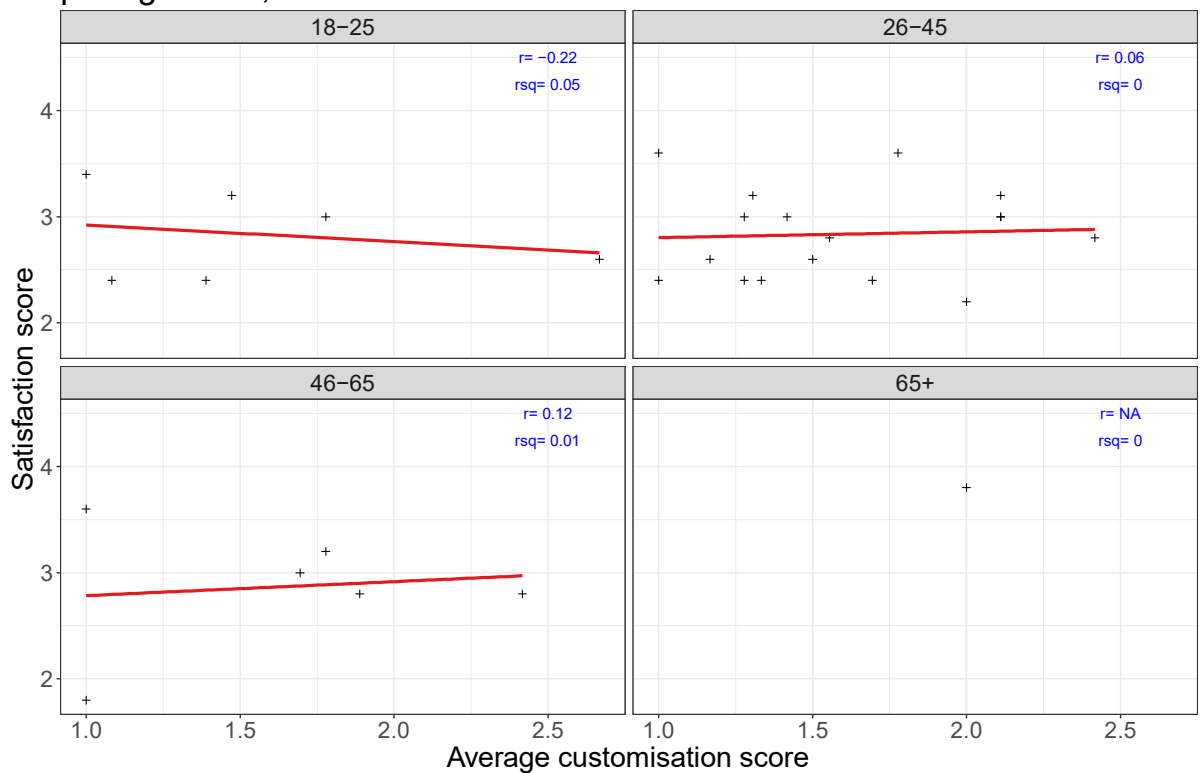


Figure 113. Average customisation score vs. satisfaction, Petticoat Lane

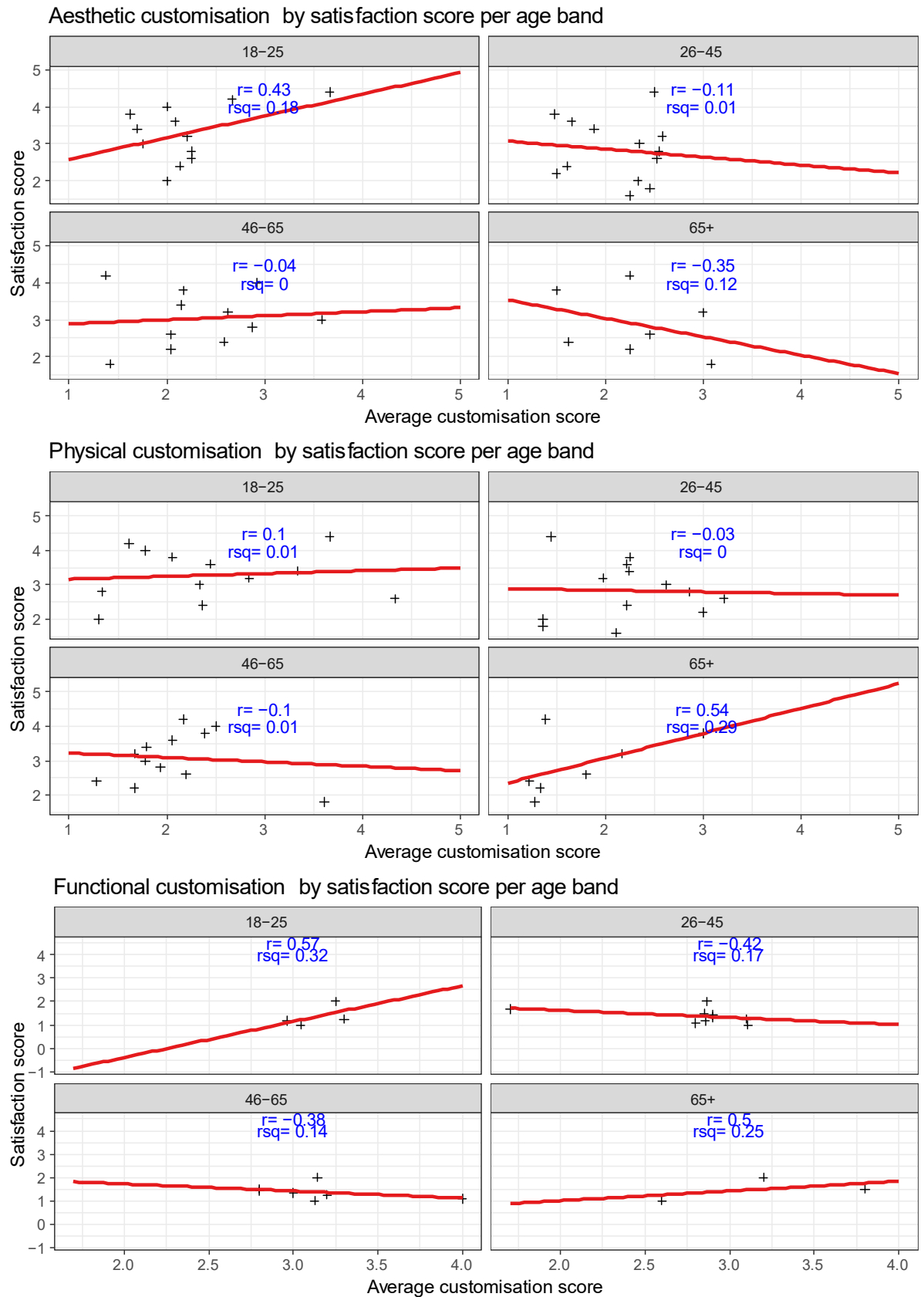


Figure 114. Customisation splits vs. satisfaction scores by age band

18-25 year olds, Aesthetic Customisation

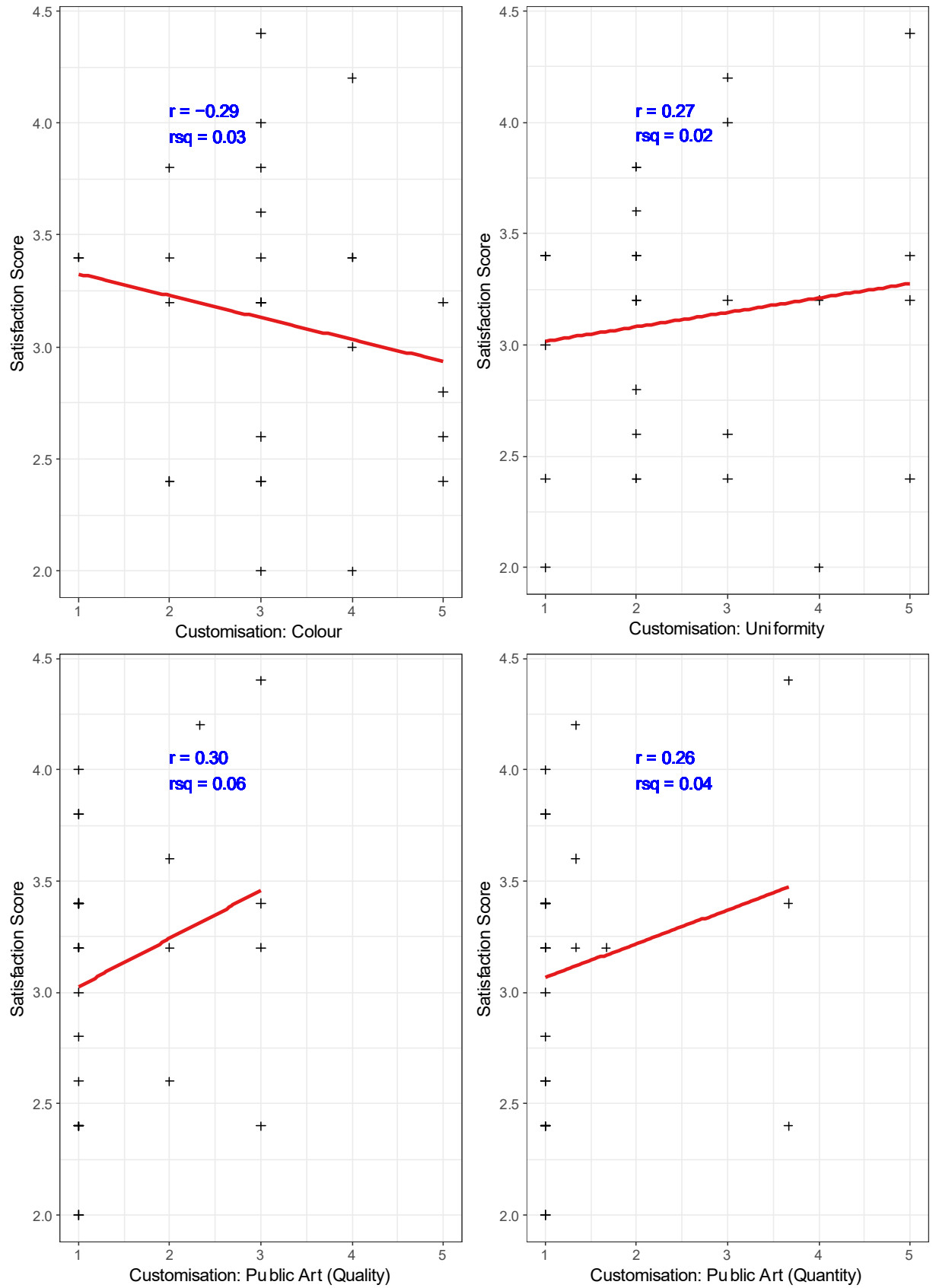


Figure 115. 18-25 year olds: customisation aesthetic attribute scores vs satisfaction

18-25 year olds, Physical Customisation

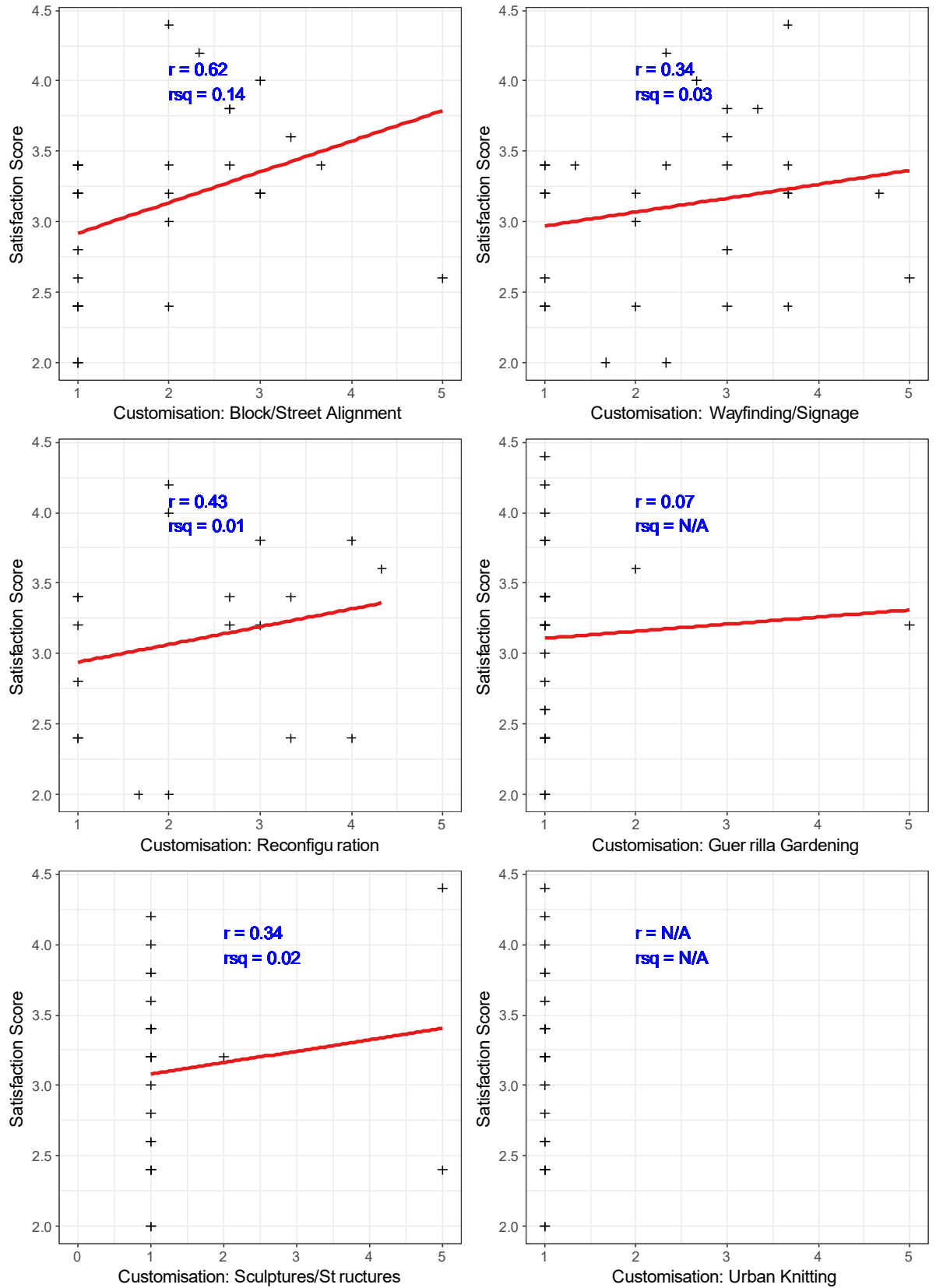


Figure 116.18-25 year olds: customisation physical attribute scores vs satisfaction

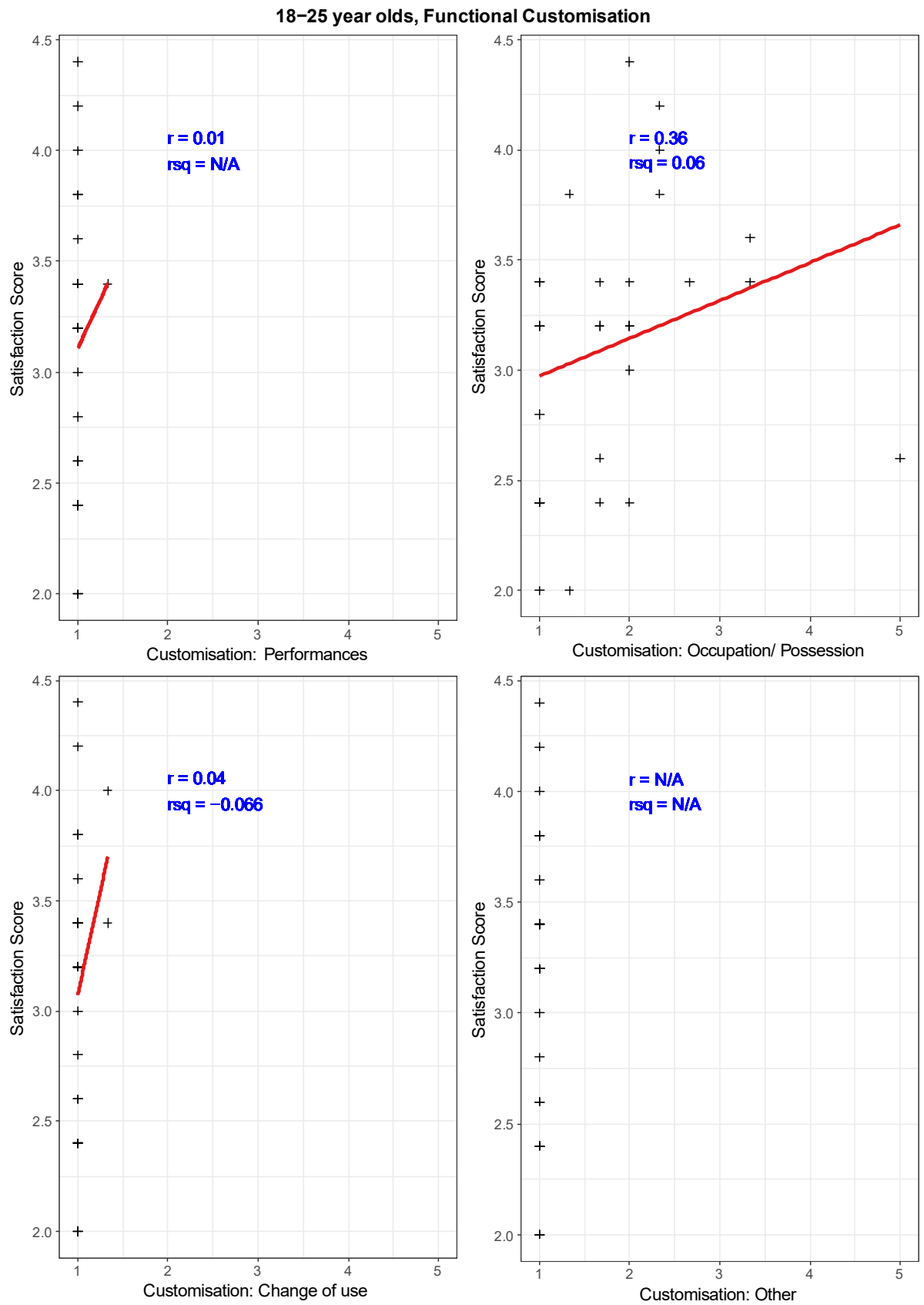


Figure 117. 18-25 year olds: customisation functional attribute scores vs satisfaction

65+ year olds, Physical Customisation

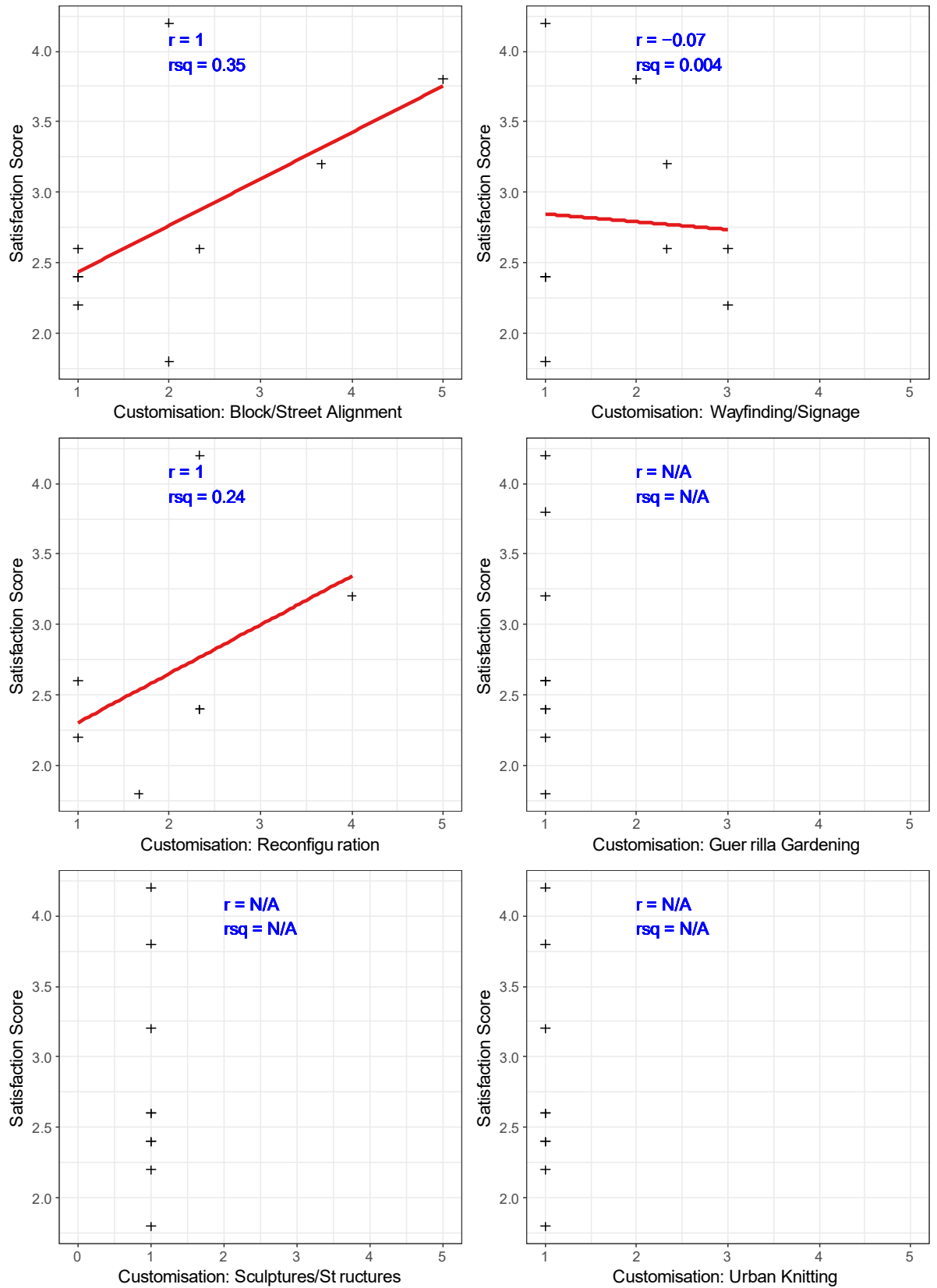


Figure 118. 65+ year olds: customisation physical attribute scores vs satisfaction



65+ year olds, Functional Customisation

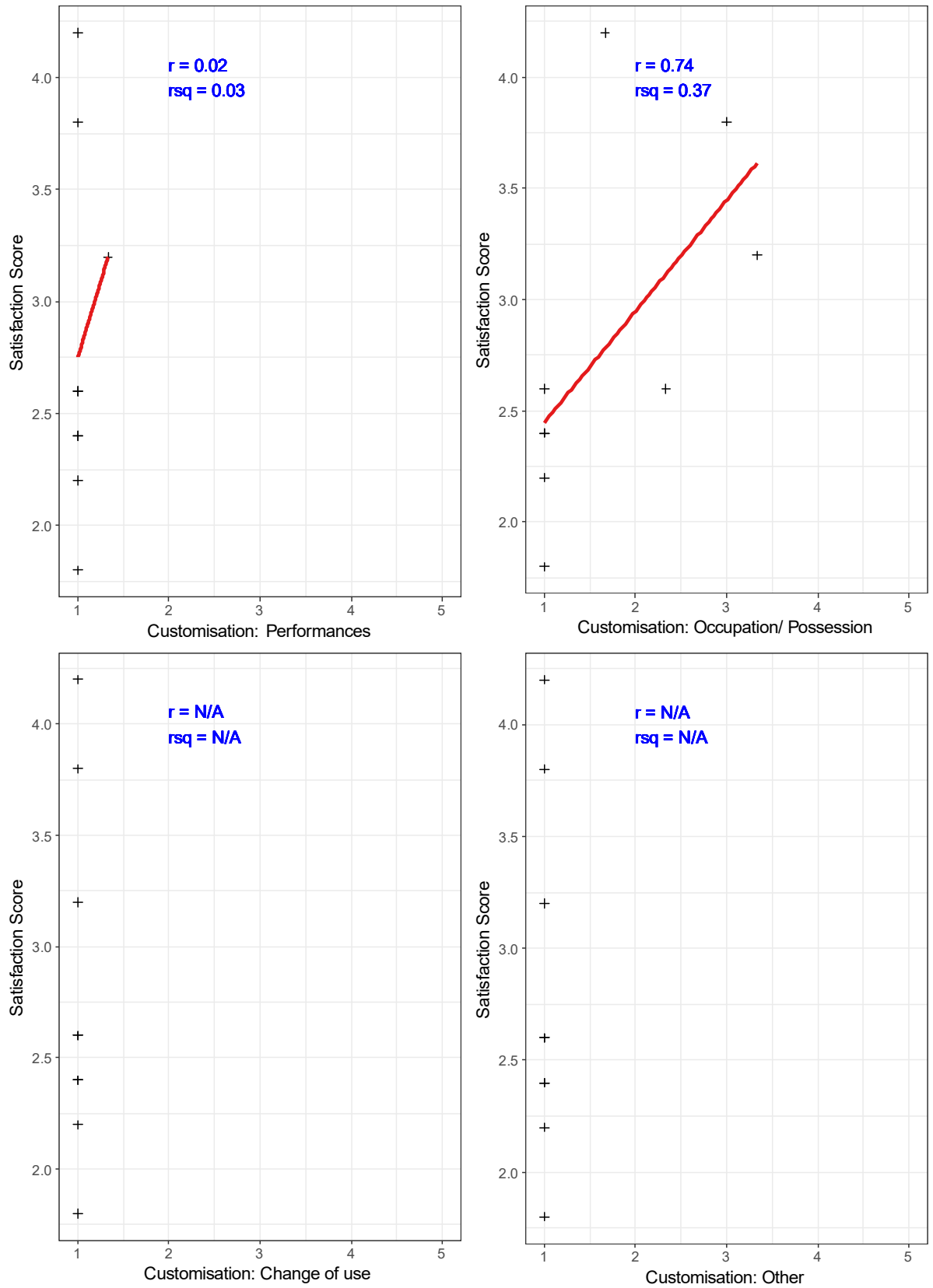


Figure 119. 65+ year olds: customisation functional attribute scores vs satisfaction

# 18 Appendix VIII

## High Street Experience Survey: Camden

### 1. How would you rate the following features of your immediate surroundings?

**a. Visibility (easy to see what's going on)**

Very Good    Good    Average    Poor    Very Poor

**b. Sound / noise**

Very Good    Good    Average    Poor    Very Poor

**c. Smell**

Very Good    Good    Average    Poor    Very Poor

**d. Décor / physical appearance**

Very Good    Good    Average    Poor    Very Poor

**e. Air quality**

Very Good    Good    Average    Poor    Very Poor

### 2. If this space were to be re-designed, which 2 fictitious configurations would you rather choose?

**Fictitious Site 1**

<b>Colours</b> You'd rather define these	<b>Performers</b> Street performers are allowed
<b>Gardening</b> Plants are everywhere and left to grow wild	<b>Façades</b> Walls and features are identical

1 11 8 2

**Fictitious Site 2**

<b>Colours</b> The council's choice is good enough	<b>Performers</b> Street performers banned from the site
<b>Gardening</b> Planting provided and maintained by the council	<b>Façades</b> Walls and features are identical to each other and orderly

1 11 8 2

**Fictitious Site 3**

<b>Paths</b> Paths and routes are laid out by the council	<b>Street furniture</b> Benches, planters, etc are fixed
<b>Signs</b> Signs point towards key landmarks and destinations	<b>Uses</b> Everyday is the same (predictable)

5 9 6 13

**Fictitious Site 4**

<b>Paths</b> Paths and routes are defined by the local communities	<b>Street furniture</b> Benches, planters, etc are mobile
<b>Signs</b> Signs direct people to local attractions	<b>Uses</b> Everyday showcases different event (unpredictable)

5 9 6 13

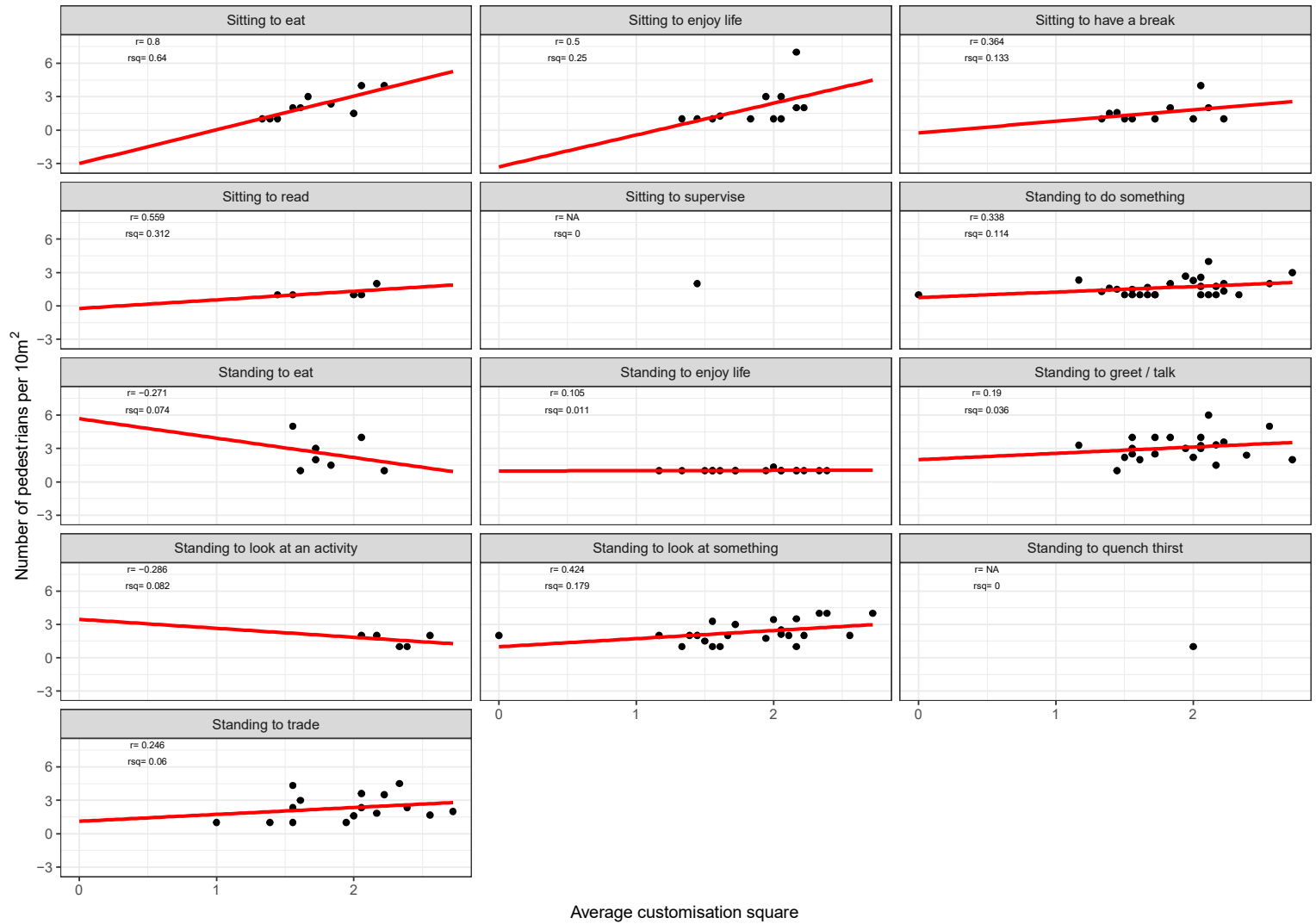
### 3. How old are you?

18 - 25    26 - 45    46 - 65    65+

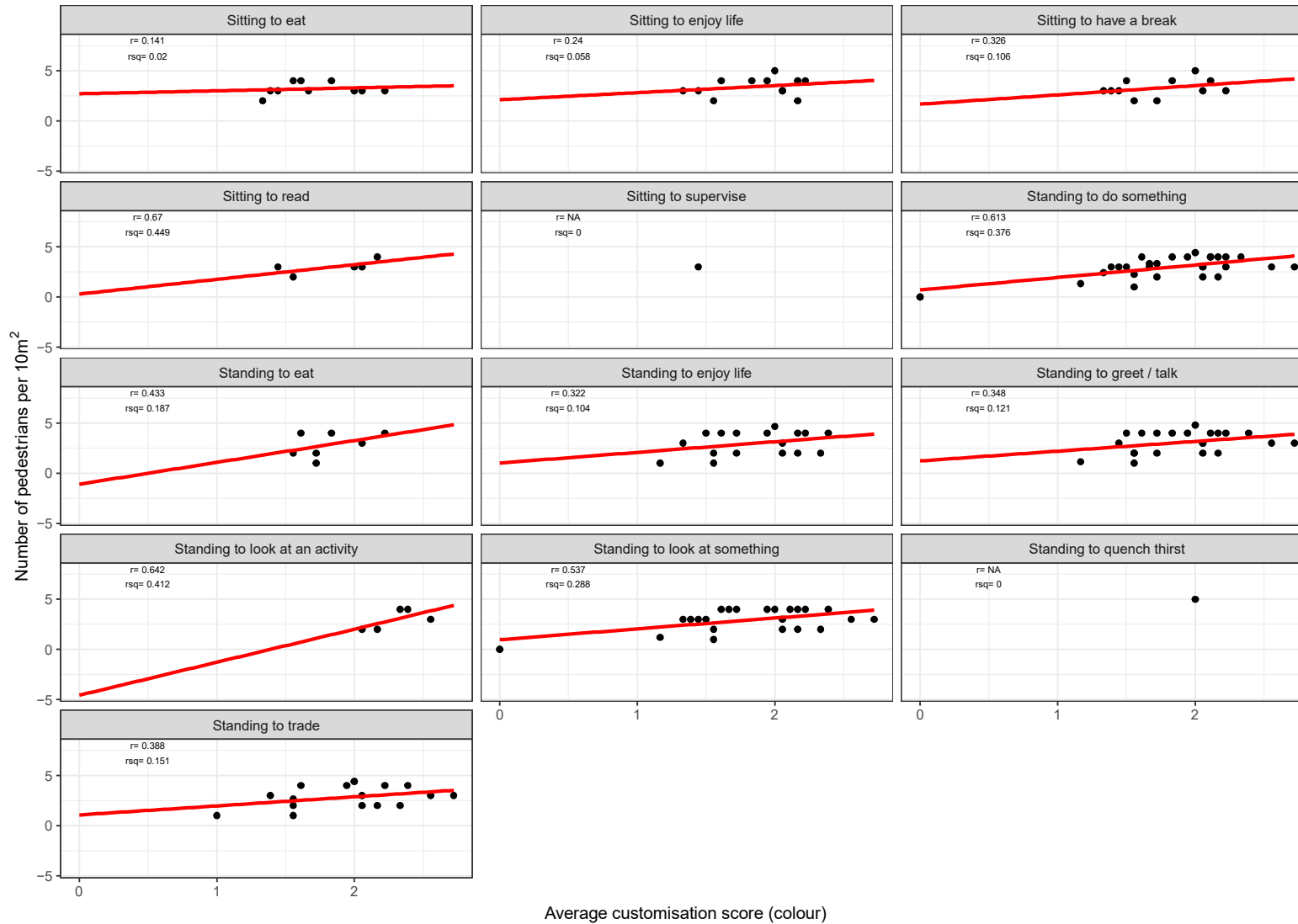
### 4. Are you:

Local    Visitor

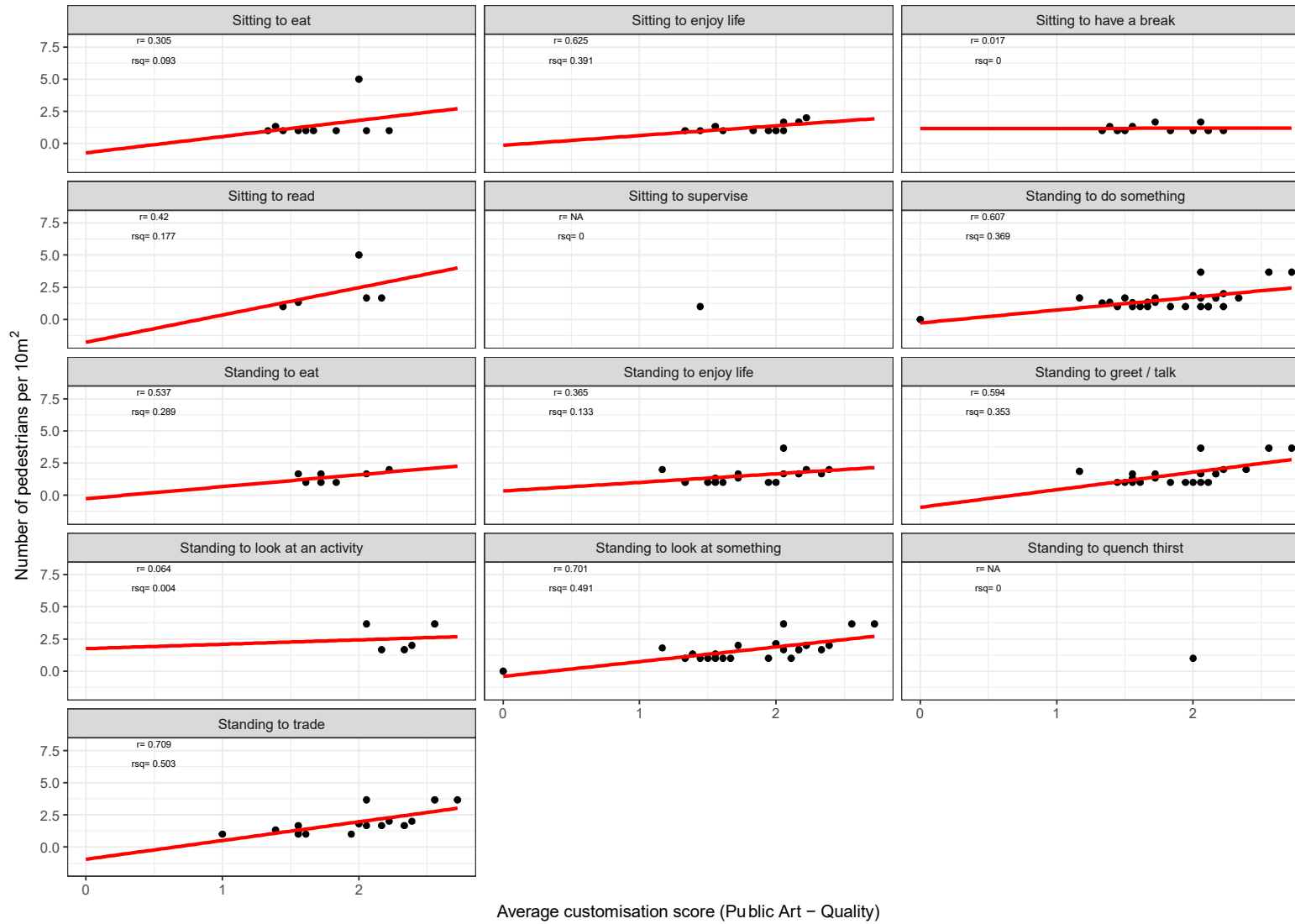
# 19 Appendix IX



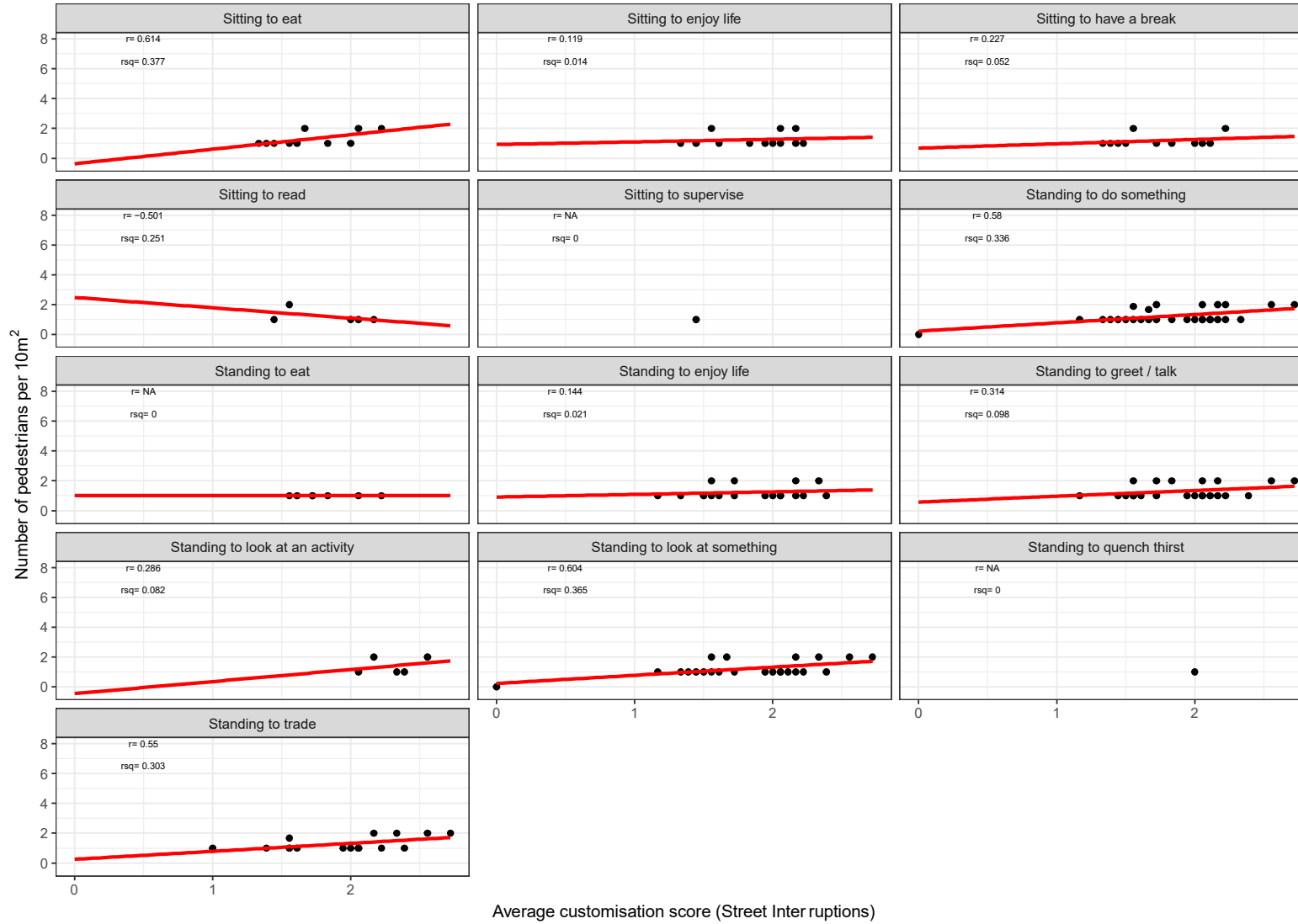
Appendix IX



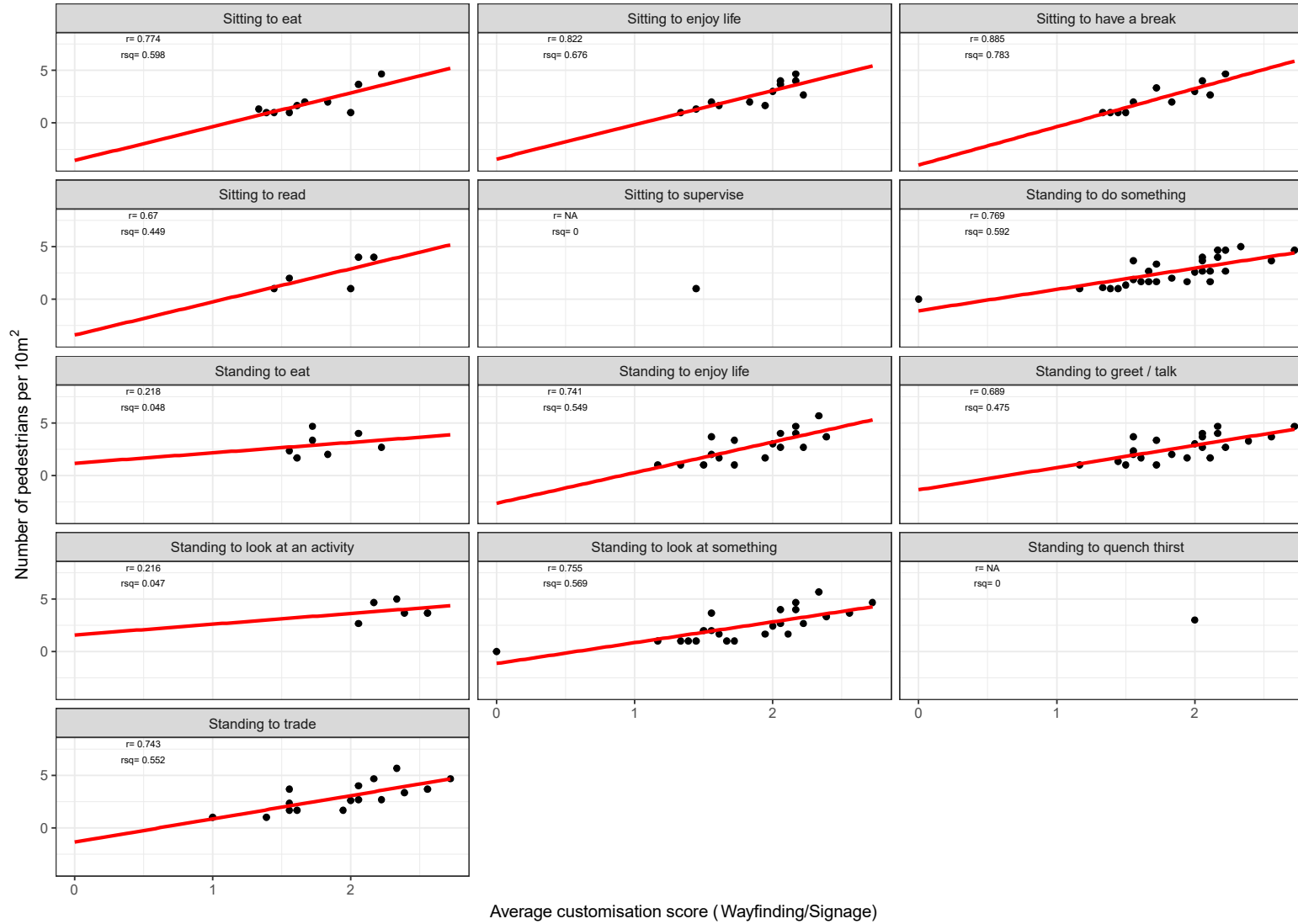
# Appendix IX



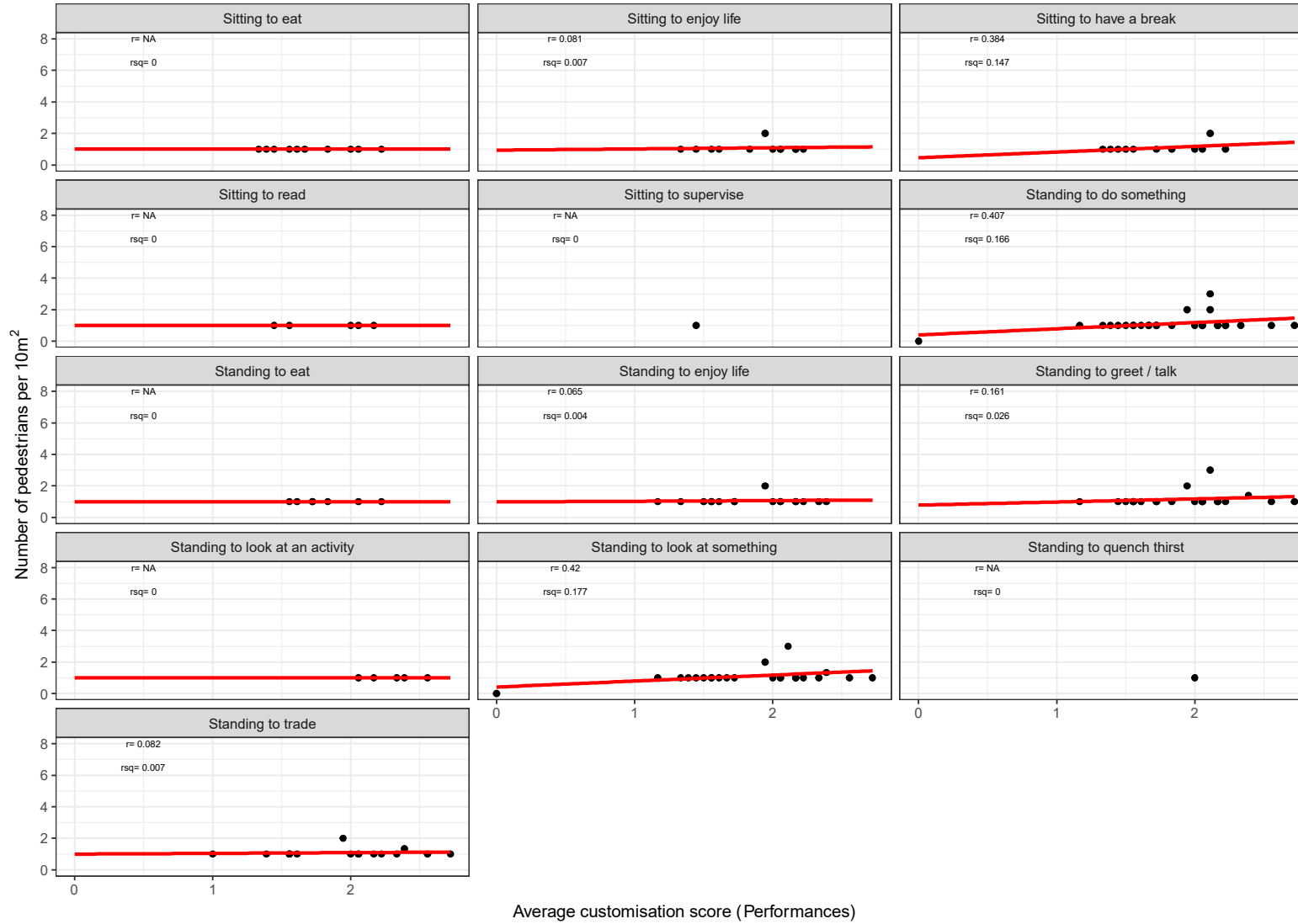
# Appendix IX



# Appendix IX

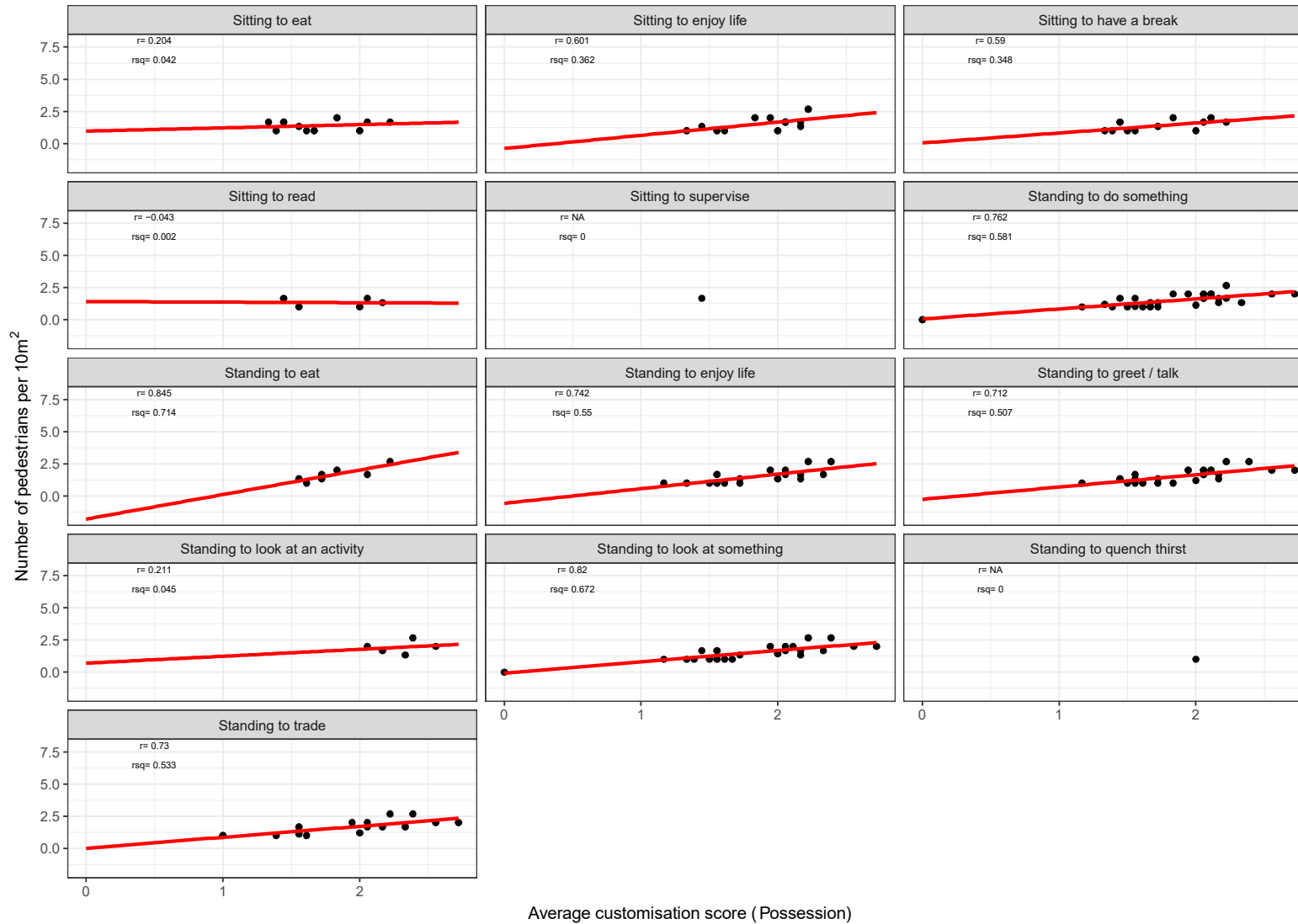


# Appendix IX



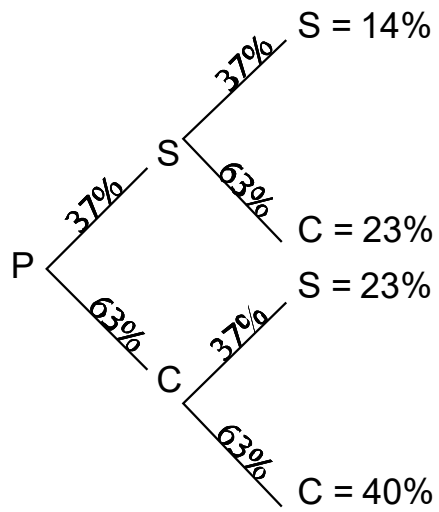


# Appendix IX

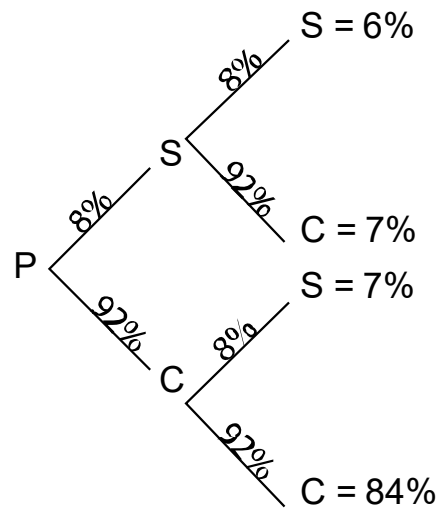


## 20 Appendix X

**Camden High Street**



**Portobello Road**



**Petticoat Lane**

