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Windowscapes
A Study of Landscape Preferences in an Urban Situation

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A thesis submitted in fulfilment of the requirements for the degree of Doctor of Philosophy in Architecture, the University of Auckland, 2015.
Abstract

Landscape plays a crucial role in modern life for urban dwellers even though the majority of their time is spent indoors. In this context, vision is the dominant sense that connects urban residents to landscapes. The visual quality of urban environments can, consequently, have a great influence on the quality of life. But how can visual quality be assessed and quantified? Research into urban landscape preferences is relatively limited, and there are significant shortcomings with the methods that have been used. For example, the method of asking people to rate photographs of scenes cannot capture in its entirety the subjective value of urban environments as experienced daily.

This thesis presents a novel method, Active Perception Technique (APT), to measure visual preferences for everyday urban scenes. Windowscape is used as a convenient, useful tool to sample urban landscapes. In addition to photographic evidence, APT uses graphic responses where participants are asked to draw from memory what they recall of their windowscapes. APT is designed to identify the most and least visually preferred features of urban windowscapes, and hence how to combine common urban features to predict preferences for windowscapes.

The method is demonstrated by studying a sample of people in both their home and work environments. APT produced several original results. As one might expect, natural features of urban windowscapes were preferred over built aspects; however, some natural features contributed more strongly to overall preference than others. Preferences for some features were found to differ across home and workplace windowscapes. Personal association with features was also found to effect visual preferences.

Results obtained from APT could be useful for policy makers, and planners to enhance the visual quality of built environments. APT may have other uses; including examining the effects of a planning intervention. Furthermore, it can show how landscape preferences differ between particular populations, e.g. children, the elderly and tourists. Although preferences may encompass other visual dimensions of urban landscapes such as tranquillity and security, that have not been studied here, APT can be modified to measure these aspects too.

Keywords: Urban landscape, Preferences, Windowscape, Active Perception Technique
To my dear parents, Hassan and Fouzieh;
and my infinitely supportive husband, Siamak.
Preface

My love for window views began in childhood with a wonderful view from my room to our small backyard and its cherry tree. I can still remember sitting behind my desk and gazing at the dance of the tree leaves in the breeze. And, there was a tall, ugly brick wall barely visible behind that big tree. But, I liked that brick wall. I liked to watch the neighbour’s cat climbing it up and down, the mystery behind it, and the privacy it gave me.

The rapid growth of population forced my family, like many other Iranians living in big cities, to move into an apartment. My tree view was replaced by a group of apartments. Worried that neighbours might look inside my room, I hardly wanted to open the curtains. Although my room was almost as big as the previous one, it seemed much smaller and I preferred to study in the living room.

These two extreme experiences led me to realise the importance of the window view. However, it was only after walking inside one of my first designs that I realised I had to put the knowledge of my experiences into practice. I was part of a team designing a 1200-unit residential complex. As an architect, I learnt to give façades the first priority and so the building was fenestrated for how it looked from the outside. Although I am still proud of the design, I am sure we could have provided much better indoor environments for occupants, had we considered the importance of the view.

The motivation to be a better architect drove me to start this research. I hope this study gives the reader an insight into people’s windowscape preferences. Ultimately, it is my hope that, architects, urban designers, and planners can take the results from this research and use them to provide more enjoyable environments.
Acknowledgments

The process of undertaking my PhD has been both an inner and outer journey that indeed would not have been possible without an extensive support system, for which I am extremely grateful. First of all, I would like to express my gratitude to my supervisor, Dr Michael Linzey, for his kind, continuous advice; invaluable feedback and guidance throughout this research effort. Thanks are due to my co-supervisor, Dr Hugh Byrd, for all his help: from finding relevant literature to introducing me to two brilliant researchers in psychology in the UK and New Zealand. I am fortunate to have Dr George Dodd as my advisor and I remain thankful for his continued friendship, support and encouragement. The countless hours they spent with me and my research are greatly appreciated, and I believe the final product would not have been complete without each of their expert opinions and comments.

I want to thank all of my research participants, who cannot be acknowledged by name; without them this research could not have been accomplished. I am grateful for the financial assistance from The University of Auckland Doctoral Scholarship that gave me peaceful mind to concentrate on my studies. Thanks also go to Dr Judith Wang who hired me as her research assistant for a funded research project, taught me how to research and helped me to build my personality, and self-esteem. The doctoral skills workshops conducted by the Student Learning Centre (SLC) have been extremely helpful and I owe Dr Barry White and the rest of the staff at the SLC my heartfelt thanks for their effort. I would also like to express my gratitude to Dr Cameron Walker and Dr Asif Khan for their statistical advice regarding data analysis. My sincere thanks go to Paul Litterick for proofreading the thesis. I also would like to thank Dr Sara Amani for her mentoring and for pushing me to start writing.

In the final year of my PhD, I had the privilege of working in “the best office” of the school with a panoramic view to the Auckland Domain, for which I am very grateful to Ross Collinson. During my PhD, I was lucky to be surrounded by two kind and talented office mates, Natalie Allen and Nur Huzeima Mohd Hussain. Natalie - thanks for being such a wonderful officemate and friend. Getting to know you and your lovely family helped me to ease my homesickness, especially in the first year or two when I was
adjusting to Kiwi culture. Huzeima, you are a true inspiration to me and I have never stopped admiring you. Thanks also for your patience and answering my never-ending questions during the past four years.

In addition to academic support, I have relied on the help and encouragement of my family and friends, without whom I could not have made it this far. Amy, a huge thank you for being such a wonderful friend and for proofreading my papers. Olga and Dima thanks for being excellent flatmates. Thanks also goes to my soccer mates, especially John-Paul, Bridget, and Leo, who helped me stay sane and strong throughout my writing process. Gary, thanks for being a great coffee mate, and for reminding me that all the hard work and pain will be worth it. Mazdak, you are the best cousin that one can have. Just knowing that you are here in Auckland (especially when Siamak was away for his research trips) makes me feel safe and protected.

And lastly, I would like to thank four very important people in my life. My parents, Hassan and Fouzieh, you definitely deserve a special thank you. Your continuous and unconditional love, encouragement and sacrifice all these years helped me to achieve my dreams. My sister, Sheida, I have only been able to walk down this path because you stayed behind to take care of our parents. I cannot thank you enough for that. Most of all, I’d like to thank my husband, Siamak. We have started this academic journey together and the only reason that I am now ahead is because I have a spouse who never failed in supporting me. It is now my turn to support you.
List of Statistical Symbols

Alphabetical Statistical Symbols

\( H \)  
Kruskal-Wallis test statistics

\( Mdn \)  
Median

\( N, n \)  
Sample size

\( ns \)  
Not statistically significant

\( p \)  
The attained level of significance (p-value)

\( r \)  
Pearson’s correlation coefficient

\( SD \)  
Standard deviation

\( U \)  
Test statistic for the Mann-Whitney test

\( z \)  
z-score (A data point expressed in standard deviation units)

Greek Statistical Symbols

\( \chi^2 \)  
Chi-square test statistic
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The view was often enjoyed by standing outside, on the balcony; the participant explained.

The balcony and the view were both rated as Strongly Liked. Note that the photo was taken from the balcony and not inside the house.

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The neighbour’s clothes drying rack was rated as Disliked

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Chapter 1. Introduction

1.1 Background and Research Question

Landscape is important to the quality of life of people everywhere (The European Landscape Convention, 2002). However, as most people live in cities it is important to focus on how the urban landscape affects the quality of life. Urban dwellers spend most of their time indoors (Shoemaker, 2002) so direct contact with the world outside is only a small part of their lives. As a result, vision is the dominant sense that connects them to landscapes. From this point of view, the quality of life of urban dwellers is associated with the visual quality of urban landscapes. However, this raises the question, how do we measure the visual quality of landscape in an urban context?
Assessing preferences for natural landscapes is an established field of study. It is not clear, however, if findings from these studies are applicable to urban landscapes (Home, Bauer, & Hunziker, 2010). Moreover, there is relatively limited research on urban landscape preference (Ma Paz Galindo & Hidalgo, 2005; Hidalgo et al., 2006; Kaymaz, 2012; Crane & Weber, 2012; Hellinga, 2013). For instance, there is a gap in knowledge regarding everyday urban scenes where natural features are no more than part of a distant view (Thompson, 2013, p. 38). Two reasons account for the lack of research in this area. First, urban areas have a highly complex structure, which makes assessing preference determinants difficult. Second, there are significant shortcomings with methods that have been used in studies of natural landscape preferences that question their applicability for studying urban landscapes.

Most studies into landscape preference have used experiments in a laboratory setting where participants are shown photographic images of scenes (for a review of the methods see Section 2.3). Thus, they did not have the holistic experience of the landscape itself (Giuliani & Scopelliti, 2009; Thompson, 2013). Stamps (1990) has identified over 1300 references that used photographs to evaluate landscape preference. Hence, very little is known on how real places are experienced (Hull & Stewart, 1992; Gobster, 1999; Myers & Thompson, 2003; Thompson, 2013).

The method of asking people to rate photographs of scenes cannot capture in its entirety the subjective value of the urban landscape as experienced daily. In addition, “a photograph is totally unable to convey the life of the scene; [being] unable to discriminate, it merely records everything at one instant” (Pocock, 1982b, pp. 360–361). Dearden (1980) and Zube, Pitt, and Anderson (1975) warn researchers to be cautious in their use of photographs and emphasise that photographs and actual environments are not completely interchangeable. Uzzell (1991, p. 9) adds that it “seems highly likely that the preferences expressed on the basis of two-dimensional photographs are different to those which might be made in situ.” As Wohlwill (1976) has rightly pointed out, a photograph cannot capture the ambience of an urban environment, which also has sonic and dynamic components. Moreover, most landscape studies primarily focus on the relationship between preferences and a single landscape indicator (Brown & Brabyn, 2012; Zhao,
Wang, Cai, & Luo, 2013). As Carlson (2001, p. 63) argued “nothing in our human environments can be appreciated adequately in isolation. Each building, cityscape, or landscape must instead be appreciated in virtue of the fit that exists within it and its larger human environment.”

Although the results concerning validity of using photographs are inconsistent (Stamps, 1990; Hull & Stewart, 1992; Daniel & Meitner, 2001; Zube & Pitt, 1981), much research in landscape preference continues to use static images. Research on urban landscapes has shown that urban images containing natural features (vegetation and water) are preferred (Herzog, 1989; Sheets & Manzer, 1991; M. White et al., 2010; E. V. White & Gatersleben, 2011). The presence of water features in urban landscapes is also found to have a positive effect on the economic values of properties (J. J. Kim & Wineman, 2005; Samarasinghe & Sharp, 2008; Jim & Chen, 2009). However, questions remain as to whether such results hold for actual views seen daily, and whether all natural features are equally preferred. Moreover, it is not yet clear how to combine common natural and built features to predict preferences for urban landscapes.

This Ph.D. thesis addresses these limitations and gaps, with the aim of developing a novel method for measuring the visual quality of a real urban landscape. The main research question is:

**How to assess preferences for urban landscapes in their actual context?**

The importance of answering this question is that preferences reflect how given environments support well-being (e.g. Hartig & Staats (2006); van den Berg, Koole, & van der Wulp (2003)). The ability to identify environmental characteristics that can contribute to the enhancement of the visual quality of urban areas can have practical value for policy makers and professional designers, to help them provide urban environments which promote psychological well-being (Jackson, 2003; Coles, Millman, & Flannigan, 2013).
1.2 Objectives and Research Structure of the Thesis

In order to answer the research question, two objectives have been pursued: 1) to establish a theoretical framework and method to measure urban landscape preferences; 2) to demonstrate the method and confirm its usefulness.

The first objective is addressed in Chapter 2 by reviewing relevant literature in the fields of environmental psychology and landscape architecture and planning. Once the main paradigms and theories of previous studies have been reviewed, the existing methods of measuring the visual quality of landscape are evaluated and potential determinants of urban landscape preferences are identified.

The result of the literature review is then used to develop a new method, the Active Perception Technique, explained in Chapter 3. The central idea of the theoretical framework stems from cognitive constructivism and research in environmental cognition that shows the real world to be too complex for people to process completely, so they create their own version of reality by selecting only those features that produce affective responses.

In this thesis, it is similarly argued that viewing an urban landscape daily makes some features stand out more than others, depending on environmental and personal factors. Preferences held for these prominent perceptual features are proposed to be the determinants of preference for the overall landscape. The Active Perception Technique (APT) aims to capture these features and to explore the relationship between values of their visual quality and the overall view. Rather than using photographs for environmental sampling, APT uses windowscapes viewed on a daily basis as a convenient and useful tool. The main advantage of using window views is the possibility of studying commonplace urban landscapes in their actual contexts and viewed from a position and environment familiar to the observer.

In the empirical section of the study, APT is used on groups of postgraduate students at two Auckland universities, collecting their preferences for home and office windowscapes. The contrasting sites (home and office views) were chosen to examine if context has an effect on preferences. Since features of urban environments may vary, the
research was designed to investigate how people experience different urban settings. As suggested by Steg, Berg, and Groot (2013, p. 104), a comprehensive understanding of people’s perception of urban landscape quality can be achieved through a multi-place approach which considers experiences of different urban settings by residents.

The result of this empirical study is presented and discussed in Chapter 4. Finally, conclusions and recommendations for future research are suggested in Chapter 5. Paper published from this research are listed in Appendix C.

1.2.1 Why Use Windowscape as a Research Tool?

Windows have many roles: providing views, daylight, and ventilation. With the advent of buildings with large areas of glazing, increased time spent in buildings and increased awareness of the benefits of improved working environments, the importance of windows for building occupants has shifted in favour of windowscape. The provision of permanent supplementary artificial lighting and ventilation reduced the role of the window as the only source of daylight and fresh air, while the concept of transparency in architecture introduced a new type of relationship with the landscape outside. This was coincident, and possibly the result of, changes in the lifestyle of modern urban dwellers who spend the majority of their times indoors (Shoemaker, 2002, p. 141). In agreement with this, McLain and Rogers (1981) and Manning (1965) say that despite fresh air and natural light remaining the major functions of windows, people are more interested in window as a contact with the outside world.

The importance of having a view out for urban dwellers is confirmed in most studies on windows. Wells (1965) found that 89% of surveyed office workers stressed the importance of having access to the window even when there was abundant artificial light in the interior. An analysis (Nichols, 1977) of sixty questionnaires from volunteer participants working in an urban high-rise office building revealed that respondents without window views made more non job-related trips away from their workstations – presumably looking for a view to the outside – than respondents with views. Nagy, Yasunaga, & Kose (1995) found that respondents from an underground office rated the importance of having a view much higher than those from aboveground offices. Both
groups considered the view as the most important function of a window, followed by fresh air, and natural light. According to the literature review by Farley & Veitch (2001, p. 8) “of all the benefits and psychological functions provided by windows the provision of a view appears to be most valued by building occupants.” In Bodart & Deneyer’s (2004) survey, sunlight and visual contact with the outside were found to be the two most positive functions of windows for building users. Ne’Eman (1974) interviewed 647 users in four types of buildings (houses, school, offices and hospitals) and asked them how they would choose between a window providing sunlight into their interiors but with an unpleasant view and a window providing a pleasant view but without sunshine. The result revealed most would prefer a nice view through their windows to the provision of sunshine. Cooper-Marcus (1982) argued that attractiveness of neighbourhoods mainly depended on what residents could see from their windows. These results can be explained by the theory that humans have evolved to crave visual information about their environmental surroundings (Kaplan & Kaplan, 1977; Verderber, 1986).

Given the importance of windowscape, it is interesting to note that only recently has a method for assessing views to the outside been proposed. To calculate a view quality score, Hellinga & Hordijk (2014) used the answers from a series of multiple-choice questions. Each possible answer was given a points value depending on their estimation of its effect on the assessment of view quality. The researchers tested the applicability of the method by comparing its results with office workers’ ratings of pictures of different windowscapes. The assessment method seemed to predict the quality of the views reasonably well, despite potential for differing interpretations of a few questions, such as “Are the building(s) well-maintained?” However, as the method was tested using photographs, its ability to predict preferences for actual views seen daily was not tested.

1.2.2 Why Home and Office Views as Case Studies?

The main research strategy selected was a comparative case study, a well-established research method in landscape architecture (Francis, 2001). Case studies can be used to accomplish various aims, including uncovering patterns, constructing conclusions and testing or generating theory (Eisenhardt, 1989; E. Patton & Appelbaum, 2003). Instead of creating a controlled environment as experimental research does, case study researchers
study things in their natural settings. The case study seems appropriate for this research, because it provides a rich set of data to better understand and critique the shortcomings of the photo-protocol research approach. This research follows the definition of the case study by C. Robson (2002, p. 146), as “a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.” This thesis investigates perceptions and preferences of views out of windows (real life situation), using the primary source of evidence (the conducting of interviews). Interview is the most-used method in qualitative research and is especially suited to studies that are context-dependent.

Home and office windowscapes were chosen as two case studies, and cross-case analyses applied whenever needed, to examine if contexts have any effect on preferences on windowscapes (Yin, 2006, 2009). Choosing two case studies rather than one requires some explanation. The multiple-case design is useful for seeing whether some of the factors contributing to view preferences are replicable in other cases (window-view context). Moreover, it creates more variance and divergence in the data, as physical features of urban landscape and their perception may vary between different settings and activities taking place within these places (e.g. city centre, suburbs, home, office). The inclusion of two case studies also increases the robustness as well as the external validity of the study (see Section 3.6.1.3 for definition) by permitting the theory to be tested in different contexts and settings (Eisenhardt, 1989; Yin, 2006).

The rationale for choosing office and home windowscape as case studies is that both are viewed daily. However, since “Without exception, home is considered to be the place of greatest personal significance in one’s life” (Proshansky, Fabian, & Kaminoff, 1983, p. 60) and an office merely a place in which to work, the relationship between observers and contexts of the views can vary dramatically.

1.2.3 Why Study Urban Landscape Features?

Landscape preference studies have been dominated by the assumption of either a psychophysical or a psychological model (see Section 2.2.2), where both hold that all components in the physical landscape can affect how a landscape is valued.
The psychophysical approach assumes the mere presence of the physical features in a landscape determines the psychological response of the viewers. Researchers have aimed to develop mathematical relationships between objective physical features of the landscape (e.g. water, greenery) and its subjective perception. This approach can produce helpful guidelines for landscape planning and management but often is criticized as being weak in providing explanations (theory) for why people like or dislike certain aspects of the landscape (e.g. Zube, Sell, & Taylor, 1982; Sutton, 1997; Lu, Burley, Crawford, Schutzki, & Loures, 2012).

The psychological approach holds that preference is derived from the interpretation of the landscape, so human responses to perceived spatial characteristics of the landscape (e.g. openness, complexity, fearfulness, and coherence) should be analysed (R. Kaplan & Kaplan, 1989)). The advantage of the psychological approach over the psychophysical is that it provides theoretical explanations for individual judgments of landscape preferences. Evolutionary theories for explaining landscape preference take this approach (see Section 2.1). However, due to the abstract nature of variables such as coherence, mystery and legibility in a psychological model, this approach fails to produce results that are useful from a practical point of view (Ruddell, Gramann, Rudis, & Westphal, 1989). There is also a the lack of standardization in methodology, and little evidence that it provides reproducible results (Daniel, 2001; Stamps, 2004; Zhao et al., 2013).

Daniel & Vining (1983, p. 80) hold that “While neither the psychophysical nor the psychological models are sufficient alone, a careful merger of these two approaches might provide the basis for a reliable, valid, and useful system of landscape-quality assessment.” Dearden & Sadler (1989, p. 9) agree but suggest the approaches “should not be seen as mutually exclusive... rather they are complementary.”

The decision was made to develop a method for the analysis of the visual quality of urban landscape, combining the variables of both psychophysical and psychological approaches. This work focuses on evaluative responses to features (e.g. trees, buildings, sky) and complexity of the scene (a psychological construct) as predictors of landscape preferences. Physical features of urban landscapes were selected for their proven effect on
landscape preferences and their immediate practical relevance to contemporary urban planning (cf. van den Berg, Hartig, and Staats (2007)).

A study on the complexity of windowscapes – the number of different visual features in a scene – is more likely to produce reproducible and applicable results than other spatial characteristic of landscapes such as coherence and mystery. Moreover, studies have found that the complexity of the windowscape can affect preferences (Hellinga, 2013; Ludlow, 1976).

1.3 Active Perception Technique: An Overview
This thesis presents a rigorous and novel technique, Active Perception Technique (APT), to assess preferences for immediate surroundings in their actual urban contexts. This technique is based on the underlying assumption of qualitative research that reality is “a multiple set of mental constructions” (Lincoln & Guba, 1985, p. 295). This research paradigm has been chosen as a response to the recognition that, in the field of environmental perception, “it is the perceived as well as the real world to which we respond” (Fenton & Reser, 1988, p. 110). The use of a qualitative approach allows researchers to study phenomena in their natural settings and understand the meaning of the observed world by revealing how all the parts work together to form a whole (S. Robson & Foster, 1989; Merriam, 1998; Bryman, 2001). Architects, planners, urban designers, and geographers have embraced qualitative methods for their unique ability to provide insight into the complicated nature of urban life.

The Active Perception Technique allows research participants actively to express their perception of a given landscape by drawing their mental images of the scenery on a page; hence its name. While perceiving a landscape scene is a mental phenomenon, drawn perceptions are physical qualitative information. Such drawings do not have artistic merits but are naïve sketches revealing how the observer values each feature of the scenery. In addition to a brief sketch, APT uses rating scales. Hence, the results obtained from this technique can be compared with those from previous landscape assessment methods.
APT is derived from Kevin Lynch’s (1960) seminal work, *Image of the City*, and Nasar’s (1990) study, *The Evaluative Image of the City*. Because Lynch (1960) was interested in how people make sense of the vast amount of visual information in a city, he asked research participants to draw a quick sketch of their city as if making a rapid description for a stranger. Lynch’s analysis predominantly dealt with the effects of physically perceptible objects and the relation between image and physical form. He proposed the concept of environmental image, a generalized mental picture of the exterior physical world (1960, p.6):

Environmental images are the result of a two-way process between the observer and his environment. The environment suggests the distinctions and relations, and the observer…selects, organizes, and endows with meaning what he sees. The image so developed now limits and emphasizes what is seen, while the image itself is being tested against the filtered perceptual input in a constant interacting process. Thus, the image of a given reality may vary significantly between different observers.

Nasar (1990, 42) argued “evaluation is central to our perception of and reaction to the environment” and Lynch’s theory of the city image can be strengthened by measuring the emotional meaning that an individual brings to the image. Nasar (1990) asked residents of two cities to identify areas that they liked visually and areas they disliked, and to describe the physical features accounting for their evaluation.

Nasar’s concept of likeability was used to develop the Active Perception Technique. Likability refers to “the probability that an environment will evoke a strong and favourable evaluative response among the groups or the public experiencing it” (Nasar, 1998, p.3). Likeability is derived from what Gibson (1977) called affordance — the reciprocal relation between environmental properties of things and the active perceiver. For instance, a road affords (supports) walking or driving. According to Nasar (1990), likeability has two components, imageability and affect. In other words, “for a favourable image, features must stand out as both memorable and likable” (Nasar, 1998, pp. 60–61). With this in mind, APT is composed of two parts:

- Capturing the imageable features of urban windowscape;
• Determining preferences for those features and their influence on overall windowscape preference.

Research participants were asked to sketch from memory what they could recall of the view from their window. It was stressed to the participants that the beauty of their sketches was not important. They were asked to number each feature of the view in the order in which they had been drawn, and to express their feelings towards them on a Likert scale by annotating each with a letter: (A) for Strongly Like, (B) for Like, (C) for Not Sure, (D) for Dislike, and (E) for Strongly Dislike. They were also asked to evaluate the windowscape as a whole based using the same Likert scale. These sketches were then compared against photos taken from the views.

With this technique, we can extend our knowledge on the subjective value of everyday urban landscapes by identifying influential features that can leave stronger traces in the memory. Moreover, APT can show not only how individuals value landscape features visually but also to what extent extra-visual characteristics of these features (e.g, personal associations and practical affordances) can influence preferences. The main concern in landscape studies is to identify “intrinsic aesthetic qualities or elements of the landscape that can be stated objectively for use in decision making” (Zube et al., 1982, p. 6). APT can reveal general preferences held for each landscape feature that can be used by architects and planners to improve the visual quality of cities.

1.4 Defining Terms

Urban Landscape

Landscape is a flexible concept, since there are various definitions in different fields. For instance, landscape in geography is conceived as “a way of seeing” (Cosgrove, 1984), “a work of the mind,” a scenery of which is “built up as much from strata or memory as from layers of rock”(Schama, 1995, p. 7). In architecture, landscape is “the part of [an] environment that we can engage with at a given time” (Bell, 2001, p. 133). Landscape preference studies, however, put an emphasis on visual experiences and defined landscape as “the environment perceived, especially visually perceived”(Appleton, 1980, p. 14).
Dictionaries give two definitions of landscape (Chambers dictionary, 2003, The Merriam-Webster dictionary, 1994): 1) a view or prospect of inland scenery, such as can be taken in at a glance from one point of view, or 2) its representation in painting or picture. There is a high degree of congruency between the definitions in contemporary English dictionaries and those most often used by researchers in landscape preference studies. Landscape is considered as an objectively real phenomenon and it is viewed and perceived by a viewer. Landscape, from this point of view, is not solely a physical reality (or “matterscape”) but also a product of observation and interpretation (or “mindscape”) (M. Jacobs, 2006). Third, the emphasis is on the vision and an individual’s visual contact with the land surface.

Landscape in this thesis has the meaning proposed by Appleton (1980) and the dictionaries. In this context, urban landscape is as a subset of landscape and means all the visible natural and built features concentrated in cities and urban areas that an eye can view at once.

Preference
Preference is frequently used in landscape studies as a dependent variable to assess the quality of landscape (Real, Arce, & Manuel Sabucedo, 2000). Preference generally means “the choice, favouring, liking of one rather than another” (Chambers dictionary, 2003). However, in landscape preference studies, preference usually refers to liking or appreciating and is usually measured by asking participants to rate or rank each landscape scene individually (Meitner, 2004a). Therefore, when a researcher says landscape A is preferred over landscape, this usually means that the research showed the mean or median of the landscape A was higher than the landscape B.

Preference in this thesis refers to a degree of liking a particular windowscape or its features, and is measured on a Likert scale with positive and negative statements. Accordingly, preference is used as a technical term, which can be either positive (Like or Strongly Like) or negative (Dislike or Strongly Dislike). It could be argued that preference simply indicates the more pleasing of two options and, therefore, Dislike and Strongly Dislike should not be included. However, there is established precedent for using positive and negative preference (e.g. Hands & Brown (2002); McCartney (2006)). Moreover,
“many real-life problems present both negative and positive preferences” (Bistarelli, Pini, Rossi, & Venable, 2005). For instance, you like eating peaches (positive preference) and dislike apples (negative preference); this will make you choose a peach over an apple when you are given the choice. In the context of this study, negative preferences for a windowscape may result in looking away from the window.

**Windowscape**

Windowscapes in this study are defined as what can be seen through a window to the outside of a room/building, not limited to scenery which meets some classical notion of visual aesthetics – especially natural landscapes (Collins, 1975).
Chapter 2. Literature Review

In this chapter, the literature on urban landscapes and windowscapes preferences is reviewed. The chapter begins by describing and evaluating the four principal theories in the field (affordance, refuge, tripartite and information processing). Then, methodologies and research instruments used to assess preferences for landscapes and windowscapes are critically reviewed and evaluated. This chapter also explores the findings of previous empirical studies to identify variables that influence urban landscape preferences. The literature review continues by presenting existing evidence on psychological and economical values of preferred views. The insights extracted from the literature review are synthesized to answer the following questions:
Chapter 2. Literature Review

2.1 Theoretical Background for Predicting Landscape Preferences

Theories for explaining landscape preferences can be divided into three categories: evolutionary, cultural and mixed theories. Evolutionary-based theories are based on the assumption that people prefer environments in which they are likely to survive; therefore, landscape preferences are innate. While evolutionary-based theories were originally developed to provide a model for preferences for natural environments; some researchers (e.g. Herzog (1992) and Abkar, Kamal, Maulan, & Davoodi (2011)) showed that these theories can be used to predict visual preferences of urban settings. Cultural preference theories, on the other hand, postulate that landscape preferences depend on the cultural background and personal attributes and nurtures of the observer (e.g. Tuan’s (1974) Topophilia theory). Mixed theories try to reconcile and integrate these two contrasting (nature and nurture) views (e.g. Bourassa (1988, 1990, 1991); Tveit, Ode, & Fry, (2006)). The following sections present a review of the key theories; found to be, affordance theory, prospect-refuge theory, information-processing theory, and tripartite theory. The results of empirical studies testing these theories are presented in Sections 2.5.1.3 and 2.5.2.

2.1.1 The Theory of Affordances

The term affordance refers to the quality of an environment, which allows one to perform an action. Psychologist James J. Gibson introduced the term affordances as:

The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill. The verb to afford is found in the dictionary, but the noun affordance is not. I have made it up. I mean by it something that refers to both the environment and the animal...It implies the complementarity of the animal and the environment (Gibson, 1986, p. 127).

Gibson argued that an environment is perceived through the perception of its affordances or the actions that can be performed there. For Gibson, affordances are the properties of an environment and are independent of one’s ability to perceive them. Thus, an observer’s culture, experiences, knowledge, or expectations have no effect on the action potential
available in the environment. Gibson added, “This is a radical hypothesis, for it implies that the values and meanings of things in the environment can be directly perceived” (1986, p. 127). It has been argued that the perceived affordance depends on factors such as context (the environment in which the element is displayed), culture, instinct (often linked to physical characteristics of element), observers’ understanding and expectations of interaction with the object (Kirkwood, 2005).

Evolutionary theories (e.g. see Sections 2.1.2 and 2.1.3) draw on affordance theory by arguing that humans have evolved to prefer certain characteristics of the landscape that afford survival benefits such as shade, shelter and food.

### 2.1.2 Prospect-Refuge Theory

Appleton (1975) extended affordances theory by clarifying what kinds of affordances environments should offer in order to be preferred. He suggested that environmental preferences are derived from biological needs rooted in our evolutionary past. As hunters and gatherers, humans are attracted to environments where they can see without being seen. Thus, environments that provide *prospect* and *refuge* opportunities, intrinsically will be more preferred. The notion of prospect points to settings or environmental elements such as hills, that provides broader views. In contrast, refuge refers to settings that offer opportunities to hide from danger, such as a cave or the security of a tree house. In today’s urbanised world, these terms can refer to one’s home (refuge) and looking through the window to the outside (prospect).

Prospect and refuge theory has been examined in urban environments using criteria such as complexity, openness (or depth of view), and the degree to which people feel safe from crime (Dosen & Ostwald, 2013). While prospect was found to be a strong positive predictor of preference, results concerning refuge are varied (Ma Paz Galindo & Hidalgo, 2005; Herzog, 1989, 1992; Nasar, Julian, Buchman, Humphreys, & Mrrohaly, 1983). For instance, Herzog (1989, 1992) and Mumcu, Düzenli, and Özbilen (2010) did not find refuge to be a significant predictor of preference, and Fisher and Nasar (1992) showed that places with low prospect and high refuge are considered unsafe by observers and are not preferred.
2.1.3 Information-Processing Theory

The most often cited theory in landscape preferences studies is the information-processing theory (or preference matrix) put forward by Kaplan and Kaplan (1989). This proposes that humans are more attracted to environments that can readily provide information about food, water, shelter, and protection. In their words:

We see preference as an expression of underlying human needs. Preference can be expected to be greater for settings in which an organism is likely to thrive and diminished for those in which it may be harmed or rendered ineffective. Thus humans, like other animals, are far more likely to prefer a setting in which they can function effectively...Underlying reactions is an assessment of the environment in terms of its compatibility with human needs and purposes. Thus aesthetic reaction is an indication of an environment where human functioning is more likely to occur (R. Kaplan & Kaplan, 1989, p. 10).

They suggested that the content and spatial configuration of landscape features could be used to predict preferences. The content of scenes (in particular presence of natural features such as water and vegetation) is recognised as the underlying basis for different preferences. The Kaplans added that the mere presence of such features is not sufficient for predicting preferences and their spatial configuration within a scene has an important influence. The spatial factors that are argued to affect preferences are:

- Coherence: which describes how well the scene “hangs together” (R. Kaplan & Kaplan, 1989, p. 54). Coherence can be increased by features such as repeated elements and unifying texture.
- Complexity: defined as the degree of diversity of elements in the scene or “how much there is to look at” (Kaplan & Kaplan, 1989, p. 53).
- Legibility: how easily the environment can be understood and remembered. Distinctive landmarks and regions strengthen the legibility of a place and help one to orient effectively within the setting.
- Mystery: the potential of a scene to offer new information if one walks deeper into the scene. Curved paths or partial obstructions, such as foreground vegetation, enhance the sense of mystery.
This theory has been criticised for being incomplete in not covering all spatial configurations that may influence preferences – such as a sense of enclosure, visual access and a sense of depth (Karjalainen, 2006). Abstract properties of landscapes raise the possibility that researchers will interpret these differently. In other words, this theory provides little information on how and what to measure in the landscape. For instance, the reason that some researchers found complexity to be a predictor of preference (e.g. Herzog, 1985) whereas another did not (e.g. Kent, 1993) might simply have been because of a difference in definition.

However, the main criticisms of this model are that it underestimates the effect of culture on environmental preferences (Bell, Greene, Fisher, & Baum, 2005; Cheng, 2007; Karjalainen, 2006; Lyons, 1983) and that it ignores the meanings and associations that places have for people (Scott & Canter, 1997). Ulrich (1983, p. 110) wrote “… an ideal or complete preference theory should include culture as a component.”

### 2.1.4 Tripartite Theory

Stephen Bourassa, Australian urban planner and academic, suggested a tripartite theory to bring together cultural and biological components of landscape perception into one inclusive paradigm. Bourassa (1990) argued that:

> If both biology and culture serve as distinct bases for aesthetic behaviour, then it is necessary to go beyond both biological and cultural determinism toward a theory that would fully embrace both biological and cultural factors. In addition, it is necessary to consider the role of personal idiosyncrasies and particularly personal creativity,… (p. 790).

Bourassa (1990, 1991) identifies three modes of aesthetic experiences: phylogenesis (or biological evolution), sociogenesis (or cultural history), and ontogenesis (or individual development). Phylogenesis, which is based on the primitive relationship between an organism and its environment, should lead to some shared cross-cultural responses. Sociogenesis refers to visual preferences that are influenced by individuals’ cultural backgrounds. Ontogenesis is “When biological and cultural influences come together …in personal development” (Bourassa, 1991, p. 110).
Bourassa (1990, 1991) argued that natural environments are experienced largely by biological mode, while cityscapes are mainly experienced in cultural mode. Thus, preferences for urban areas may be determined by meanings they convey for members of cultural groups. While research in this field has been traditionally based on the biological and cultural perspectives (Bourassa, 1988); there are relatively few studies that have focused on ontogenesis (Cheng, 2007).

Seamon (1993) criticized Bourassa’s theory for its usability and limitations; remarking that it “says little about how environmental qualities or the sensibilities of individuals and groups can be worked with and changed to provide places and worlds that are more beautiful and humane” (p.525).

2.2 Methods Used in Landscape Preference Research

Landscape perception and preference research is a complex field of study, which has captured the interest of researchers in disciplines as diverse as architectural landscape, urban planning, geography, psychology, and environmental studies. As a result, a wide range of techniques and methods has been developed.

These methods have been categorized based on their basic assumptions and goals. In a seminal work, Zube, Sell, and Taylor (1982) reviewed 160 landscape perception papers and identified four paradigms: expert, psychophysical, cognitive, and experiential. This classification has been further refined by Daniel and Vining (1983) and Lothian (1999) (see Figure 2-1).

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The focus of landscape assessment methods, however, has been always on natural landscapes and none of these methods has been developed to evaluate the visual quality of windowscapes or urban landscapes (Hellinga, 2013; Kaymaz, 2012).

Daniel and Vining (1983) categorised the methods as ecological, formal aesthetic, phenomenological, psychophysical, and psychological. Ecological and formal aesthetic models assess visual quality of landscapes entirely based on their features and do not
include human perception. Psychophysical, psychological and phenomenological models, however, put the human observer in a central position and regard visual quality as a product of the mind (the eye of the beholder).

2.2.1 Ecological and Formal Aesthetic Models

Ecological and formal aesthetic models assume that the view of professionals is superior to the assessment of the general public. Methods within these models have been predominantly used in the disciplines of landscape architecture, forestry, and environmental management. Researchers using the formal aesthetic model hold that “aesthetic value is inherent in the abstract features of the landscape” (Daniel & Vining, 1983, p. 49). In this model, an expert (e.g. a landscape architect) translates biophysical features of landscape (e.g. mountains and trees) into formal features (e.g. line and colour) or relationship among them (e.g. unity and harmony) (Daniel, 2001). The ecological model is similar to the formal aesthetic model but the landscape is characterised in terms of species of plants and animals present, ecological zones or ecological processes.

Ecological and formal aesthetic models have been heavily criticized for poor reliability and validity (Daniel, 2001; Daniel & Vining, 1983; Skřivanová & Kalivoda, 2010). Other criticisms that have been made of these models are: 1) lack of theoretical framework; 2) subjective and non-replicable, 3) results are field-based and generally cannot be extended beyond the area of study (Lothian, 1999).

2.2.2 Psychophysical Model

The psychophysical model seeks mathematical relationships between objective physical features of the landscape (e.g. water, greenery) and subjective perception of the landscape (Zube et al., 1982; Daniel & Vining, 1983). It was developed on the assumption that certain landscape properties are universal predictors of preference. To apply this model, the researcher objectively measures landscape physical characteristics (e.g. water, sky, and buildings). Then, an empirical study is run to find the perceived quality of the given landscape. The most common technique is by asking subjects to give a rating, ranking or yes-no judgment to a range of physical stimuli (usually photographs of the scenes). The
selection of subjects is usually by purposive rather than random sampling (Daniel & Vining, 1983).

Psychophysical models have been valued for their quantitative precision, and relating landscape quality systematically to the objective properties of the environments (Daniel & Vining, 1983; Uzzell, 1991). Results obtained from this model can produce helpful guidelines for planning and management. Due to these advantages, the psychophysical approach comes closest to meeting “the criteria of the ideal assessment system” (Daniel & Vining, 1983, p. 79). However, the psychophysical model relies heavily on the use of colour photographs as surrogates for real landscapes and ignores the possible effect of cultural and demographic factors on preferences. Moreover, it has been criticized for its lack of theoretical foundations (Real et al., 2000; Ruddell et al., 1989; Uzzell, 1991).

2.2.3 Psychological Model

The psychological model is similar in many ways to the psychophysical approach but addresses a different set of variables. Researchers in this field have proposed that preference is derived from the interpretation of the landscape, and hence human responses to perceived (not objective) landscape characteristics (e.g. openness, complexity, fearfulness, and coherence) should be analysed (R. Kaplan & Kaplan, 1989). The psychological approach aims to understand whether and how the perceived properties are associated with positive or negative cognitive and affective reactions (Scopelliti, Carrus, & Bonnes, 2012). As a result of this approach, so-called evolutionary-based theories have been formulated (see Section 2.1).

Measuring psychological variables is difficult and usually relies on subjective judgment. In a typical experiment, researchers select photos of different scenes, which are shown to respondents for brief periods (around 15 to 25 seconds). A panel of judges evaluates scenes on dimensions such as complexity, spaciousness, or mystery and then the same or a different panel rates the quality of the scene (Bell et al., 2005).

The advantage of the psychological approach to a psychophysical one is that it provides theoretical explanations for individual judgments of landscape preferences. However, due to the abstract nature of variables in a psychological model, this approach
fails to provide results that are useful from a practical point of view (Ruddell et al., 1989). To be useful, it requires that researchers link psychological variables to identifiable, independent, measurable features of the landscape (Uzzell, 1991; Wohlwill, 1976).

### 2.2.4 Phenomenological Model

This model focuses on humans as interpreters of a unique environment and their interaction with the landscape (Daniel & Vining, 1983). Going beyond the visual aspect of landscape, the phenomenological model emphasizes observers’ experiences, feelings, expectations and interpretations of the landscape (Daniel & Vining, 1983). Phenomenological studies are usually conducted by means of detailed interviews, and verbal questionnaires with a small sample of people; for example, Palega’s study (2011) on everyday aesthetic experiences interviewed only ten adults in New York City. The data collected is then analysed to find experiences common to the interviewees (Uzzell, 1991).

Daniel and Vining (1983) argued that phenomenological methods cannot be considered as landscape assessment methods as they are “too sensitive to be useful” (p. 75). The overemphasis on personal, experiential and emotional factors makes the visual properties of the landscape become only tenuously associated with landscape experience. One cannot establish systematic relationships between psychological responses and landscape features (Ibid). Zube et al. (1982) saw this model as having a role in development of theory but with little immediate practical application. Lee (1990) added that it is virtually impossible to analyse the data into “useful explanation that goes beyond the environment and people from which it was gathered”. Considering these limitations of the phenomenological approach, it is not surprising that this model has been least employed for landscape assessment and has not been used by landscape managers.

### 2.3 Research Instruments and Procedures

A review of laboratory-based and field-based studies is presented in this section. A comprehensive review of methods used in the field over the period 1966 - 1996 was made by Lothian (2000). Since landscape assessment is an active field, there are some newer instruments used in key studies published since 2000.
2.3.1 Laboratory-based Methods

In the laboratory-based method, participants were exposed to surrogates of landscapes such as photographs, where they would assess each scene remote from their everyday meanings. This method has the advantage that it requires significantly less time than the field-based method, costs less and allows researchers to employ more observers. It may be due to these advantages that most landscape studies have used laboratory-based methods. Lothian (2000) noted that, of 218 studies he reviewed, only 20 used field assessments.

2.3.1.1 Types of Surrogates

Table 2-1 lists several different types of surrogates used in recent landscape preference studies. Colour photographs, computer-generated images, and photomontages are most often used. Colour photographs have been identified as the most appropriate surrogates among others to represent landscapes. Daniel and Meitner (2001) questioned the validity of computer-generated landscape visualizations, finding very low correlations between the ratings of the same set of scenes in four different visualization conditions (full colour, grayscale, 4 bit colour, and B/W sketch). Consequently, they argue, “Environmental value assessments based on such visualizations will not be valid. Environmental policies and management decisions based on predictions of public preferences derived from inappropriate representations will not achieve the intended benefits…” (Daniel & Meitner, 2001, p. 70). A meta-analysis by Stamps (2010) found no significant difference between static and dynamic simulations. He suggested that the extra expense associated with dynamic simulations can be an inefficient use of resources. His analysis also showed that black and white images produced invalid results, suggesting that colour is necessary (Stamps, 2012). Stamps (1993) showed that the use of photomontages does not modify the appreciation of the landscape and only a few were able to identify photographic alteration.
2.3.1.2 Techniques for Quantifying Landscape Preferences

Studies using a laboratory-based approach have employed different measurement techniques; these include Q-sort (Hofmann et al., 2012), rank orders (Heath et al., 2000), rating scales (Abkar et al., 2011; Fernandez-Cañero et al., 2013; R. Kaplan, 2007; Lohr & Pearson-Mims, 2006; Zheng, 2009), forced choice (Wong & Domroes, 2005) and paired comparisons. Studies have shown that evaluation techniques do not affect the results of the study (Buhyoff, Arndt, & Propst, 1981; Daniel & Boster, 1976; Nousiainen, Tahvanainen, & Tyrväinen, 1998; Tahvanainen, Tyrväinen, & Nousiainen, 1996; see Meitner, 2004a for review).

Rating Scales Method

Rating scales, the prevalent technique in landscape studies, involves asking research participants to rate landscape scenes on a Likert scale (e.g. 1 to 10 representing worst to best). The majority of surveys used 5-point Likert scales, followed by 7-point and 10-point scales (Lothian, 2000). Rating photographs is fast and easy; however, since the method usually involves rating a large number (on average 40-60) of photos of unfamiliar scenes, a few problems can arise. For instance, if respondents have already assigned the best score
to a picture it is not possible for them to give a better score to a more preferred image they encounter later. Researchers try to obviate this problem by showing a set of slides before the actual rating so the respondents can adjust their individual scales. The number of photographs used in these studies varied from 5 (Nasar & Lin, 2003) to nearly 2200 (Lothian, 2000).

Rank Ordering Method and Q-sort Method

Rank ordering allows better discrimination between landscape photographs than the Likert scale (Meitner, 2004a). However, this method often is time-consuming and so limited to a restricted number (around 10-15) of photographs. This limitation can be avoided by using the Q-sort method. This is a version of the rank ordering technique, in which participants are asked to sort images into piles (usually between 5 and 7), based on their preference. Each pile is then connected to a numerical value; the Q-sort method is thus close to numerical rating.

The main advantage of Q-sort over a rating method is that participants can shift items between piles, as they proceed (Cronbach, 1970, p. 586). It can also be an attractive and enjoyable procedure for respondents. The Q-sort method is usually used in explorative research and complemented with in-depth interviews. Weber, Schnier, and Jacobsen (2008) used the Q-sort technique to study aesthetic judgments of streetscapes. Participants were asked to assign 35 pictures of a street in Germany to five categories, ranging from 1 (beautiful) to 5 (not beautiful).

Other methods

The forced choice paired comparison is a technique in which participants are shown a pair of stimuli (e.g. photographs) and asked to choose the more visually appealing. Magnitude estimation measurement is another qualitative method used infrequently in landscape studies (Daniel, 1990). This method asks respondents to assign absolute numbers to stimuli in comparison to a standard – the number expressing the strength of their response in terms of the standard. Alternatively, respondents can express their evaluation by marking it on a continuous scale where the two extremes are labelled. For example, Jorgensen et al. (2002) used 10cm lines with “dislike very much” and “like very much” at
the two extremes and asked respondents to mark on the line their preferences for 15 scenes of a park. The researchers then converted the responses to a number between 1 and 100, using a scale ruler.

Adjective checklist was developed by Craik (1972). The researcher asked 35 students to list 10 adjectives to describe each of 50 natural landscapes. From the 1196 collected adjectives, those that were used six times or more formed a Landscape Adjective Check List (LACL) that contains over 200 adjectives. Since then others have used LACL to develop a shorter list of descriptors. The adjective checklist method is a quick method to assess observers’ descriptive impressions. However, the technique does not quantify preferences for landscape which can explain why it has not been widely used in landscape preference studies (Lothian, 2000).

Semantic differential method (also known as bipolar adjective scales) was introduced to urban landscape studies by Nasar (Nasar, 1998; Nasar & Li, 2004). This method measures observers’ reaction to different environmental stimuli using adjective pairs (e.g. Beautiful-Ugly, attractive–unattractive, harmonious–discordant, and natural-artificial). The method has been criticised on the basis that meanings for some of these predictors can be unclear and hence the results may be difficult to interpret (Aoki, 1999).

A few researchers combined two or more of these techniques. For instance, Wong and Domroes (2005) conducted a study inside a park in Hong Kong to identify those scenes that were liked by visitors. Instead of evaluating the scenes in-situ, park visitors were asked to choose, from 15 colour photographs of the park, the one scene that they liked the most and the one scene they most disliked. This method was used in combination with Shafer’s method of measuring photographs and semantic differential to explore various aspects of affective appraisals. Jungels, Rakow, Allred, and Skelly (2013) used adjective checklist together with semantic differential to evaluate preferences for ten photographs of green roofs. First, 12 participants were asked to write down one-word descriptions (using positive and negative qualities rather than neutral ones) for each of ten photographs. The eight most common descriptions were then used to define the extremes on a 5-point Likert scale, for use in experiments in which respondents rated their impression of green roofs.
2.3.1.3 Photographic Evaluation Methods

Most preference studies have asked participants to evaluate photographic images of the scenes (Nickerson, 2012; Thompson, 2013). This method has been popularised in the field of urban landscape by Nelessen (1994), who termed it “Visual Preference Survey” or VPS. Photographic evaluation methods in general follow five stages (see Figure 2-2). In each stage critical decisions are required as to:

- What type of camera and lenses to use and where to take the photos (vantage points) and how to frame the scenes (Stage 1)
- Which selection of photos can represent the landscape (Stage 2)
- What to exclude from the selected photographs (Stage 3; optional)
- What is the best way to present the photos to the participants (Stage 4)
- What characteristics of landscapes generate more positive preferences (Stage 5)

The issues related to each stage are discussed below together with the key approaches used to address them.

![Figure 2-2 Photographic method procedure (Author)](image)

Taking photographs (Stage 1)

When taking photographs and sampling landscape scenes, two sets of decisions have to be made: first, what equipment to be used (camera and lenses); and second, how to take
the photographs (environmental sampling). It has been shown that the type of equipment can influence preferences for the scenes. For instance, Nassauer (1983) compared viewers’ responses to photographs taken from coastal landscape with both 50mm and 35mm lenses. Responses for 17 pairs of matched sets indicated that the rating of panoramic scenes taken with 50mm lenses were higher. To assure reliability of the study, it has been suggested that camera with 50mm focal length and a tripod should be used for taking panoramic photos (Skřivanová & Kalivoda, 2010).

Regarding environmental sampling, two major factors need to be considered: where to take the photos within the landscape (vantage point) and what to look at from that point (framing). Researchers in the field have developed some rules about how to frame the photos, since factors such as the amount of sky and light can effect landscape perceptions (e.g. Palmer & Lankhorst, 1998). However, little attention has been paid to other aspect of environmental sampling (Hull & Revell, 1989; Hidalgo et al., 2006). Porteous (1996, p. 140) noted that the “extremely broad range of conditions which confront an observer in the field is never accurately represented by set of surrogate slides or even movies.” This has raised concerns about bias in sampling, which brings the validity of findings into question (Akbar, Hale, & Headley, 2003; Daniel & Boster, 1976). Hidalgo et al. (2006, p. 116) have also expressed concerns about urban landscape samplings and the possibility that some valued places associated with real experiences of the city were not incorporated into samples.

A few researchers have suggested strategies to minimize these types of biases. For instance, Daniel and Boster (1976) introduced a random sampling procedure, which requires a walk through the area, taking photographs from eye level at orientations dictated by randomly drawn compass headings. The researchers observe that diverse and structurally rich landscapes may require a large number of photos to insure adequate representation (Ibid). Hull and Revell (1989) have used Visitor-Employed Photography as a means of supplementing existing sampling techniques (see Section 2.3.2.1). However, as Aoki (1999) and Porteous (1996) rightly argue there is no consensus on the best means of sampling, which indicates the need for more research on this issue.

**Selecting and processing photos (Stage 2 & 3)**
Scenes are selected by controlling as many landscape variables as possible. For instance, Dramstad, Tveit, Fjellstad, and Fry (2006) excluded “strong drivers of preference” such as water, and human-made features from their samples of agricultural landscape scenes. Similarly, Hofmann et al. (2012) retouched their sample of urban green spaces so that people, water, and buildings were not visible in prominent positions in the photographs. People also have been excluded from samples of familiar urban places (Herzog, Kaplan, and Kaplan, 1976) and forest scenes (Herzog & Bryce, 2007) as the researchers judged them potentially powerful distracting stimuli. Litter, churches, unusual architecture and wherever possible, damaged or unhealthy vegetation were excluded from the sample of urban forest scenes (Buhyoff, Gauthier, & Wellman, 1984). These controls can constrain the scale of representativeness of the sample. The question remains as to whether these selected scenes can accurately represent the actual landscape under investigation.

Modes of Presenting Photographs and Instructions to Participants (Stage 4)

Photos are typically presented in a laboratory setting using projection onto a large screen, although other modes of presentation have also been used. For instance, R. Kaplan (2007) printed photos in survey booklets containing 24 black and white photographs and asked her participants to rate each image on a 5-point Likert scale based on “how much they would like to see these kinds of scenes in the area around their work place.” Other have used a computer screen for presenting images. One of the advantages of using computers over projectors is that the survey can be easily distributed using Internet. This also allows respondents to view each scene at their own pace which is of importance as there is some evidence that a restricted viewing time can affect preference ratings (Herzog, 1984, 1985). A significant correlation was found between results obtained when using photographic slides, printed photographs and scanned images viewed on a computer monitor, suggesting that each mode of presentation can be effectively used in place of the others (Wherrett, 1999).

However, Hägerhäll and Hassan (2011) found screen size had an effect on evaluation of some landscape scenes. For instance, emotional responses to high diversity forest scenes were higher in a 7x3m curved display in a virtual reality theatre than on a standard computer screen. Meitner (2004b) compared four methods for view presentation varying
from individual slides to interactive 360° panoramas. The researcher found the mode of presentation to be an important factor when evaluating landscape visual quality and that the individual slides method (often used in landscape preference studies) was significantly least valid for assessment of this landscape type. Using eye-tracking technique, Dupont and Van Eetvelde (2014) found panoramic photographs are viewed in a significantly different way from standard, detailed and wide angle photographs (see page 28 for more information on eye-tracking technique). Their results suggest that a landscape image can be easier to recognize and memorize when presented as a panoramic photograph.

Researchers using photographs usually ask their respondents to try to rate the scenes based on their content but without reference to their frames, the appearance of the sky, or the quality of the photograph. For instance, Nasar and Terzano (2010) asked their respondents to “imagine they were in the environment looking at each real place shown, and to rate the place, not the quality of the photograph.” Similarly, Herzog and Leverich (2003) asked their respondents to rate “How much do you like the setting?” and instructed them that “This is your own personal degree of liking for the setting as a setting, NOT as a picture.” However, “It goes without saying that photographs are not landscapes and landscapes are not photographs” (Carlson, 1977, p. 142). There are significant differences between viewing the scene directly in reality and viewing it via photograph: for instance, direct experience of a landscape is frameless and allows viewing over all available angles.

**Analysing observers evaluations (Stage 5)**

The last stage of a photo evaluation method involves linking participants’ preferences to the landscape characteristics. At this stage, scenes are categorized in terms of features and attributes. Then, analyses such as correlation and factor analysis are conducted to identify what is influencing preference. One of the problems of this stage is that little knowledge can be gained about which attributes are salient in landscape assessments (Porteous, 1996, p. 142). Moreover, as the researcher is the one subjectively categorizing the elements in the scenes, it is not clear whether the variables selected as likely determinants of preferences are those “observers actually attend to when they are viewing environments” (Ibid, p. 140). Nelessen's (1994) VPS method has been also criticized for not determining “which
design elements influence public preference or by how much they do so” (Bailey, Brumm, & Grossardt, 2001, p. 3).

One of the approaches in this stage is the landscape-photography approach (often referred to as Shafer’s model) (Shafer, 1969; Shafer et al., 1969; Shafer & Brush, 1977). In this method, 8x10-inch black and white photographs were subdivided into zones of sky, water (e.g. streams, waterfalls) and vegetation and non-vegetation (e.g. mountains) in the foreground, mid-ground and in the distance. A transparent quarter-inch plastic grid was overlaid on each photo and the number of sides of grid squares enclosing each zone determined.

The results of factor and multiple regression analyses indicated that preference scores were related to six landscape variables in the photograph: 1) perimeter of immediate vegetation, 2) perimeter of intermediate non-vegetation, 3) perimeter of distant vegetation, 4) area of intermediate vegetation, 5) area of any kind of water and 6) area of distant non-vegetation. Later work by Brush (1981) found mountains and steep hills have a positive effect on landscape preference, suggesting that the model should also take the landform into account.

Shafer’s model has been criticized for lacking theoretical justification in choice of variables (Bourassa, 1991) and being of questionable reliability and validity due to using regression analysis (Weinstein, 1976). However, the researchers themselves were the first who warn that caution should be taken in applying the results to actual landscapes (Shafer & Brush, 1977). Another limitation of the model is that it can only be used for natural landscapes without built features or other obvious features of human intervention as human-made structures were not part of the research (Ibid). Carlson (1977, p. 142) argues that Shafer’s model “predicts the appeal for a photograph of a landscape” and not the landscape itself. Dearden (1980, p. 319) agrees, “One of the major predictors of preference was the framing of foreground elements. Obviously, two photographs could be taken, a few centimetres apart, of exactly the same location and yet might vary widely in foreground framing.” Despite these criticisms, Shafer’s model has been widely used by other researchers. For example, Kfir, Munemoto, Sacko, and Kawasaki (2002) used this method to measure the perceived quality of window views.
**Eye-Tracking Technique**

Eye tracking technique is an innovative method developed to overcome difficulty in photo protocol research to “objectively measure how people visually observe landscapes” (Dupont & Van Eetvelde, 2012). This technique requires participants to be positioned in front of a monitor with an eye tracker and measures the speed and direction of eye movements while participants look at images. Participants usually are then asked to rate their level of preference on a Likert-type scale for each image (Dupont & Van Eetvelde, 2012; M. Kim, Kang, & Bakar, 2013). The important advantage of this technique is the possibility of identifying elements in a landscape that catch the attention. However, as research needs to be conducted in laboratories, results do not represent how environments are experienced in real-settings.

Kim, Kang and Bakar (2013) used eye tracking to study whether brightness affects nightscape preferences and found that landscape images with brighter and more open areas were preferred. Moreover, they noted that participants spent more time looking at preferred images than non-preferred images. In Dupont and Van Eetvelde’s study (2014), however, no rating method was used. Instead, participants were asked to freely view the photographs and eye tracking was used to compare viewing pattern of landscape experts with that of novices. Research found landscape experts view a landscape as a whole, whereas novices focus mainly on a few single elements within the landscape.

**Can Photographic Methods Produce Valid and Reliable Results?**

The results concerning validity of using photographs are inconsistent (Stamps, 1990; Hull & Stewart, 1992; Daniel & Meitner, 2001; Zube & Pitt, 1981; Kellomäki & Savolainen, 1984). Several studies have reported high levels of consistency in preference scoring between photographs and actual scenes they were intended to represent. For example, Zube, Pitt, and Anderson (1975) conducted a series of studies where evaluative responses of a field population were compared against a non-field population. In addition, a meta-analysis by of 11 papers found a strong correlation (r = .86) between preferences obtained from photograph assessments and preferences obtained in situ (Stamps, 1990).
Although these studies suggest that colour photographs are valid representations for landscape assessment, as Uzzell (1991, p. 9) pointed out “this approach may still be invalid in the wider sense of not matching people’s experience in natural places.” Furthermore, several studies provide evidence that raises questions about the representational validity of photographs. For instance, in an experiment carried out by Hull and Stewart (1992), only 38% of participants were found to have insignificant correlations between their on-site and photo-based scenic beauty ratings. The authors concluded that the validity of these kinds of studies is in doubt, at least for some of the people studies here. A similar result was obtained from a study conducted by Kroh and Gimblett (1992). Participants were asked to rate their preferences for 16 scenes along a trail, and to articulate their feelings about each. The same group of participants repeated the study three weeks after in a laboratory using slides. It was found that scenes experienced in the field were rated consistently more highly than laboratory ones. The researchers concluded that for “an accurate understanding of landscape preference the impact of multi-sensory dynamics must be accounted for” (Ibid, p. 68). Huang (2009) questioned the validity of using video and slides for representing waterscapes in urban landscapes as findings revealed that on-site emotional responses were significantly stronger than those of video and slide viewers. Scott and Canter (1997) found participants made different conceptualizations depending on whether they looked at the photographs or they thought about the place in the photographs. The study indicated that photographs might not be sufficient to valuate thoughts, and feelings that people associate with actual places. As Lothian (2000, p. 221) rightly pointed out “when viewing a photograph the elements can be seen as forms, lines, textures whereas in the field they are trees, grass, water, clouds and so on.” In agreement with this, Rabinowitz and Coughlin (1970) and Zube (1974) found a tendency among field analysts to focus on material and objects when describing landscape, whereas photo analysts focused more on patterns.

Further support for the inadequacy of photographs to provoke observers’ emotional responses to a landscape is found in a study by Pocock (1982). The research design involved asking those visitors who took a photograph of a historical site from approximately the same vantage point to participant in the study. Pocock (1982) asked those photographers to sketch what they anticipated their photograph to look like after
leaving the site, but before seeing their photographs (digital cameras did not exist at the time the study was conducted). Later, with photos of the scene to hand, participants were asked to compare their photographic record with “the experience alive in memory.” The sketches were then compared against the photographs the researcher had taken from the scene. Detailed comparison of photograph and sketch revealed that 1) the precise photographic spot was subsumed within their overall experience of the place; 2) depending on what was valued by observers, a few features were overlooked and some were exaggerated in their sketches. The comparison between photographic record and memory of experience of the scene led to a strong emphasis on the richness of the latter. For instance, one of the study participants remarked, “The motion of people and boats and water, and the warmth of the sun are all part of the memory not included in the picture. The memory moves and lives, but the photo is stopped at an instant.” Uzzell (1991, p. 9) has remarked, “It seems highly likely that the preferences expressed on the basis of two-dimensional photographs are different to those which might be made in situ.” This difference is probably more evident in urban landscapes, which are assemblages of both permanent and dynamic parameters.

2.3.2 Field-based Methods

Although there seems an overriding view that studies following field-based approach are superior to laboratory-based studies because participants actively engage with and respond to landscapes in a multisensory manner, the number of studies using these methods is relatively limited due to their several shortcomings.

2.3.2.1 Field Assessments

As field assessments usually involve taking a group of participants to each viewpoint location and asking them to rate the scenery. This method is time consuming and expensive (Lothian, 1999; Skřivanová & Kalivoda, 2010); so field assessments have been mostly used to compare preferences for photographs against field observations in order to justify using surrogates (e.g. Zube et al. (1975)).

Sometimes field assessments can be conducted by asking observers present in the scenes to assess their surroundings, as was the case when Jungels et al. (2013) were
assessing the value of the green roofs. Visitors were asked to rate a series of questions about their aesthetic reaction to the roof they were visiting. This approach might produce biased results as such visitors might have chosen to visit that site because of a preference for the scene (Lothian, 2000).

2.3.2.2 Visitor-Employed Photography

To overcome some of the problems associated with researcher-selected photos in experiments, some researchers have put the selection process literally in the hands of the research participants by providing each participant with an inexpensive and easily operated camera. This has been termed Visitor-Employed Photography (VEP). VEP can be considered as a combination of a photo-protocol approach and a field assessments (Garrod, 2007). Hull and Revell (1989) were among the first to use this method in preference studies. They asked a group of Western and Balinese tourists to take photos of Balinese landscape and write down the main feature of each scene. From these, consensus scenes (that has been photographed by 10% or more of the participants) were identified and re-photographed to be used as the test material in the preference experiments.

The participants taking photographs are usually asked their reasons for taking each photograph. In Nielsen, Heyman, and Richnau’s study (2012, p. 458) participants were asked to note “whether the photograph represented liked or disliked attributes; the position where the photograph was taken by writing the number on the red tag closest to them; and a short motivation for taking the photograph”. Analyses usually concentrated on the contents of photographs and frequencies of the most photographed scenes (Dakin, 2003).

Although VEP can lead to high survey response rates as it usually appears interesting to the research participants (Taylor, Czarnowski, Sexton, & Flick, 1996); several drawbacks have prevented the method from being widely used (Balomenou & Garrod, 2010). These issues include the high level of commitment required from participants, lack of complete control of the project for the researcher particularly regarding the spread of participants’ photography, and the possibility of creating bias in the research (e.g. by asking participants to take meaningful photographs) (Ibid). Also, fear of losing the
equipment has led researchers to limit the study to fairly controlled settings such as loop trails (Taylor et al., 1996). In addition, sampling the temporal characteristics of a landscape is limited as cameras can be distributed for only a short duration (Hull & Revell, 1989).

2.3.2.3 Nasar’s Evaluative Method and its Updated Versions

Nasar (1990, 1998) designed a somewhat different method to “determine how public evaluate the cityscape.” Residents or visitors of two cities in U.S. were asked 1) to identify up to five areas they liked and five they disliked visually, and 2) to list the physical features that accounted for their evaluations. The boundaries for each area were defined by either asking respondents to provide street names, landmarks, known buildings or making the area on a map. Maps developed from each interview were overlaid to produce a composite depicting the evaluative image of the city. This method can provide general information about the visual appearance of a city and help to identify the areas that need to be improved.

Galindo and Hidalgo (2005) improved Nasar’s method by asking respondents to list the most visually attractive and the most visually unattractive places of the city and rate the extent to which their first choice had certain characteristics such as vegetation, visual diversity, openness and cleanliness. Hidalgo et al. (2006) suggested that results obtained from their study could be used to improve issues related to environment sampling of traditional preference methods (see Section 2.3.1.3).

Another method, that originated and advanced from Nasar’s work, is Public Participatory Geographic Information Systems (PPGIS) (Al-Kodmany, 2003). PPGIS is a web-based survey, which enables participants to express their preferences spatially via GIS (Talen 2000). Both PPGIS and Nasar’s method rely on participants’ memory of the area by asking them to evaluate the city or neighbourhood according to their lived experiences. However, in Nasar’s method, data is collected through phone or face-to-face interviews, which needed to be manually converted into maps, whereas the PPGIS directly collects responses in map-forms.

Brown and Brabyn (2012) employed custom Google® maps, which can be viewed in four different ways: Map, Terrain, Satellite, Hybrid and 3-D Earth. Participants were
instructed to identify the spatial attributes of landscape by dragging and dropping markers to show landscape values, experiences and development preference onto the appropriate location on a Google® base map.

The use of PPGIS in landscape preference research is still in its infancy and research is needed to prove its validity and reliability. The validity of the PPGIS method depends partly on participants’ level of familiarity with the region and their accuracy at locating the value markers on particular places (Brown & Pullar, 2011). Rixon and Burn (2008) see the method as a “powerful tool for informed participatory decision-making processes within urban planning projects.” However, participation is limited to Internet users and at best can reflect only the view of this sub-group of people.

2.4 Windowscape Assessment Methods

Windowscape preferences are assessed either directly by asking participants (usually occupants of the room) to evaluate their views or indirectly by studying people’s behavioural choices. Direct methods make use of the techniques discussed above, while indirect methods gather information on the price of the properties and link it to their window view characteristics.

2.4.1 Direct Methods

Markus (1967) was the first to assess view preferences. He asked 400 office workers to indicate whether 1) the amount of view through their office was plentiful, adequate, rather poor, or mean; 2) they prefer to see distant city and landscape, sky, or ground and buildings to see through the windows. The wording of the questionnaire was criticised by Markus himself arguing that rather than “ground” more attractive terms (e.g. “people and traffic and shops nearby”) should have been used (Ibid).

In a simulation, Ludlow (1972) asked his research participants to rate slides of typical views projected onto a sort of window and comment on them. Viewing time was also measured as an indicator of satisfaction. Ludlow obtained three measures of satisfaction: evaluative rating, general comments, and length of viewing time.
R. Kaplan (2001) distributed photo booklets among residents of six apartment communities and asked them to rate photographs in terms of similarity to the view from their apartment and how much they would like such a view. Participants were also asked to consider how dominant features such as trees, park, large mowed area, busy street, houses/apartments were in their home view.

A study by Kfir et al. (2002) on view evaluation surveyed residents living in apartment buildings on human-made islands in Japan. Residents were asked to estimate the extent to which they could see certain features (e.g. buildings, sea, and port facilities) out of their windows as well as rate the quality of their views. A multiple regression analysis was carried to find features that could explain the positive or negative assessments of the views (see Section 2.5.1 for a summary of the findings). Photographs of living room views were also taken and analysed using Shafer’s landscape-photography approach (see page 31) to determine whether the distance and extent sea and residential buildings influencing preferences.

In Hellinga and Hordijk's study (2008), office workers were asked if they could see the sky, the ground, buildings, water, and greenery through their windows and rate their pleasantness. The result of this study was used to develop an objective method for evaluating visual quality of windowscapes (Hellinga & Hordijk, 2014).

The objective method proposed by Hellinga and Hordijk (2014) involves answering a series of multiple-choice questions. Each possible answer was given a point value depending on estimation of its effect on the assessment of view quality. The sum score represents the view quality (from 0 pt (low view quality) to 12 pt (high view quality)). The researchers tested the applicability of their method by comparing its results with office workers’ ratings of pictures of unobstructed windowscapes.

View Event or active seeing is a qualitative method in which residents’ interaction with their windows were documented in a digital video recorder (J. M. Jacobs, Cairns, and Strebel, 2008). View Event starts by a simple question: “Show us your view” which took the residents to the window in an “unthinking” manner. The researchers explained the view event process as it occurred, “while the residents had their eyes (and narrative
accounting) on what they could see, we had our eyes (and camera) on what they were seeing through. In this sense we follow what might be described as a praxeological approach to videoing and digital editing...We were studying...with the camera and not simply through it. And at various times the camera and its operator was quite active in the scenes analysed: being invited to be closer to the window, having windows opened for it to look through and so on” (Ibid, pp. 174–175).

This method can identify which features of everyday windowscapes held residents' attention. However, since active seeing happened in the presence of an interviewer, a camera person, and the camera, the data captured is far from normal view events (J. M. Jacobs, Cairns, & Strebel, 2012, p. 140). The researchers also found it difficult to present film-based data in a text-based journal. The collected data cannot be statistically analysed and can be only used for qualitative comparisons.

2.4.2 Indirect Methods

Hedonic pricing method does not directly ask people’s opinion about the visual quality of their views. Instead, it assesses preferences by studying buyers’ willingness-to-pay for views. The method assumes that the price of a property reflects people’s appreciation for its characteristics (such as building age, location, urban centres and facilities, tree cover and air quality). Each characteristic is then related to house prices in a statistical model to estimate that part of a price due to a particular attribute – such as how much the presence of a particular feature within the views affects the price of the property.

Jim and Chen (2009) used hedonic pricing to understand how natural features are valued in dense urban areas. They collected data from 1474 property transactions which included key structural characteristics of individual apartments such as apartment age, gross area, floor level and bedroom count. The view data was collected with the assistance of property agents, and verified by fieldwork and map analysis.

Using the hedonic pricing model is time-consuming and expensive. In addition, conclusions depend on the statistical model used; meaning that with the same data set different findings can be obtained (Damigos & Anyfantis, 2011). The method has also been criticised for its assumption that “all subjects have the same preferences and willingness
to pay for a characteristic” (Cox & Vieth, 2003). A retrospective study which has not been planned to collect cultural and individual data will not allow the researcher to find any such influences.

2.5 Determinants of Urban Landscape Preferences

This section is concerned with factors influencing preferences for urban landscapes and windowscapes: properties of landscapes and attributes of observers. Environmental characteristics can be divided further into physical and psychological determinants.

Physical dimension refers to concrete features of urban landscape (e.g. water, greenery, sky, buildings). These types of variables are widely studied due to their practical use. The psychological landscape descriptors (e.g. complexity and mystery) are related to spatial configuration of landscape features, which have been emerged from evolutionary-based theories (see Section 2.1).

2.5.1 Environmental Variables

2.5.1.1 Built Features

Comparatively little is known about how built features contribute to the visual quality of urban landscapes, not only because research into urban landscape preferences is relatively limited but also because urban scenes in preference research are often treated as a general category and compared against natural landscapes (Aries, Veitch, & Newsham, 2010; Kaplan et al., 1972; Ulrich, 1981; M. White et al., 2010) so the contribution of individual features is not identified.

Buildings

Since buildings are an inevitable component of urban landscapes, the question for designers and developers is: how can buildings be incorporated in an urban scene to positively increase the visual quality of the views and what characteristics of buildings are more highly valued by viewers? Kfir et al. (2002) found the presence of residential buildings in the near distance were the most influential factor in negative assessments of the view. However, if the buildings were more than 500 metres away or if the window outlook included a view of the sea, buildings had no effect on view preference. Herzog and Shier (2000) found distant views of buildings and those where the entrance is visible
are preferred. Herzog (1992) and Kfir et al. (2002) reported that even the presence of buildings in the middle ground of a scene results in negative assessment of the view. Tuaycharoen (2006) asked 20 students to assess how interesting they found the views of ten rooms in different buildings; a concrete wall with little colour variation was chosen as the least interesting view. Similarly, in a hospital context, rooms with large windows towards a concrete building were disliked (Verderber, 1986).

Low preference for obscuring buildings might be related to the associated loss of occupants’ privacy. For instance, Markus and Gray (1973) found the satisfaction with windows in residential dwellings depends on the number of buildings visible and their infringements upon privacy. Meerdink, Weersink, and Rozendaal (as cited in Hellinga, 2013) found viewing some sort of activity out of a window is appreciated as long as one’s privacy is not violated.

Historical, cultural, and traditional buildings are found to be more visually appealing than other types, in particular industrial, commercial, and residential buildings. For instance, Herzog et al. (1976) found pictures depicting cultural buildings (e.g. churches, an art museum and hall of justice) were relatively high in preference, whereas, commercial buildings were by far the least liked. Similarly, in Nasar’s study (1990) historically significant buildings and places with new buildings were liked, whereas places with new buildings, industry and commercial strips were disliked. Participants of the study by Hidalgo et al. (2006) listed historic-cultural urban places as visually attractive whereas housing, administrative buildings and bus or train stations were least visually attractive. Ulrich and Addoms (1981) found that preferences for complex commercial views were negatively affected by presence of signs, wires and mixed façades, as well as lack of vegetation. White and Gatersleben (2011) reported that residential buildings with vegetation on the roofs and walls were perceived as more attractive than buildings without vegetation.

Old and traditional buildings in a good condition are preferred to modern buildings. Urban greenery scenes followed by older buildings were the most preferred scenes in Herzog et al. (1982). Howley and O’Donoghue (2011) reported modern buildings as the least liked landscape features. Herzog and Shier (2000) and Herzog and Gale (1996) argued
that poor maintenance of older buildings would be likely to contribute negatively to their visual quality.

Home and office views with high-rise buildings were disliked by most respondents in Dornbusch and Gelb’s study (1977). Luttik (2000) found that a view to a multi-storey apartment building can decrease house prices by 7%.

Visual richness, ornament, curves, contoured walls, textural variation and fancy windows all have a positive influence on building preference (Herzog & Shier, 2000), whereas an extreme heterogeneous architectural typology may result in negative assessment (R. Weber et al., 2008). However, when buildings were viewed as a cluster in the far distance, their design has an almost insignificant role on preferences; for instance, façade articulation of tall buildings had no influence on preferences of the urban skyline (Heath et al., 2000).

Cityscapes

Panoramic views of a city are valued by urban dwellers (Galindo & Hidalgo, 2005 and Hidalgo et al., 2006). 88% of the office workers (n=348) in Markus’ study (1967) preferred to see the distant city and landscape from their windows. A cityscape was rated higher than views showing close natural features (Tuaycharoen, 2006). Cityscape views containing trees and lawns, the surrounding neighbourhood, people outside, and near and distant vistas were rated as the most desirable view for a therapy room (Verderber, 1986).

Roading

Roading (e.g. streets, highways, and parking lots) can negatively influence assessment of a scene. Parking lots and traffic were identified as two prominent disliked features of urban landscapes and windowscapes (Verderber, 1986; Nasar, 1987, 1988, 1998; Hellinga, 2013). R. Kaplan (1985) found that home views with no power lines and busy streets were perceived as being more satisfactory. Surprisingly, the result was not unanimous regarding preference of views of parking areas. Access to social information such as the coming and going of neighbours was suggested to explain the positive responses towards parking views (R. Kaplan, 1985).
Lake, Lovett, Bateman, and Langford (1998) found that, where a road was visible from the front of a property it depressed the average property price by 2.5%. Jim and Chen (2009) also reported that street views would reduce the price by 3.7%, while residents were insensitive to building views due to their ubiquity in the compact city.

R. Weber et al. (2008) found streetscapes were considered more beautiful if the street is broad and laterally bounded by trees with only a few buildings visible. Using photomontage, Stamps (1997) reported that the effect of cars on preferences for streetscapes was very small, whereas trees had a medium effect.

2.5.1.2 Natural Features

In an urban context, the word nature usually refer to trees, foliage and vegetation (e.g. Herzog, 1989; Nasar, 1998). R. Kaplan (1983, p. 130) in The Role of Nature in Urban Context, described nature as “overgrown empty lot, the street trees, the growth along the rail road right-of-way, the backyards, schoolyards, planters and weeds, as well as the cemeteries, parks, botanical gardens and landscaped places”. The present work uses a wider definition for nature such as water, greenery, sky, mountains, and islands.

Naturalness is proposed as an influential factor in preference by (Kaplan & Kaplan, 1989). In laboratory studies, natural scenes were found to be preferred over urban views, (Wohlwill, 1976; Zube, Pitt, & Anderson, 1975; Hull & Revell, 1989). Urban scenes with natural features are found to be preferred over scenes without them (Herzog, Kaplan, & Kaplan, 1982; Im, 1984). A review of 90 articles published in the Journal of Landscape and Urban Planning between 1991 and 2006 reported that 44 studies found urban landscapes dominated by natural features to be strongly preferred (Matsuoka & Kaplan, 2008).

People prefer window views of natural scenes to those of the built environment (Markus, 1967; Tregenza & Loe, 2013). Ludlow (1976) claimed, “inclusion of any natural elements improves assessment of view and this includes sky, natural vegetation and water even if only a small amount”. Views with dominant nature content were rated as more pleasing than views dominated by built features (Heerwagen & Orians, 1986). Similarly, Hellinga and Hordijk (2008) reported that views of the sky and greenery were considered more pleasant than a view to buildings.
Such results are supported by evolutionary-based theories (see Section 2.1) arguing that natural features – especially water, green vegetation, and flowers – should be visually preferred over human-made features such as glass and concrete (Ulrich, 1983; Kaplan and Kaplan, 1989) as they signalled a nourishing food source to our hunter-gather and later our farming ancestors.

Sky

Although the sky often covers a substantial area of a photographed scene, photographic protocol studies generally disassociate the sky from the rest of the scene and treat it as a backdrop (Lothian, 2000) and; respondents are asked to rate the scenes without reference to its appearance (e.g. Ribe, Armstrong and Gobster (2002)). Also, those who predicted landscape quality with Shafer’s model usually measured percentages of the view exclusive of the sky (Ribe et al., 2002; Tveit, 2009; Zhao et al., 2013). It has been argued that excluding the sky from consideration removes the risk of obtaining different percentages of open land as a result of the photographer tilting the camera up or down. Others argued that assessing the preference for the sky has no use in management and can only be useful to predict preference as it relates to photocomposition (Wherrett, 2000b).

Findings differ between those who investigated the effect of the sky on preference for natural landscapes. Hammitt, Patterson and Noe (1994) found the sky to be the most influential but negative predictor of preference. Their interpretation was that the area of sky might be a surrogate for other variables, particularly the absence of aesthetically valued features such as ridges, rolling plateau and water. Wherrett’s (2000b) research on Scottish natural landscapes reported that the positive contribution of sky peaked when it covered at around one quarter of the photograph area.

However, sky has been found to be an important determinant of windowscape preference (Hellinga & Hordijk, 2008). People preferred a complete view that contains the sky, far distance, middle distance and surfaces near the viewers (Markus, 1967; Ludlow, 1976; Tregenza & Loe, 2013). The ability to see the sky from the window can keep observers in touch with information such as seasonal changes, time of day and the weather (Markus, 1967, p. 103) and was found to be a main reason behind a desire for windows (Keighley,
Butler and Biner's (1989) research reported a view of outside for temporal information (weather and time of day) to be the strongest predictor of window size preferences. Office workers who could see the sky, were less likely to report fatigue, headache and eye strain problems (Heschong Mahone Group, 2003).

While it has been found that a view dominated by sky is more satisfying than a view without this feature (Lottrup, Stigsdotter, Meilby, & Claudi, 2013), the sky alone cannot evoke positive feelings in observers. For instance, Markus' study (1967) reported that only 4% of office workers liked a view of the sky. In Verderber's photo-questionnaire (1986), rooms with monotonous views of sky were rated as least liked.

**Greenery**

Greenery was found by a significant number of researchers to be the most effective addition to a view for improving the visual quality of: commercial highway strips (Lambe & Smardon, 1986; Smardon & Goukas, 1984), residential areas (R. Kaplan, 1985; Nasar, 1983) and streetscapes (Nasar, 1988; Stamps, 1997; F. Weber, Kowarik, & Säumel, 2014). Most participants in Lynch's (1960, p. 44) mental mapping research, noted greenery and water bodies “with care and pleasure,” and a few made a detour to work to pass particular planting, parks, or water. In a controlled study, more than 50% of participants were willing to take a scenic parkway route with longer travel time than a fast non-scenic expressway route (Ulrich, 1974). Kaplan, Kaplan and Wendt (1972, p. 355) found “the urban scene with by far the highest preference rating was the one with the plaza containing a few small trees.” Ulrich and Addoms (1981) reported that preferences for park scenes with buildings visible in the background were higher than commercial areas with little or no vegetation. Kuo, Bacaicoa, & Sullivan's study (1998) indicated that preferences for inner-city landscapes increase with density of trees.

It is not the case that all kinds of vegetation are equally preferred, nor can vegetation always evoke positive responses. The presence of manicured lawns and tidy bushes in residential and workplace views did not receive as enthusiastic ratings as trees (R. Kaplan, 1983, 1985, 2007). Lottrup et al.'s (2013) research on workplace window views found that flowers, trees and park-like environments increased the odds of being satisfied with the
views, while no significant relationship was found for mowed lawns and wild self-seeded natural environment. A study on nursing home residents by O’Connor, Davidson, and Gifford (1991) found that newly admitted residents with views to parking lots, the front entrance, or a yard are more satisfied with their views than those with windows looking down to grass, bushes, and trees. It was suggested that during the initial period of admission to a nursing home, residents crave social information.

Aoki, Yasuoka, and Naito (1985) suggested the three-dimensional visual effect of trees as a reason for their higher preference rating than grassed areas. The practical functional value of urban trees, shade and shelter can also explain why trees are valued more than lawns (Gibson’s affordances (see Section 2.1.1)). In fact, two of the most frequently mentioned benefits of street trees reported by urban residents are their ability to improve visual amenity of the area (Brush & Palmer, 1979; Gorman, 2004; Hitchmough & Bonugli, 1997; Sommer, Guenther, & Barker, 1990), and to provide shade (Sommer et al., 1990; Gorman, 2004; Lohr, Pearson-Mims, Tarnai, & Dillman, 2004).

Partially obscuring greenery can detract from the visual quality of a scene (Hammitt et al., 1994) as it deprives a prospect view from an observer and reduces complexity of a view. A survey of office workers found that a view of greenery was preferred, as long as it was not frame-filling and blocking the view (Meerdink, Rozendaal, and Witteveen (as cited in Hellinga, 2013)).

Urban parks are valued more than other types of urban green spaces (e.g. forests and agricultural lands) (Brander & Koetse, 2011) and a park view can increase property prices (Konijnendijk, Annerstedt, Nielsen, & Maruthaveeran, 2013; Luttik, 2000; Pearson, Tisdell, & Lisle, 2002). Water, vegetation type and vegetation density was reported as three dimensions of preferences for urban parks (Bitar, 2004). The most likeable urban park scenes show a balance between vegetation and water (Wong & Domroes, 2005).

In China, a view of a garden inside a residential development was valued more than a view to urban parks or even a view of water (Chen & Jim, 2010). This finding differed from studies in western cities, which was explained by poorer water quality in China and noise issues related to urban parks. Moreover, residential gardens could only be accessed
by residents and provide a semi-private experience of vegetation, which is sparse in China. Result from the hedonic pricing model also showed that the visibility of greenery and green areas was valued more than their accessibility (W. Y. Chen & Jim, 2010). This result echoes that of R. Kaplan (1983, p. 146) where the “thereness” of a little park was identified as the greatest source of pleasure by those living or working in the vicinity.

Little (1979) found that urban and suburban residents often cherished the presence of a tree outside their windows. Kaplan, Kaplan, and Ryan (1998, p. 111) argued that even a single tree could make a big difference in a view from a window, as it reflects changes in season and provides a perch for birds. Detroit residents stated that the presence of trees would influence their choice of where to reside and felt that provision of trees in residential streets was more important than city parks (Getz et al., 1982). Most participants in Coles, Millman, and Flannigan’s study (2013) strongly agreed with the statement that “street trees make streets nicer places to live in”. One of the respondents stated, “Trees simply make the street look more pleasant and cared for. They give the residents something to enjoy and care about together” (Ibid, p. 829).

In residential situations, large street trees are preferred to smaller trees (Kalmbach & Kielbaso, 1979). Higher preferences for large trees are likely because of their greater scope for providing shade and improving air quality by removing pollutionn particles (Sommer et al., 1990). This highlights the importance of selecting species of trees that are long-lived and preserving them (Kaplan et al., 1998). Using photo manipulation, Lohr and Pearson-Mims (2006) found that spreading trees were preferred over round and conical tree forms. Participants in Gorman’s survey study (2004) identified “trees block visibility” as one of the negative attribute of street trees.

Private gardens are valued for creating a pleasant environment and promoting relaxation (Dunnett & Qasim, 2000). The presence of gardens within a home view is a strong predictor for neighbourhood satisfaction (R. Kaplan, 1985). One of the few studies on private gardens asked respondents to rate each simulated photograph on the extent to which they would like their front yard to resemble it (Palmer, 1986). A yard with a hedge and no canopy along the front walk was the most preferred, closely followed by a yard with small ornamental trees and foundation shrubs. The picture showing overgrown
shrubs along the front walk was rated as the most disliked yard; while a yard with a completely open lawn without any tree canopy or with a very dense two-tree canopy was disliked.

Mountains

Relatively little attention has been paid to the effect of mountains on preferences. For instance, Shafer (1969) and Hellinga (2013) in their assessment models did not label mountains with their proper name and referred them as “the distant non-vegetation zone” and “distant landscape”. Nasar's study (1990) is one of the few providing evidence that mountains can be considered visually attractive. Howley and O'Donoghue (2011) found water bodies as the most liked landscape attribute, followed by mountains and greenery, respectively.

Results from hedonic pricing research are not consistent regarding preferences for mountains. A real estate study in the USA reported that a distant mountain views have no insignificant influence on single-family housing prices (Benson, Hansen Jr & Smersh, 1998). Jim and Chen (2009, 2010), on the other hand, found a negative correlation between a mountain view and the sale price of apartments in Hong Kong. The authors argued that their results stemmed from Chinese cultural beliefs in which mountains are associated with wilderness. A Malaysian study reported that a panoramic/partial mountain view had a positive influence on house prices (Iman, Tian, & Ismail, 2014). Based on these studies, a tentative conclusion is that preferences for mountain views depend on the cultural backgrounds of observers.

Water

The positive effect of water on preferences has been consistently reported (R. Kaplan & Kaplan, 1989; Roger S. Ulrich, 1983; R. S. Ulrich, 1993; Nasar, 2000; M. White et al., 2010). Even a photo protocol study found that the mere indication of presence of water near a scene (clear vegetation belts) can lead to higher preferences (Dramstad et al., 2006). Although a broad harbour view can increase the value of a property (Jim & Chen, 2009), White et al. (2010) found that the extent of aquatic features in a built environment might be less important in influencing preferences than their mere presence.
The preference for water as a visible feature is referred to as *hydrophilia* (Herzog, 1985). Evolutionary theories argued that, since water plays an essential part in human survival, we have evolved to have strong positive feelings for water (Appleton, 1975; R. Kaplan & Kaplan, 1989; R. S. Ulrich, 1993). This proposition has been supported by studies comparing preferences for waterscapes across different cultural and socioeconomic groups. Yang and Brown (1992) reported water as the most preferred landscape feature for both Koreans and Western tourists. Vecchiato (2012) asked experts and lay people to express their opinion about a list of landscape features; bodies of water were found to be the most important feature to increase the visual quality of a landscape. Zhao et al. (2013) found that natural landscapes with approximately 45% of water body cover were preferred. The researchers explained this upper limit as resulting from the fact that, although water is vital to human existence, humans still need land, plants, and shelter.

Water streams and ponds were found to be the most liked features of an urban park (Özgüner & Kendle, 2006). Nasar and Terzano (2010) reported that night skylines with water in the foreground had a similar preference to natural scenes. Similarly, White et al. (2010) found that built scenes containing water were rated just as positively as natural green spaces. This suggests that natural features may have a different power in affecting preferences for urban scenes.

Nasar and Lin’s (2003) research found fountain jets as the most preferred and flowing water as the least preferred urban water features. Nasar and Li (2004) found that reflective water was considered more attractive than transparent water. Sakici (2014) found age a determinant of preferences for different types of water features. While flowing natural-looking water was preferred by the oldest age group, the younger respondents favoured a plain square platform with several jets that flow at various times.

### 2.5.1.3 Spatial Configuration

The spatial configuration of landscape features can influence preferences (Herzog, 1989; R. Kaplan & Kaplan, 1989; Ruddell et al., 1989; Nasar, 1998; Tveit, 2009). However, this dimension is less important than physical determinants (Kaplan & Kaplan, 1989; Stamps, 1994). Research on this topic usually examined the effect of spatial configuration of natural
environments, under the theory proposed by Kaplan and Kaplan (1989) (see section 2.1.3). However, it is argued that these predictors of preferences could also be found in urban environments (Abkar et al., 2011; Herzog, 1992).

The typical experimental procedure to assess the effect of spatial configuration on preferences uses photographs or slides of existing environments (Kaplan & Kaplan, 1989, pp. 207–215). Generally, subjects rate their preferences for 50 or more scenes; then the same subjects or a panel evaluated the scenes for their psychosocial dimensions, such as coherence, complexity, legibility, and mystery. Another spatial variable that has been often studied is openness, which emerged from Appleton’s prospect-refuge theory (e.g. Ruddell et al., 1989; Herzog, 1992; Ozdemir, 2010; Tveit et al., 2006).

Mystery can be elicited with a deflected or curved in the line of sight (Ulrich, 1983) or the existence of multiple features in the scene (Zhao et al., 2013). While mystery is found to be a key predictor of preferences for natural landscapes (Kaplan & Kaplan, 1989; Kent, 1993), its influence on urban landscape preferences is unclear. For example, Herzog’s (1992) found mystery as an insignificant predictor of urban landscape preferences, while Abkar et al. (2011) reported it as a positive determinant. Gifford (2007, p. 83) suggested the positive effect of mystery on preferences may not be true for urban scenes.

A coherent landscape assists orientation in time and space (Van Mansvelt & Kuiper, 1999; Tveit et al., 2006). Preference was found to be positively related to coherence of natural, rural (R. Kaplan & Kaplan, 1989; JoAnna Ruth Wherrett, 2000a), and urban scenes (Herzog, 1989, 1992; Nasar, 1987). However, factors that can enhance the coherence of urban areas are not fully identified (Nasar, 1998).

Complexity is a positive and influential predictor of preferences for urban scenes (Abkar et al., 2011; Falk & Balling, 2009; Herzog, 1992) and window views (Collins, 1975; Markus, 1967). Wolf (2003) found that the increase of complexity of urban scenes by disliked features (e.g. buildings, and overhead wires) could negatively affect preferences. S. Kaplan (1987) reported that natural landscapes were preferred over urban scenes regardless of the level of complexity. Ulrich’s (1981) study confirmed that complexity is a less important factor than landscape features.
Several researchers (e.g. Day (1967); Berlyne (1971)) hold that there is an inverted U-shaped relation between complexity and preference. In other words, landscapes that provide an optimal level of complexity will be preferred (Wohlwill, 1976). Ludlow (1976), accordingly, argued that a view from the window should be of medium complexity to be preferred. However, Tuaycharoen (2006) found a positive linear correlation between complexity of a view and preferences.

Although under-researched (Herzog & Bryce, 2007), legibility was found to be the weakest predictor of preference for natural landscapes (e.g. (R. Kaplan & Kaplan, 1989; Herzog & Leverich, 2003; Stamps, 2004)). Abkar et al. (2011) also did not find legibility influential in predicting preferences for urban built scenes.

Openness is a key driver of preferences (Appleton, 1975; Nasar, 1983; Kaplan & Kaplan, 1989). People prefer moderate openness, and preferences were low for blocked and open undefined views for both natural (Kaplan & Kaplan, 1989; Zube, Pitt, & Anderson, 1974) and urban environments (Herzog, 1992; Im, 1984; Nasar, 1997, 1998). Blocked scenes are less preferred as they limit the ability to see or move and can cause unsafe feelings (Fisher & Nasar, 1992). In a wide-open setting, it may be difficult for viewers to find their way, due to the lack of distinguishing features (Kaplan & Kaplan, 1989).

Openness of an urban view depends on the density and configurations of buildings (Hur, Nasar, & Chun, 2010), as well as the storey level where the window is located (Kfir et al., 2002). Kim and Wineman’s research (2005) found an upward positive relationship between number of floors in a building (access to improved skyline and cityscape views) and the assigned property value. Hellinga and Hordijk (2008) asked their respondents to choose which of six pictures they preferred most and least as a view from their offices. A wide view from a high floor was the most appreciated and a view from the ground floor to a close building was preferred the least. Participants in Haber’s research (1975) identified scenic views and the ability to see the distance as the most liked features of tall buildings. However, Jacobs et al. (2012, p. 179) found a high and expansive view from a high-rise building may initially cause fear and anxiety: “at first I wouldn’t open…the window and look down. It was so scary. But now it is just too beautiful” said a resident.
(Ibid, p. 179). A positive relationship was found between age and preferences of high-rise views (Haber, 1975).

Ozdemir (2010) found identical offices to be experienced differently, depending on their views. Office workers with open expanded views perceived their rooms to be larger and lighter, and thus more satisfying, than those with closed views (Ozdemir, 2010). Hellinga (2013) found an increase in the diversity and openness of views enhances the view quality ratings. She explained the results by suggesting that obstructed views are low in mystery, complexity, and legibility (Ibid). Meerdink et al. (1994, as cited by Hellinga, 2013) found that the feeling of openness was strongly limited when a feature totally filled a view and when the sky could not be seen. This can make a view less satisfactory.

Markus (1967, p. 103) proposed that a view incorporating “a layer of ground, a layer of city or landscape, and a layer of sky” is preferred to views that include only one or two layers. Tuaycharoen (2006) found that images of urban scenes with these three layers were rated more attractive than those with one or two layers. She explained her results by arguing that images with three layers demonstrate the clearest three-dimensional space of the landscape (Ibid, pp. 126–127). Hellinga (2013), similarly, found pictures containing three layers – the sky, distant city or landscape and the ground – had higher ratings than pictures lacking one or two of these layers. To assess the relationship between horizontal stratifications of a view and its preferences, one needs to evaluate the view in a two-dimensional manner, which is not how individuals experience their windowscapes.

Based on the literature reviewed, the relationship between spatial configuration and preferences is unclear; as Gifford (2007, p. 84) says it can be concluded that “mystery, complexity, coherence and legibility are differently related to preference in different kinds of environments, rather than having the same relation to preference in all environments.”

2.5.2 The Influence of Types of Observer on Preferences

Research on how the characteristics of observers influence their landscape preference is relatively limited. Lothian (2000) noted that, in 191 preference studies on natural landscapes, only 37% collected data on the demographics of the research participants. The
majority of those studies used demographics only to assess whether the sample was representative of the population. The lack of such research is mostly the result of evolutionary-based theories suggesting visual preference is an innate part of the human evolutionary survival kit. Indeed the high degree of consensus found in preferences for natural landscape (Stamps, 1999) can be considered to result from evolutionary adaptation.

Due to limited research on urban situations, it is not clear whether or not there will be a consensus in preferences for urban landscapes. Bourassa (1990, p. 806) argues, “it seems likely that natural landscape are experienced largely in the biological mode, whereas urban landscapes are experienced preliminary in cultural mode.”

Age seems to influence preferences. Research shows that preferences in young children [6 - 11 years] differ from adults (Balling & Falk, 1982; Lyons, 1983; Zube, Pitt, & Evans, 1983). Dearden (1984) found no significant effect of adult age on preferences for natural and urban landscapes. However, since the influence of age, gender and income on urban landscape preferences was close to significant level, he advised further research. Stamps’ (1999) meta-analysis also points to the need for further investigation in this area. Newly published research on different types of green roof reported significant differences between preference ratings of adults and adolescents (Fernandez-Cañero et al., 2013).

Evidence concerning the effects of gender on preferences for natural landscape is inconclusive. Several studies have identified gender as one of the predictors. For instance, in a study of pictures of natural environments, preference for green scenes was slightly higher in women than in men (Lyons, 1983). Hull & Stewart (1995) reported that in hiking a natural area males were more likely to be viewing the ground, topography and ephemeral objects. Strumse’s study (1996) on agricultural landscapes found scenes of grassy fields and flowers were preferred by women. Lothian (2000) reported gender as the only characteristic of respondents (among age, income, country of birth and childhood background) that had a statistically significant influence on preferences.

However, gender was found to be an insignificant factor in evaluating scenes from mountainous landscapes (Tips & Savasdisara, 1986) as well as wilderness and rural
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Landscapes (Dearden, 1984). Brush et al. (2000) and Surová & Pinto-Correia (2008) also did not find gender an influential determinant of preferences for natural landscapes. In addition, the meta-analysis conducted by Stamps (1999) showed that gender had a negligible effect on landscape preferences.

The literature on the effect of gender on preferences for urban landscapes is equally confusing. K. Yu (1995) found gender had no significant influence on preferences for scenes of a Chinese national park. Conversely, a study on the perception of respondents about pictures of an urban park in Britain found a remarkable difference in the safety and preference ratings of males and females (Jorgensen et al., 2002). Research on preferences towards different types of green roofs reported gender as a significant predictor of preference, as male respondents rated the non-vegetated roof slightly higher than females (Fernandez-Cañero et al., 2013). While Todorova et al. (2004) reported some differences in preferences for street planting among gender, occupation, and age, gender was found to have no effect on preferences for roadside vegetation (F. Weber et al., 2014) and urban water features (Sakici, 2014).

Level of education along with environmental experience significantly influenced preferences for an urban park (K. Yu, 1995). Buijs, Pedroli, & Luginbühl (2006) reported that more educated respondents had a narrower definition of nature and did not regard urban and rural landscapes as real nature. Farmers, older respondents and those with a low level of income and education showed comparatively low preference for wild nature (Van den Berg & Koole, 2006). In contrast younger respondents and respondents with a relatively high income and education displayed relative high preferences for wild nature scenes (Ibid). Fernandez-Cañero et al. (2013) found respondents with more education scored green roofs significantly higher in preferences than those with less education. However, Dearden (1984) and Surová & Pinto-Correia (2008) reported that education did not affect preferences for natural landscapes.

One’s occupation has been shown to affect preferences. Among six groups of individuals (dairy farmers, professional foresters, logging contractors, members of a lakes association and two groups of prospective tourists), all except the farmers chose forest as the most enjoyable landscape (Brush et al., 2000). Farmers rated farmland the highest. Lay
people and building specialists (e.g. landscape planners and architects) have been found to have different tastes in landscape preferences. For example, architects and the lay public differed in how they evaluated buildings (Devlin & Nasar, 1989). Hofmann et al. (2012) found that landscape planners preferred natural looking parks with low accessibility and high species richness, while the residents showed a greater preference for formal parks. Vecchiato (2012) found lay people assigned more positive scores to natural features (such as water bodies and meadows) and more negative scores to human-made features (e.g. modern buildings) than experts.

Some studies have shown that cultural background has an almost negligible effect on landscape preferences. Kaplan and Herbert (1987) found a high degree of similarity between landscape preferences of American and Australian subjects. Previously, Ulrich (1977) reported impressive similarities between Swedes and Americans when evaluating urban and natural landscape scenes. Italian and Australian students also had similar preferences for the same types of scenes (Purcell, Lamb, Mainardi Peron, & Falchero, 1994).

Western and non-western cultures also share similar landscape preferences. Nasar (1984), examining preferences for Japanese and American urban street scenes, found preference was associated for both groups with ratings of upkeep, prominence of nature, and absence of vehicles. However, respondents from each country rated the scenes from the other country more favourably. Likewise, Yang & Brown (1992) found regardless of cultural differences, Japanese style landscapes and presence of water were highly preferred by both Koreans and Western tourists. However, Koreans preferred Western style landscapes, while Western tourists preferred Korean style landscapes.

Several studies, however, have reported culture as a determinant of preferences. For instance, Buijs, Elands, & Langers (2009) found that preferences for natural landscape differed significantly between immigrants and native Dutch people, as immigrants showed lower preferences for non-urban landscapes. Given that the majority of the immigrants were Moslem, the results were attributed to differences in the images of nature in Islamic and Christian cultures. However, research on the effect of religion on landscape preferences to confirm this hypothesis is limited (Buijs et al., 2009; Howard, 2013).
Childhood environmental background appeared as a potential determinant of preferences in several studies. For example, Balling & Falk (1982) found a positive association between the amount of time subjects reported having spent outdoors as a child and their preferences for deciduous and coniferous forests. Fernandez-Cañero et al. (2013) found respondents who spent their childhood in a forest environment rated all types of green roof lower than those growing up in rural or urban environments. Lohr (2004), however, reported that almost all respondents expressed positive attitudes toward trees in cities, regardless of childhood exposure to plants or background.

The current place of residence seems to affect preferences but the nature of this influence is not clear. Dearden’s finding (1984) showed that those living in natural, low-density housing environments had more positive feeling toward rural and wilderness scenes than residents of high-density housing environments. Urbanites showed higher preferences for wilderness compared to rural residents, while those from rural areas preferred farming scenes (Strumse, 1996). Yoon, Kim, and Jung (1995) found urban residents rated natural features of rural landscapes highly, while rural residents preferred scenes with visible sign of development. Hoyt and Acredolo (1992) found urban residents have a higher preference for built scenes, while preference for natural environments does not depend on residence experiences.

2.6 Benefits of Preferred Windowscapes

As with the fact that not all windowscapes are equally preferred so not all windowscapes are equally beneficial i.e. their economic and psychological value depend on their content.

2.6.1 Economic Value

What is visible from a property plays a significant role in its selling price (Lake, Lovett, Bateman, & Day, 2000). A pleasant view can lead to a considerable increase in house price (e.g. Luttik (2000)), while an unpleasant view could be expected to lead to a decrease in the house price. Factors that increase the value of a property include (in descending order of importance) view to the sea, view to urban parks, view from high-rise apartments and view to sparsely populated regions (Damigos & Anyfantis, 2011). Full views to the ocean could increase the market price of single-family homes in Washington by almost 60%
(Benson et al., 1998). Similarly, a wide water view could increase the mean sale price of residential properties in Auckland as much as 44% (Samarasinghe & Sharp, 2008). In Singapore, an unobstructed sea view from a high-rise building could add an average of 15% to the property price (S. Yu, Han, & Chai, 2007).

Kim and Wineman (2005) found the extent to which rental cost of office accommodation is related to quality of view would vary depending on the type of business conducted in the building. While view is a determining factor in price structures for residential and office buildings, it has no effect on hotels. The results are explained by arguing that hotels are temporary accommodation, while residential and office buildings are more permanent.

2.6.2 Physiological Value

R. Kaplan (1993) reported that employees with desk jobs with a window to natural features (i.e., trees, vegetation, plants and foliage) had fewer ailments, were less frustrated and more satisfied with their jobs. Window views of green vegetation or water, rather than of other buildings or a brick wall, were found to have a positive effect on attention capacity (Tennessen & Cimprich, 1995). Leather et al. (1998) added to this finding by demonstrating that natural features within a view can buffer the negative effect of job stress on intention to quit and a marginal positive effect on general well-being.

The Heschong Mahone Group (2003) found a significant correlation between the content of the views and reports of fatigue, headache, difficulty concentrating and influenza. The study also found office workers with interesting views performed 10% to 25% better on tests of mental function and memory recall than those with no view. Shin (2007) documented positive self-rated health effects of viewing forests through a window on office workers in Seoul, South Korea. A cross-sectional survey on office workers in the Netherlands showed that attractive window views reduced discomfort (e.g. concentration problems and headache) (Aries et al., 2010). A recent study by Lottrup et al. (2013) showed that a view of natural elements was related to high view satisfaction, which then contributes to high work ability and high job satisfaction. Research in this area shows that an attractive windowscape is more than an amenity and underpinning this preference is
a fundamental issue of psychological well-being and physical comfort (Leather, Pyrgas, Beale, & Lawrence, 1998; Tuaycharoen & Tregenza, 2007).

Heerwagen and Orians (1986) investigated whether employees who work in windowless offices use visual decoration to compensate for the lack of having access to a window. Those who worked in windowless offices used more visual materials for decoration than occupants of windowed spaces. The content of the décor in windowless offices was dominated by nature themes. Bringslimark, Hartig and Patil (2011) reported similar results. Bringslimark et al. (2011) noted that workers in windowless offices were more likely to bring plants and pictures of nature into their workspaces than workers with windows. Radikovic (2005) argued that an artificial window video would be an excellent replacement for a window in all single-person spaces with a limited view of nature, such as underground, underwater, outer space, or just strictly urban areas. However, a research conducted by Kahn Jr. et al. (2008) showed that a plasma window was no more restorative than a blank wall.

The physiological effect of windowscape is not limited to workplaces. Patients with a view to stands of trees were found to recover faster and required less pain medication than patients facing a brick wall (Ulrich, 1984). Prison inmates whose view consisted of adjacent farmlands had lower rates of sick call than those looking out upon the prison yard (E. O. Moore, 1981). An archival study of past residents of a nursing home revealed a significant negative correlation between people view (view to parking lots, the front entrance, or a yard) and length of stay, while view of greenery had no effect on this matter (O’Connor et al., 1991).

Having natural elements in the home window views contributes substantially to residents’ satisfaction with their neighbourhood and their sense of well-being (R. Kaplan, 2001). Taylor, Kuo, & Sullivan (2002) found concentration and self-discipline of inner-city girls (but not boys) were positively affected by the naturalness of the view from their high-rise urban homes. The authors explained their results by suggesting that boys typically spent less time indoors. Residents living in greener surroundings reported to have a lower level of fear, fewer incivilities and less aggressive and violent behaviour (Kuo & Sullivan, 2001). Residents of a large metropolitan area in the U.S. rated the potential of trees for
helping people feel calmer as one of the key benefits of this natural feature (Lohr et al., 2004). Having a view over gardens has been shown to have a strong contribution to neighbourhood satisfaction (R. Kaplan, 1985, 2001; Kearney, 2006); moreover, those whose homes had access to their own garden or to shared gardens had significantly better health (de Vries, Groenewegen, & Spreeuwenberg, 2003; Macintyre et al., 2003). Surprisingly, R. Kaplan (1985) noted that urban parks and large grassy open spaces played a minor role, at best, in residents’ ratings of satisfaction with various aspects of the neighbourhood; while the availability of nearby trees and well-landscaped grounds were the two most important factors. Although, from these studies, it can be concluded that viewing natural features through windows has positive psychological effects, it is still not clear which features have contributed most (Velarde, Fry, & Tveit, 2007).

College students living on higher floor levels with open views found their dormitory rooms less crowded and got along better with their roommates (Schiffenbauer, 1979). Undergraduate university students who had views to a lake and trees from their dormitory windows were better able to concentrate than those students with views to city streets, buildings or a brick wall (Tennessen and Cimprich, 1995). Students who were asked to imagine themselves cognitively fatigued, rated settings with views of large natural murals with water more restorative than settings with window views of real, but mundane nature with built structures present (Felsten, 2009).

There is a series of laboratory studies that adds to our understanding of the psychological value of viewing attractive scenes. For instance, experimental research by Tuaycharoen and Tregenza (2007) found less discomfort to be caused by glare from a window when the window offered an interesting view than from a window of the same mean luminance but with a view of less interest. The authors previously conducted a similar study in a laboratory condition with images of scenes, which led to similar findings (Tuaycharoen & Tregenza, 2005). Purcell, Peron and Berto (2001) found nature scenes with water were rated higher in restorativeness than nature scenes without water. Karmanov and Hamel’s (2008) study added to this finding by showing urban environments with an outlook onto water could have the same stress-reducing and mood-enhancing power as a
natural environment. This may suggest that water bodies can compensate for the lack of greenery in urban environments.

2.7 Summary

2.7.1 Key Findings

The key findings regarding landscape preference theories are:

- According to evolutionary-based theories, preferences depend on landscape features and their spatial configuration. None of these theories, however, recognizes the importance of cultural and individual differences in preferences.
- The tripartite theory argues that preferences for landscapes are determined by biological, cultural and personal factors. However, little is known about how to apply this model in empirical studies.
- While all landscape theories proposed so far have their limitations and deficiencies, they can be blended together to formulate a more comprehensive theoretical framework.

The key findings from the literature review on methods and instruments used in landscape studies are:

- Psychophysical and psychological approaches are considered the most appropriate for assessing preferences. These approaches have been endorsed for their robustness, due to using statistical analyses and linking landscape characteristics to preference responses. However, both only collect quantitative data and hence miss valuable qualitative information about the landscape assessment. Moreover, psychophysical and psychological approaches both underestimate the importance of observers’ characteristics on preferences, arguing that these emotional responses are tied to our evolutionary roots. Psychological methods also have been criticised for using abstract variables without strong links to measurable features of landscapes.
- Numerous techniques for evaluating landscape visual quality have been used within psychophysical and psychological approaches. None of these methods, however, is complete and each has its advantages and limitations.
The majority of the studies used methods that are passive in two senses: they are conducted in laboratory settings where observers can view the scenes remote from their everyday meanings; these methods do not allow the participants to actively detect and identify factors influencing their preference responses.

The photographic evaluation method, the traditional preference technique, has several issues associated with urban landscape sampling and using colour photographs to represent everyday scenes. These limitations call into question the validity of this method for determining preferences, particularly in an urban situation. Based on these criticisms, only field-based methods should be used for assessing urban landscapes.

Field assessment methods and VEP are relatively expensive, time-consuming, and difficult to organise on site. Nasar’s method, although highly promising for assessing urban scenes, may have limitations arising from the fact that the data cannot be analysed statistically. Moreover, the data obtained loses the particular viewpoint from which the landscape is viewed; hence, the method only can provide general information on visual quality of the city.

This thesis agrees with Hellinga and Hordijk (2014) that a comprehensive method to assess which characteristics of the view influence preferences does not exist. The majority of methods used so far have provided a list of possible features one could view out of the window and asked participants to evaluate them. This approach can introduce bias to the survey results depending on the wording (e.g. Markus' study, 1967). Moreover, using these lists only provides general information about preferences for windowscape features, while visual qualities and contextual surrounding which can influence preferences remains unknown.

Windowscape methods similar to those used in landscape studies have emphasized biological explanations at the expense of those related to cultural and individual experiences.

The literature study on factors influencing landscape preferences leads to the following key findings:
• The presence of natural features (sky, mountains, greenery and water) is likely to enhance the likeability of urban scenes.

• Not all kinds of greenery are equally preferred. Large, non-obscuring trees are the most liked and lawns are the least liked types of greenery.

• Buildings at a close distance are likely to have a negative influence on the visual quality of urban scenes. However, people like to view landmarks buildings with historical or architectural values. A panoramic view of cityscape is also liked.

• The presence of parking lot and traffic are found to have a negative effect on preferences for a scene.

• Besides the content, the spatial configuration of an urban scene also influences its perceived quality. Mystery, coherence, and legibility are not strong predictors of preference for urban scenes, whereas openness and complexity are found to be a significant driver particularly for urban windowscapes.

• Age, level of education, occupation, childhood background, and current place of residence are found to have an effect on landscape preferences. Culture seems to have no influence on preferences, while the role of gender on landscape preferences is not clear.

The key findings regarding the benefits of preferred views are:

• Views to certain features can increase rental and sale prices of buildings.

• The inclusion of natural features within a view has an influence on physical and psychological well-being of office workers, and urban residents.

2.7.2 Theoretical Framework

The decision was made to develop a method for the analysis of urban landscape visual quality, which can benefit from the advantages of both psychological and psychophysical model. The complex nature of everyday urban landscapes, however, mandates more complex research design and hence, both qualitative and quantitative data need to be collected (mixed-method approach). Based on these arguments, the proposed method should:
1) Identify the influence of physical properties of landscape such as trees, sky, buildings on preferences, as such findings can be used for practical purposes in planning and architecture;

2) Use the spatial arrangement of landscape features (openness and complexity) in a way that the results can be used for practical applications;

3) Consider possible effect of observers’ variables on preferences;

4) Allow dealing with actual scenes that are viewed daily;

5) Use a quantitative technique to measure preferences, allowing statistical analysis to determine the significance of the relevant variables; collect qualitative data that can capture how the landscape has been experienced. Given that few others have attempted to measure the visual characteristic of urban environments in a mixed-method approach (Ferdous 2013), this research can act as a foundation for future research.
Chapter 3. Method

The purpose of the present chapter is to give a detailed account of the research design of the study. In the first part, literature gaps and the research questions are reviewed. The procedure of developing the original method, Active Perception Technique (APT), is then explained, with a description and rationale for each of the research instruments employed in the study. A detailed strategy of the sampling process and the characteristics of the research participants are provided. The procedures for data collection and analysis are then described. The final section of the chapter discusses strategies used to enhance the quality and ethical integrity of the project to ensure trustworthiness of the results.

3.1 Study Objectives and Research Questions

This section addresses the major gaps and issues identified in the literature review:
First, the research on environmental preferences to date has tended to focus on natural and rural environments and there is limited research in urban and suburban (mixed) settings (Galindo & Hidalgo, 2005; Hidalgo et al., 2006; Kaymaz, 2012). Kaymaz (2012) remarked that this is because “it is rather difficult to measure and assess landscape preference determinants in urban landscapes,” due to the highly complex structures of urban areas, with too many kinds (both natural and cultural) of elements.

Second, researchers argued that, since the photo-protocol studies record responses to pictures of landscapes rather than the more rounded and holistic experience of the landscapes (Brook, 2013; Fenton & Reser, 1988), there is no justification to use their findings to influence public landscape policy (Porteous, 1996, p. 143). In other words, there is a need for further research into respondents pursuing “their normal activities in real situations” (Ibid). As Fenton and Reser (1988, p. 110) observe, “There is an urgent need for an interactive theoretical and methodological approach to environmental perception, which would recognize that there is a perceived as well as the real world to which we respond”. Accordingly, the aim of this research is:

- To establish a method to investigate preferences for urban scenes that are experienced daily

In order to address the aim of this thesis, the focus is particularly on urban window-views. Urban windowscape is a subset of urban environments that people view daily. The first leading research question is: How does a daily observer perceive and respond to his/her windowscape? This question is divided into three sub-questions:

1. Which visual features of physical environments are influential in affecting the preferences of windowscapes?

2. What are the most and least preferred features of windowscapes? Does the context\(^1\) of windowscape have any effect on recognizing and preferring these visual features?

\(^1\) “Every act of perception is made in the light of context and experience. For each individual, the context includes whatever tasks are currently engaging in and expectation of the future and experience of the past” (Thompson, 2013, p. 31).
3. What is the relationship between observers’ characteristics and windowscape preferences?

This thesis argues that landscape perception is an active process (Millman, 2012), where the viewer determines what is worth seeing and comprehending (Bell, 2001). Dealing with urban landscapes viewed daily with both permanent and dynamic parameters, each encounter may have a different effect on the viewer. Or as Lowenthal (2007, p. 636) puts it, “Wind and weather, light and shadow, clouds and sky, seasonal foliage, the disposition of birds, animals and people make each glimpse a new scene, even when seen repeatedly from the same spot.” In each encounter with the landscape, some features are noticed, and others overlooked. A memory of a landscape is formed by overlaying layers of perceived glimpses. To measure urban landscape preferences, the continuing interaction between a person and the landscape should be taken into account, but focus on overall experiences of the landscape. This explanation raises the second question: how to capture observers’ encountered experiences as a whole?

3.2 Technique Development

3.2.1 Background to the development of the technique

To reach the objectives of this study, an innovative technique is desired that can:

- Capture the influential visual features of windowscape (the generalized mental picture of the outdoor view),
- Explore affective responses to those features and their effect on overall preferences of windowscapes,
- Detect differences between actual views that are out there and the perceived views.

Based on these points, Active Perception Technique (APT) was developed as the main instrument of the research. While the underlying idea of this method stems from Kevin Lynch’s (1960) seminal work, Image of the City and Nasar’s (1990) study, The Evaluative Image of the City, APT can be viewed as an extension and complement of Pocock’s studies (1982a, 1982b).
From the overall experiences of windowscapes, the thesis is focused on those features that stand out from views and stay in one’s mind. It is assumed these features are more important in affecting preferences towards a scene being viewed daily. With a similar aim in mind, Kevin Lynch (1960) was interested in how people make sense of the vast amount of visual information in a city. He proposed the concept of environmental image, a generalized mental picture of the exterior physical world. Based on this idea, Lynch pioneered a sketch map technique to capture visible elements that contribute to a person’s environmental image of a place. He asked inhabitants of particular cities to draw a quick sketch of their city as if they are making a rapid description to a stranger. Lynch’s analysis predominantly deals with the effects of physically perceptible objects and the relation between image and physical form. His findings demonstrated that differences exist between the actual and the perceived city. He also pointed out the attractive elements in the city and some problematic points for orientation, because of features lacking in distinctness and identity. Since this seminal work, sketch-based technique is a frequently used method to externalize a subject’s mental representation of an environment. To Tuan (1975, p. 206), sketch maps are “cartographic representations of how people differ in their evaluation of places.” The main benefit of the technique is its focus on elements selected by respondents rather than the researcher (Ramadier & Bronner, 2006). It is easy to organize and administer due to short and simple instructions (Chiodo, 1993; Ramadier & Bronner, 2006). Moreover, it allows respondents to visually express issues in a fun and creative way; therefore, it is more pleasurable and less repetitive and tedious than other survey instruments (Baird, 1979; Ramadier & Bronner, 2006).

While the sketch-map technique can to some extent satisfy the first aim of the research and help visualize and capture one’s subjective way of seeing a windowscape, it does not reveal how windowscapes are visually evaluated by their daily observers. Addressing this deficiency in Lynch’s technique, Nasar (1990) argued the city image theory must be tempered by the emotional meaning that an individual brings to the image. He (1990, p.42) further explained, “Humans have feelings both negative and positive, about their surroundings and the imageable elements. In fact, evaluation is central to our perception of and reaction to the environment.” Nasar (1990) extends the work of Lynch by asking residents of two cities to identify areas they liked visually and areas they disliked, and to
describe the physical features accounting for their evaluation. He called this aspect of city image “likeability,” the probability that an environment will evoke a positive evaluative response among the people experiencing it.

Lynch and Nasar research focused on broad aspects of a city, such as roads and districts, and dealt with map-like images which are much bigger than mental images of windowscapes. Lynch and Nasar’s studies assume that subjects have a map-like representation of their environment. Through the abstraction process of mapping techniques, subjects must put aside viewpoints of their mental pictures and transform their collections of mental pictures, obtained from direct experiences, into a sketch-map. This level of abstraction is undesirable for current research: we are interested in sketches that are as close as possible to individuals’ mental pictures of views. Viewscape is an entirety of the landscape visible from an observation point (Burcher, 2005, p. 2); therefore, vantage point is of a crucial importance. These scenic sketches are comparable to photographs taken from the same vantage point and can be compared against them to detect differences between the perceived view and the actual view.

The study of such sketches is similar to that of Pocock (1982a, 1982b); however, his strategy of data collection and analysis needs to be adjusted to the context of this research. Pocock compared on-site impression of a historical tourist attraction with subsequent recall of the experience. The study was in two phases. First, people who took a photo of a particular historical attraction scene were asked to draw from memory the main features of the photographed view after they had left the city but before seeing their photographs. Pocock compared these sketches with the photographs he had taken from the scene. In the second phase, with their photographs of the scene to hand, respondents were asked to compare their remembered experiences with their photographs in a reflective essay. While APT is using both sketches and photographs, it was decided to not to ask participants to write a reflective essay. This decision was made because of the differences in objectives of the studies. Pocock (1982a) was interested to find how visitors (mostly tourists) remembered a historical scene viewed for the first time and how they contrasted their memory of their experience with the photographic record taken from the scene as a souvenir. Therefore, essays reflect subjective comparisons, which to some extent reveal
preferential values for features within the scenes. In the present study, more robust and useable information of the preferential values can be obtained using Nasar’s method. Moreover, the focus here is on scenes viewed daily; participants have enduring relationships with the views as opposed to one-off experiences. Photographs in APT are accordingly proposed as an instrument to facilitate objective comparison of the views with sketches. The process of developing APT is presented in Figure 3-1.

Based on what has been discussed, APT is proposed as a practical empirical research method to externalize a mental picture of a windowscape, to explore subjects’ emotional attachment towards their windowscapes and contents, and to compare differences between perceived views with actual views. As Figure 3-1 shows, APT has three main steps and consists of a combination of a brief sketch, rating scale, and photography. Detailed description of research instruments follows below.
Figure 3-1 The process of developing the Active Perception Technique
3.2.2 Active Perception Technique (APT)

Sketch mapping is easy to organize; however, caution should be made when instructions are given to participants. Instructions can influence the quality and detail of sketches being produced and consequently the results of the study. In Image of the City, Lynch (1960) provided his respondents with very precise instruction for drawing their sketch-maps (p.141):

We would like you to make a quick map of central Boston, inward or downtown from Massachusetts Avenue. Make it just as if you were making a rapid description of the city to a stranger, covering all the main features. We don’t expect an accurate drawing—just a rough sketch. [Interviewer is to take notes on the sequence in which the map is drawn.]

A literature survey was conducted to assist in framing the instruction for sketching technique of current study. From those publications, that provide detailed instruction on drawing technique, six key concepts were detected. These include asking participants to:

- Draw unaided using their memories (Goodey, 1974; Pocock, 1982a, 1982b; Smiley, 2007),
- Try to cover all the significant features (Annechino & Cheng, 2011; C. Chen, 2011; Gentry, 2010; Goodey, 1974; Gray, 1998; Lynch, 1960; MacKay & Olshavsky, 1975; Omer, Goldblatt, Talmor, & Roz, 2006; Ommen & Painter, 2005; Pocock, 1982a, 1982b)
- Note the sequences in which features are drawn (Demick, Hoffman, & Wapner, 1985; Lynch, 1960; Ommen & Painter, 2005; Ramadier & Bronner, 2006),
- Label the elements (Castillo, 2006; C. Chen, 2011; Gentry, 2010; Young O. Kim & Penn, 2004; Long, 2007; Matthews, 1980; Ommen & Painter, 2005),
- Not to worry about the aesthetic quality of their sketches (Goodey, 1974; Gray, 1998; Lynch, 1960; McLees, 2012; Pocock, 1982a, 1982b; Smiley, 2007),
- Draw as if they are drawing for a friend, a stranger, or a visitor (C. Chen, 2011; Demick et al., 1985; Goodey, 1974; Gray, 1998; Young Ook Kim, 2001; Young O. Kim & Penn, 2004; Lynch, 1960).
Some of the studies also restricted their subjects to a certain amount of time (5-20 min) (e.g. Matthews, 1980; Baskaya, Wilson, & Özcan, 2004; De Witte et al., 2006) and features (6-15 items) (e.g. Omer et al., 2006; Owen, 2005); others provided no constraints. It was decided to leave participants open on the amount of time and effort they want to put into their sketches. This is appropriate because the contents of windowscapes and subjects’ sketching abilities— the two main influential factors on these matters— are varied. Based on the literature, the exact wording of the instruction was derived (see Figure 3-2 below also see Appendix A).

1. By using your memory, could you please sketch or quickly draw the most significant elements of the view seen from your [office or room/living room]? What are the most significant features that jump to mind should i.e. a friend ask you about your window-view?
2. Please rank these elements your emotional reaction to each item in your view. (“Strongly Like”, “Like”, “Not Sure”, “Dislike” and “Strongly Dislike”)
3. Please describe your overall feeling about your [office or room/living room] window view and your house in general.

These questions were placed in a grey text-box of 10x18cm² on the left hand side of the drawing sheets. A 15x15cm² grid pattern covered the rest of the page with a note on top: “Please NUMBER and LABEL each element as you draw” (See Figure 3-3).
Labelling the features was not sought by initial researchers using sketch-mapping technique. However, the importance of labelling became evident over time, as some researchers argued that differences in drawing ability may confound sketch output and consequently the result of the study ((Golledge, 1976; Bell et al., 1990; Long, 2007)). As a response to this criticism, sketch mapping is usually combined with other methods such as written description, free recall, and labelling. Using labelling also can help coding the process and provides a deeper insight into how each feature has been perceived.

It is a common practice to provide participants of the study with a blank A4 paper to draw their sketches (e.g. Baskaya et al., 2004; Ommen & Painter, 2005). However, Jorgensen (2010) reported that blank paper usually results in difficulties. Orleans (1973, p. 129) remarked, “a blank sheet of paper as a stimulus for obtaining a mapped image of the city is more of a liability than an asset.” However, his recommendation of providing participants with maps showing streets and important landmarks cannot be used in the current study. Pocock’s (1982a, p. 15) approach was to provide a frame for his participants to draw their sketches: “Imagine the frame drawn below is that of your photograph from Prebends Bridge. Could you sketch...?” Give that in the present study windows are of a different size and shape, our solution was to provide a grid-pattern on the paper. The grid was assumed to help respondents with their drawings as well as reduce their possible fear of the blank page.

Researchers also usually assured their participants that no artistic ability is required for drawing and there is no right and wrong answer. Pocock (1982a, p. 15) said: “Only the barest of outline is requested: few of us are artist!” This helps to establish a rapport between the researcher and participants and positively affects the credibility of the research (see Section 3.6.1.1). Accordingly, at the beginning of the drawing activity, participants were advised and informed verbally that the analysis is based on contents and not the beauty of their sketches.

To make sure the sketches come from memory, researchers had different approaches. Goodey (1974, p. 82), in the newspaper advertisement asked his respondents to “do not make use of official maps, an A-Z street guide, photographs or drawings. Nor need you pay special attention to the city if you are going there today.” In one-to-one interviews,
participants were supervised to ensure they would not get help from any material for drawing their sketches.

### 3.2.2.1 Selection of Rating Scale

To measure the evaluative image of cities, Nasar (1990) used a pair of adjective words with opposite meanings (like-dislike) but suggested that his method could be improved by asking participants about the intensity and weight of their preferences. Accordingly, in this research, Likert’s scaling method was selected to measure respondents' preferences for their window views (see Figure 3-2, question 2). Rating scales have been widely used in landscape preferences research as a means of recording judgments about landscape settings. No consensus was found in the literature concerning wording and rating scale formats (see Table 3-1). The positive end of the scale was located either on the extreme right or the extreme left. Seven to eleven-point scales have been frequently used in recent literature, while a five-point scale is the most common one.

A fully labelled five-point Likert scale is preferred for this study; since it creates a degree of likeability (the degree to which one likes or dislikes) for each feature, while the seven or more scale labelled at endpoints creates end values. Fully labelling makes the scale more directly interpretable and direct summaries of responses, e.g. mediums and percentage, can be reported (Weijters, Cabooter, & Schillewaert, 2010). In addition, a five-point scale allows a neutral midpoint for respondents who may truly be neutral regarding a feature. Using midpoints makes respondents more comfortable (Nunnally, 1978) and it would be unlikely for them to experience task-related distress when they are forced to choose (Weijters et al., 2010). It worth mentioning that the reliability and validity of the method are independent of the number of scale steps employed for Likert-type item (Matell & Jacoby, 1971).
A rating scale for measuring the evaluative quality of features and windowscapes (Figure 3-4) was placed at the left side of the relevant pages with the following instructions: “Please specify your emotional reactions to each element of your view using following rating scale.” This is a similar rating scale format as Todorova et al. (2004). Literature suggests that there was no difference in preferences for formats and different formats do not influence the results (Blumberg, DE Soto, & Kuethe, 1966; Dixon, Bobo, & Stevick, 1984). No numeric values were assigned to Likert scale responses, and instead, it

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<th>Scale</th>
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<tr>
<td><strong>Five-point scale</strong></td>
<td>“Not at all” to “A great deal”</td>
<td>(Herzog, 1985, 1989; Herzog &amp; Barnes, 1999; Herzog, Chen, &amp; Jessica S. Primeau, 2002; Herzog &amp; Gale, 1996; R. Kaplan &amp; Kaplan, 1989; S. Kaplan et al., 1972)</td>
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<td>“Not at all” to “Very Much”</td>
<td>(Verderber, 1986; R. Kaplan &amp; Herbert, 1987; Ma Paz Galindo &amp; Hidalgo, 2005; Tveit, 2009)</td>
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<td>“Preferred not at all” to “Preferred very much”</td>
<td>(Hammitt, 1979; Yang &amp; Brown, 1992; Zheng, Zhang, &amp; Chen, 2011; Fernandez-Cañero et al., 2013)</td>
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<td>“Strongly like” to “Strongly dislike”</td>
<td>(Todorova et al., 2004)</td>
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<td></td>
<td>“Beautiful” to “Ugly”</td>
<td>(Akalin, Yildirim, Wilson, &amp; Kilicoglu, 2009)</td>
</tr>
<tr>
<td><strong>Six-point scale</strong></td>
<td>“Most preferred” to “Least preferred”</td>
<td>(Nasar &amp; Hong, 1999)</td>
</tr>
<tr>
<td></td>
<td>“Extremely desirable/beautiful” to “Extremely undesirable/not at all beautiful”</td>
<td>(Balling &amp; Falk, 1982; Lyons, 1983; Van den Berg &amp; Koole, 2006)</td>
</tr>
<tr>
<td><strong>Seven-point scale</strong></td>
<td>“Not at all beautiful” to “Very beautiful”</td>
<td>(van den Berg &amp; Vlek, 1998)</td>
</tr>
<tr>
<td></td>
<td>“Very unpleasant” to “Very Pleasant”</td>
<td>(Nasar &amp; Terzano, 2010)</td>
</tr>
<tr>
<td></td>
<td>“Do not like at all” to “Like very much”</td>
<td>(Kaltenborn &amp; Bjerke, 2002)</td>
</tr>
<tr>
<td></td>
<td>“Not at all” to “A great deal”</td>
<td>(Abkar et al., 2011)</td>
</tr>
<tr>
<td><strong>Nine-point scale</strong></td>
<td>“I dislike” to “I like this spot very much”</td>
<td>(Lückmann, Lagemann, &amp; Menzel, 2013)</td>
</tr>
<tr>
<td><strong>Ten-point scale</strong></td>
<td>“Low scenic beauty” to “High scenic beauty”</td>
<td>(Hill &amp; Daniel, 2007)</td>
</tr>
<tr>
<td></td>
<td>“Not at all like this place” to “Completely like this place”</td>
<td>(Tenngart Ivarsson &amp; Hagerhall, 2008)</td>
</tr>
<tr>
<td></td>
<td>“Not attractive at all” to “Extremely attractive”</td>
<td>(Buijs et al., 2009; M. White et al., 2010)</td>
</tr>
<tr>
<td><strong>Eleven-point scale</strong></td>
<td>“Not at all like this place” to “Completely like this place”</td>
<td>(Bodin &amp; Hartig, 2003)</td>
</tr>
</tbody>
</table>
was decided to use letters to represent each scale. This was done to prevent confusion between preferences toward features and the number representing the drawing sequences. Since the numbers in Likert scale do not represent the actual value, using letters instead of numbers is acceptable (Breakwell, 2008). For the data analysis, responses were recorded as A = 5, B = 4, C = 3, D = 2, and E = 1. Participants were also asked to rate their feelings towards their view in general using the same Likert scale. The main difference from and advantage over previous pictorial stimuli studies is that subjects first evaluate each memorable feature and then evaluate the scene in general. Therefore, the analysis can be based on those influential features that affect windowscape preferences, rather than all the features within the actual views.

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Like</td>
<td>Like</td>
<td>Not Sure</td>
<td>Dislike</td>
<td>Strongly Dislike</td>
</tr>
</tbody>
</table>

Figure 3-4 Rating Scale

3.2.2.2 *Photographs*

Photographs still play a role as a research instrument in this study, though the use differs from photograph study protocols. Traditional protocols see photographs as a reasonable surrogate of the physical environment. In this research, photographs are viewed in the way that has been described by Pocock (1982a, 1982b) and his participants: a tool incapable of discriminating, which merely records everything in one instance. A photograph, therefore, is considered as an objective, representation of the view outside the window. Photographs capture exactly what is there to be seen and are compared against sketches to gain insight into the differences between the objectiveness of the environment and the subjective way of seeing the windowscape (or reconstructed image of the view). In particular, this thesis was interested to find: what features either went unnoticed and became invisible to the eye captivated by other features or considered unimportant to be drawn; what features are more emphasized and exaggerated as the sign of high levels of enjoyment. A comparison needs to be made between the representations of views (photographs) and the representations of mental images of the views (sketches).

Photos were to be taken after the completion of sketches. Participants were asked to provide reasons regarding omission of office-view features (See Figure 3-5), if needed. For
convenience purposes, respondents were requested to take photos of home views and email them to me. Photos were also used to analyse sketches in terms of content inaccuracy (e.g. details and size of the drawn features). Such errors and distortions are argued to determine respondents’ degree of “impressiveness and significance” of those features (Pocock, 1982b).

Figure 3-5 An example where participant forgot to include the street in his office-view sketch

3.2.3 Designing the questionnaire (Personal Lifeworlds)

The aim of the questionnaire was to attribute the relative importance of participants’ characteristics upon their landscape preferences. The questionnaire comprised four main parts: (a) university lifeworld, (b) current residency lifeworld, (c) childhood lifeworld, and (d) personal information. Lifeworld is a phenomenological concept, and is defined as “The taken-for-granted dynamic of everyday experience that largely happens automatically, without conscious attention or deliberate plan” (Seamon, 2004, p. 123). Each person may inhabit different lifeworlds at different times of the day, such as the lived world of the home and the lived world of work (Schütz & Luckmann, 1973; Van Manen, 1997, p. 101). The participant information sought is summarised in Table 3-2. Given the

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>University Lifeworld</strong></td>
<td></td>
</tr>
<tr>
<td>Faculty</td>
<td>9 + others</td>
</tr>
<tr>
<td>Studying towards the degree</td>
<td>4</td>
</tr>
<tr>
<td>Length of time in Workplace</td>
<td>4</td>
</tr>
<tr>
<td><strong>Current Residency Lifeworld</strong></td>
<td></td>
</tr>
<tr>
<td>Suburb of residency</td>
<td>8+ others</td>
</tr>
<tr>
<td>Current housing type</td>
<td>5</td>
</tr>
<tr>
<td>Having a personal garden</td>
<td>2</td>
</tr>
<tr>
<td><strong>Childhood Lifeworld</strong></td>
<td></td>
</tr>
<tr>
<td>Hometown</td>
<td>Open question</td>
</tr>
<tr>
<td>Childhood housing type</td>
<td>5</td>
</tr>
<tr>
<td>Had a personal garden</td>
<td>2</td>
</tr>
<tr>
<td><strong>Personal Information</strong></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>4</td>
</tr>
<tr>
<td>Gender</td>
<td>2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>5 + other</td>
</tr>
</tbody>
</table>
respondents were students, it was necessary to assess if there were differences that were attributable to lived experiences at university. The question relating to the country and place was open-ended. Participants were particularly asked to name the place (city/town or village) where the respondent resided the longest before the age of 15.

Participants were also asked to specify the housing types where they were currently living and where they spent most of their childhood (Figure 3-6). Participants were also asked to draw their favourite windowscape of that childhood house. These sketches, however, were treated differently from home and office sketches and were merely used for categorization purposes regarding their urban backgrounds. At the end of the questionnaire, participants were asked to state some personal details related to their age, sex and ethnicity.

3.3 Study Sites and Participants Selection

The study was conducted in two Auckland-based universities. A target population was identified as postgraduate research students, who had been assigned university workplaces in rooms with outdoor views. It was decided to use postgraduate students because they are the only students who are usually assigned fixed workplaces at universities and usually spend most of their times within their workplaces. Postgraduate students are from more culturally and geographically diverse regions than undergraduates due to university and government policies. This provides the opportunity to explore possible effects of their urban background on windowscapes preferences.

Initially, the respondents were recruited by using a combination of voluntary-response sampling and snowball sampling. This sampling procedure was appropriate for this study for two reasons: this sampling procedure requires no sampling frame, which corresponds to the lack of a list of research postgraduate students who had workplaces

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Figure 3-6 Housing Types
with access to windows; participation needs to be voluntary for ethical concerns. A voluntary response sampling is one of the most common forms of convenience sampling, made up of persons who select themselves into the study. Snowballing is a technique for developing a research sample where existing study subjects recruit future subjects from among their acquaintances (Merriam, 2009). Snowballing is particularly useful in situations where members of a population are difficult to locate. The rules of snowball sampling method outlined by Applicant’s Manual of University of Auckland Human Participants Ethics was followed (UAHPEC, 2013, p. 22). Hence, the existing participants were asked to approach potential participants with information about the research and ask those who interested to contact the researcher directly. Due to the qualitative nature of the study, participants were not expected to constitute a representative sample. However, individuals with different ethnicity and educational backgrounds and genders were recruited. As the research progressed, additional participants were recruited by purposeful sampling in order to achieve desired diversity of urban backgrounds. Purposeful sampling refers to the intentional selection of respondents based on key characteristics, Patton (2002) explained that this method can be used to maximize diversity within the participants sample. In this study, 30 participants were recruited using this method for a total of 158 respondents.

3.3.1 Participants’ characteristics

158 postgraduate research students of two different Auckland-based universities have been interviewed. A summary of the characteristics of respondents is shown in Table 3-3. The distribution of participants across gender was evenly balanced with 51% female and 49% male. Most of the participants were in the age group of 26-35 (93 students, 59%); followed by the group <26 (48 students, 30%) and only 11% were above the age 36. The large proportion in the age groups >25 and 26-35 was predictable as the research was targeting postgraduate students. There is an even distribution of subjects across age groups and gender (see Table 3-3); no statistically significant differences between these groups were found ($\chi^2(2) = 0.44, p = 0.8$). The study participants were ethnically diverse (32% Far East, 24% Pakeha, 19% European, 13% Middle East, 12% other).
73% of the respondents were PhD candidates and 20% were pursuing Master’s Degrees; 7% were either Honours students or Post-docs. Participants were mostly from the faculties of Science (24%), National Institute of Creative Arts and Industries (NICAI) (22%), Engineering (16%) and Bioengineering Institute (12%). The low response from postgraduate students in the University of Auckland Business School is due to the school policy that the research advertisement could only be distributed through the School Facebook page. The research also was relatively unsuccessful in attracting the postgraduate students of faculties of Education, Arts and Medical and Health Sciences, despite advertisement distributions using emails, online notice boards and networking sites.

In terms of urban background, participants are fairly well distributed, with 53% being less urbanized. The classification for urban background was based on several questions in childhood lifeworld section. Participants who lived most of their childhood in apartments within cities or mega-cities and had no access to private gardens were classified as more urbanized, whereas those who lived in standalone houses within village, suburbs and towns were categorised as less urbanized. To ensure the accuracy of this classification, participants’ memory of their childhood windowscapes were also taken into consideration.

95% of the respondents were studying within the University of Auckland, and only eight respondents were recruited from another Auckland-based university (University A). The low response to the survey from University A is due to the use of different recruitment strategies. The local Ethics Committee refused to grant permission to circulate the research advertisement through an email among postgraduate students. The use of other methods of recruitment, online noticeboards and networking sites, were not very successful.
Table 3-3 Respondents’ characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual Characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;26</td>
<td>48</td>
<td>30%</td>
</tr>
<tr>
<td>26-35</td>
<td>93</td>
<td>59%</td>
</tr>
<tr>
<td>36&lt;</td>
<td>17</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>81</td>
<td>51%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Far East</td>
<td>50</td>
<td>32%</td>
</tr>
<tr>
<td>New Zealand European (Pakeha)</td>
<td>38</td>
<td>24%</td>
</tr>
<tr>
<td>European</td>
<td>30</td>
<td>19%</td>
</tr>
<tr>
<td>Middle East</td>
<td>21</td>
<td>13%</td>
</tr>
<tr>
<td>Other</td>
<td>19</td>
<td>12%</td>
</tr>
<tr>
<td><strong>Studying towards the degree of</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honours</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>Master’s</td>
<td>32</td>
<td>20%</td>
</tr>
<tr>
<td>PhD</td>
<td>115</td>
<td>73%</td>
</tr>
<tr>
<td>Post-Doc</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Faculty</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td>38</td>
<td>24%</td>
</tr>
<tr>
<td>NICAI</td>
<td>34</td>
<td>22%</td>
</tr>
<tr>
<td>Engineering</td>
<td>26</td>
<td>16%</td>
</tr>
<tr>
<td>Bioengineering Institute</td>
<td>19</td>
<td>12%</td>
</tr>
<tr>
<td>Medical and Health Sciences</td>
<td>14</td>
<td>9%</td>
</tr>
<tr>
<td>Arts</td>
<td>12</td>
<td>8%</td>
</tr>
<tr>
<td>Education</td>
<td>9</td>
<td>6%</td>
</tr>
<tr>
<td>Business school</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td><strong>Length of time in Workplace</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 hours per day</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>5 hours per day</td>
<td>51</td>
<td>32%</td>
</tr>
<tr>
<td>6-8 hours per day</td>
<td>74</td>
<td>47%</td>
</tr>
<tr>
<td>More than 8 hours per day</td>
<td>27</td>
<td>17%</td>
</tr>
<tr>
<td><strong>Urban Background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More Urbanized</td>
<td>75</td>
<td>47%</td>
</tr>
<tr>
<td>Less Urbanized</td>
<td>83</td>
<td>53%</td>
</tr>
</tbody>
</table>

Participation in the study was not limited to a particular university building or campus. However, 86% of the participants were based on the University of Auckland city campus, while the rest distributed among four campuses of the University of Auckland and two campuses of University (A) (see Table 3-4). Workplaces of 59% of respondents (90 out of 153) were located in Bio-Engineering and Engineering-Science Building,
Architecture and Planning Building, or Thomas Building (23%, 20% and 16% respectively). This high rate of participation from these buildings can be explained by the fact that both PhD and master’s students within these buildings had fixed workspace with a window to the outside. Such distribution of the participants provides a mixture of diverse and similar window views, which facilitates and enriches the analysis of the data. Figure 3-7 shows the distribution of city-based participants among the buildings of the University of Auckland. 36% of the participants (56 out of 157) were living in the city centre; while the rest of participants were living across 31 suburbs of Auckland (see Figure 3-8). Among these suburbs, Mount Eden (6%), Ponsonby (6%) and Mount Roskill (6%) were the most popular.

<table>
<thead>
<tr>
<th>The University of Auckland</th>
<th>CBD Campus</th>
<th>131</th>
<th>86%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epsom Campus</td>
<td>8</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Grafton Campus</td>
<td>4</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Leigh Marine Laboratory</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Tamaki Campus</td>
<td>1</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Campus 1</td>
<td>2</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Campus 2</td>
<td>6</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>153</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 3-7 The distribution of participants’ workplaces across the University of Auckland city campus

Figure 3-8 The distribution of participants’ home places across Auckland suburbs
3.4 Data Collection Procedure

Face-to-face questionnaire-based interview sessions were used to collect data. The strength of using a questionnaire-based interview is that interviewers can clarify matters to obtain relevant responses and decrease the number of don’t know and no answers and observe the respondents while they are answering the questions (Babbie, 2010, p. 275). In addition, an interviewer can ensure that “the respondents answer the questions in the appropriate sequence...before they are asked subsequent questions” (Nachmias & Nachmias, 1996, p. 237). The data collection was started by 28/6/2012 and the last participant was interviewed on 18/12/2012.

Participants were recruited by advertising via fliers, emails, Facebook and universities newsletters, or a group presentation in one of the postgraduate student meetings. The study advertisement invited postgraduate students who have fixed workspaces within the university with windows to the outside to contact the researcher by email. All who responded to the advertisement were contacted to schedule a date and time for interview. All but one, who had to leave the country for an unforeseen event, participated in the study. Signed consent was obtained at the face-to-face meeting. No incentives were offered for participation in the study.

All the participants were initially met at their workplaces or occasionally in their departmental common rooms. Most interviews were conducted with a single participant but a few involved more people when officemates wanted to be interviewed at the same time. Interviews followed a standardised pattern. Before the session started, the respondents were briefly informed of the objectives of this study and how the interviews were be conducted. Then, he or she was asked to read the participants’ information sheet and sign an informed consent form. All information was obtained with an eight-page questionnaire. The questionnaire was designed to be self-guided and participants had an unlimited amount of time to complete it. During the interview, they were encouraged to ask questions if they found any part of the questionnaire to be unclear.
The drawing sheets were on pages 4 and 5 of the questionnaire. At this stage, participants were presented with a regular lead pencil, eraser and a set of colour pens. Participants were asked to draw what they could remember seeing from their window views. They were asked also to rate each feature in the order that they were drawn, to express their preferences towards them using the five-point Likert scale (see Figure 3-4) and to label these features. At the end, they were asked to rate their feelings towards the view in general using the same Likert scale. Figure 3-9 shows an example of data collected. The view was rated as Strongly Liked.

Participants were given no rules or guidance on how to draw mental images. The only restriction was that the image should not be copied from the outdoor view but drawn from memory. This was clearly explained to the participant during the interview. Participants were also supervised to ensure they would not look out of their office window while drawing. If a lack of confidence with drawing skills was observed by the researcher or expressed by participants, writing down the name of features instead of drawing them was suggested. Only three participants, whose drawing skills were reasonably good, wrote some of the features names under her sketch without drawing them (see Figure 3-10 for instance).

For the office view sketches, participants were advised to draw the view they could see when they were sitting behind their desk. For the house views, the choice of view was more complicated. Students were living in university halls of residence, at home, or in private accommodation. Several had access to more than one window in their homes. In these cases, participants were advised to choose, from their bedroom and living room, the one
where they spend most of their time. Participants were encouraged to talk freely during sketching. The interview generally took about 20 to 30 minutes to complete.

From 158 interviews, 153 sketches from office views and 157 sketches from home views were collected (310 sketches). Missing data is because not all the participants have access to windows from their workplaces or their places of residence. A few students who contacted the researcher did not meet the study criterion of having an office windowscape. As the students still had home windowscapes, it was decided to include them in the study.

Upon the completion of the questionnaire, participants were thanked for their time and effort and then a photo was taken of their office window views (see Figure 3-11). To
make it more comfortable for participants, they were asked to email photos of their home outdoor view. Participants received a reminder email seven days and again fifteen days after their interview if they had not submitted their home view photos. In their emails, some of the respondents also explained reasons for omitting features from their sketches. From 157 participants, six did not send their home view photos. Despite the lack of photographs, some information was still extractable from the sketches. The sketches were analysed based on their content and not their aesthetic value. Sketches were compared with photographs of the actual views without critical commentary about the subjective contents of the photographs.

The majority of interviews were conducted between July and August 2012; only 19% were held between November and December 2012. The data collection was interrupted for two months between September and October, as the initial analysis indicated the necessity of making some changes in the research design and also recruiting more participants. Initially, it was intended to repeat the study in the opposite season. As the data collection started and progressed in wintertime, it was noticed that trees and greenery were drawn as if they still had leaves and/or flowers present. Absence of seasonal variation might be because sketches were drawn from memories. Based on this observation, it was decided to cancel the follow-up interview sessions. The brief analysis also indicated that the distribution of respondents’ urban backgrounds needed to be equalized. This was achieved by using purposeful sampling and recruiting further participants from the University of Auckland and extending the data collection to another Auckland university.

3.4.1 Practical challenges in the method

Studies using sketch-mapping technique often reported their participants felt nervous and mostly hesitated to draw maps. Such reactions seem predictable, as drawing is not something adults necessarily do often. Stea as cited in Smiley (2007, p. 291) suggests several reasons for unwillingness to draw: “unfamiliarity with pencils, viewing the interviewer as the expert who would do this better than they could, seeing themselves as being of low status and thus not capable.” Surprisingly, drawing a brief sketch did not seem difficult to most participants of the current study. Their comments during the
meeting indicated that they found the method fun and creative and were very willing to participate. This might be due to a combination of factors, including differences in the type of participants and research design. For instance, Francescato and Mebane (1973) observed that persons belonging to lower social classes more often refuse to draw a sketch map, which might be due to the degree of familiarity with paper-and-pencil tasks. Using paper and pencil seems not to be a totally a foreign process to the participants of the present study, postgraduate research students. Moreover, the sketch relating questions were on pages 4 and 5. This allowed participants to feel comfortable with the interviewer, before moving into sketch parts. One of the previous researchers had to convince her participants by explaining them that she would not laugh or judge their cartographic abilities (Smiley, 2007).

In the present study, the participants were advised that an accurate drawing is not expected and just a rough sketch of what they remembered is enough. It was chosen to bring a regular lead pencil, eraser and pen to afford erasing and permanence. 42% of participants (66 out of 159) used pencil for sketching, as the possibility of erasing made them feel more comfortable with the task. Although it was not intended to analyse sketches on the use of colours, a pack of twelve coloured pencils was taken into the first nine interviews. Participants refused to use coloured pencils and articulated their lack of confidence in using them by saying, “I am not a professional painter,” or “I haven’t used colour pencils since preschool.” However, some participants used their own colour pens to emphasize on the colour of the features. Based on this observation, a Staedler Triplus Fineliner Pens 10 colour pack was presented to the rest of the participants and used by 36% of them (55 out of 149). Overall, 29% of the sketches (91 out of 310) were in colour. It was noticed that colour pens worked as a cue for some of the participants to remind them to add more features. For instance, one of the participants while drawing said, “let me think, what else do I have in green?” During their drawing, respondents verbally explained and justified their preferences-responses towards each feature or gave descriptive details about the drawn features. Such information either was added to the sketches by participants at the researcher’s request or was scribbled down in the research field notebook. Examples of these notes included: “I am not a smoker, but I appreciate and like that wall, because smokers can go and lean on it without disturbing anybody else,” “I
sometime see boats with colourful sailcloth which I like very much,” and “I hate this building because its windows are fake;” the windows were fixed and could not be opened. This additional information was particularly helpful to explain odd cases.

3.5 Data Management and Analytical Technique

The data from the sketches and photographs were all coded and then categorised (P. Bazeley, 2009; Merriam, 2009; Miles & Huberman, 1994). To avoid identification, a number was assigned to each participant and scanned on his or her sketches (see Appendix B). A digital library was built up by placing sketches and the corresponding photographs next to each other in one page using Adobe Photoshop CS6. The montage collection of sketches and photographs was analysed using content analysis.

Content analysis has been widely used in studies involving visual data (Bell, 2001; Catherine Lutz, 1993; Maggi & Scholz, 2008). Content analysis is described as “a research technique for making replicable and valid inference from texts (or other meaningful matter) to the context of their use” (Krippendorff, 1980, p. 18). Several major benefits of content analysis are as follow:

- it offers a relatively systematic and comprehensive summary or overview of the dataset as a whole;
- it allows for both qualitative and quantitative operations (Zhang & Wildemuth, 2009);
- it is an unobtrusive means of analysing interactions (Krippendorff, 1980);
- it is context sensitive (Krippendorff, 1980)
- it allows work with large quantities of data (Krippendorff, 1980; Smith, 2000)
- it is valued for efficiency and proven reliability (Namey, Guest, Thairu, & Johnson, 2008; Maggi & Scholz, 2008).

However, since content analysis relies heavily on researchers examining and organizing the data repeatedly, it can be extremely time-consuming.

The aim of content analysis conducted in this thesis was to classify sketches based on physical and psychological determinants (e.g. tree, sky, blocked views). The special design of the study also provided the opportunity to explore features usually eliminated from
sketches and assumed to be unimportant to observers. The sketch-photograph pair, rather than respondents, was used as the unit of content analysis.

The digital collection of sketches and photos was uploaded into NVivo 10 for content analysis. NVivo is a qualitative data analysis software program designed “to manage, access and analyse qualitative data and to keep a perspective on all of the data, without losing its richness” (Bazeley & Richards, 2000, p. 1). Data can be coded into various categories, which NVivo refers to as nodes. NVivo nodes work like a virtual filing box enabling the user to see all information on a category summarized together. Coding was implemented by looking simultaneously at the sketches and their corresponding photographs. The process of extracting the codes out of the data set is explained in Section 4.1.1.

Although NVivo software was useful to organise sketches based on their contents, the process of analysis involved moving between NVivo nodes and sketches to ensure that the richness of drawings was not lost. However, it was found difficult to skim, browse and navigate (to zoom in and out or flip) through this large amount of visual data in NVivo. Printing and hand coding on paper was also found impractical, being both time- and money-consuming. To facilitate the data analysis, it was decided to transfer the coded data in digital folders that corresponded to NVivo categories. Hence, new folders were created on the computer to work like nodes in NVivo (see Figure 3-12). Each folder was named after the category representing each feature or spatial configuration of the views. The relevant sketches and photographs were then copied into these folders. With this technique, the visual data was analysed a second time using Windows Photo Viewer to
ensure the reliability of the codes. For each category, a Word Documents was also created to write short comments (memos) and reflect the categorization. In order to ensure the assessment was not influenced by a person’s drawing ability, the coded visual data was then dual-checked against the labels participants provided for each feature. Each code was compared with those proceeding to avoid inconsistency and redundancy. The data was searched for examples that were both illustrative and typical of categories generated.

As features and views also carry particular preference responses, the data required further analysis with a quantitative software package. This involved creating a separate workbook in Microsoft Excel for each main category and summarizing the sketches and photographs and questionnaires into the spreadsheet. The rows represented each participant and the columns represented various variables such as: preference for the window-view, omission of a particular feature and preference score for that feature, as well as observer characteristics (e.g. age, gender and urban background). These spreadsheets were then imported to the SPSS 20 program for statistical analysis (Field, 2007).

In tabulating responses in Excel, it was noticed that a small number of participants did not follow the provided rating system. The questionnaire was in a structured form

Figure 3-12 Content analysis using digital folders
and respondents were asked to describe their preferences towards their views and features within their view by choosing a Likert-scale response (from Strongly Dislike to Strongly Like). Only one participant could not express his preferences towards his office view by choosing one Likert-scale option. In this case, the rating was based on the lower score (e.g. since the participant chose the line between Like and Strongly Like; it became Like). One respondent assigned both Dislike and Like to a feature within his sketch, resulting in a missing data code for quantitative data analysis (see Figure 3-13).

3.5.1 Statistical Approach for Hypothesis Testing

In landscape preferences studies, correlation and (M)ANOVA are the most common statistical tests used to determine the significant effect of between-subjects (variables such as socio-demographic effects (see Stamps (1999) and Sevenant and Antrop (2010) for more information). Regression analysis is also employed to explore how a visual indicator influences preference scores (e.g. (Herzog, 1992; Lindal & Hartig, 2013; Zhao et al., 2013)). In these studies, Likert scale data are described using means and standard deviations. This trend was not followed for two main reasons. One is that by use of parametric tests for Likert scale data assumptions that must be met for the test to be accurate invalidated:

- Parametric tests should be used on interval or ratio data; however, the Likert scale is an ordinal scale data.
- Statistical analysis using Likert scale data involves calculating the mean in one way or another; however, for ordinal-scale data, one should employ the median or mode as the measure of central tendency.
- Parametric statistical tools are based on the assumption that the differences between numbers are exactly equal — for example, three is as far from four as
six is from seven. Although Likert scales have a rank order: the intervals between values cannot be presumed equal because respondents’ interpretations of phrases such as Strongly Like can vary widely.

- Parametric tests assume the data to be normally distributed (symmetrical with zero skew); data sets generated with Likert-type scales often have a skewed or polarised distribution.

Although applying parametric statistical tests to Likert scaled data increases the risk of coming to a wrong conclusion (Gardner & Martin, 2007; Jamieson, 2004), these tests have been largely used in the landscape preferences studies. Golbeck (1986) explained this tendency:

“Parametric tests were the first to be developed and still are the standard fare of introductory statistics courses. Several decades ago nonparametric tests (those appropriate for ordinal level variables) were relatively unknown to the average researcher. Many psychologists and researchers with psychological training in environmental and other fields continue the tradition of using classical parametric statistical procedures with ordinal data. Statistical theory on the other hand dictates that using statistical procedures with an inappropriate level of measurement leads to conclusions that are neither empirically nor semantically meaningful. Unfortunately, the prevailing psychological orientation has been characteristic of the study of landscape quality and preferences” (p.6).

While some researchers (e.g. Kahler, Rogausch, Brunner, & Himmel, 2008) have empirically demonstrated that using parametric tests for analysing Likert scaled data can lead to erroneous results, the debate around using and misusing Likert scales continues (see Norman, 2010 for other position in this debate).

The second reason is while parametric tests cannot handle data from several different populations (Gaito, 1959; S. Siegel, 1957), there are some non-parametric tests for treating these data. This property of non-parametric test is necessary to analyse content analysis categories, which are usually of different size.

For these reasons, non-parametric tests were used: for ordinal data, Wilcoxon-Mann-Whitney U-test and Kruskal-Wallis H-test; for categorical (nominal) data, Pearson Chi-square test, or Fisher exact test when appropriate. Non-parametric tests make fewer
assumptions about the data and are appropriate for the relatively small samples, nominal and ordinal variables of this research (Jamieson, 2004; Williams, 1993). Wilcoxon-Mann-Whitney, is based on the rating data and is a statistical hypothesis test that looks for differences between two independent samples (Field, 2007). Kruskal-Wallis H-test is a nonparametric statistical test analogous to ANOVA. Chi-square test essentially tests whether two categorical variables forming a contingency table are associated. A p-value less than 0.05 was considered significant for all statistical tests.

3.6 Ethical Considerations and Trustworthiness

As research involved human participants, ethical considerations need to be taken into account at all stages of study design, conduct and reporting. To ensure the research procedure complied with relevant ethical principles, an application was submitted to The University of Auckland Human Participants Ethics Committee (UAHPEC) on 25th of May 2012. After further clarification, approval was granted on 27th of June 2012.

The ethics application included descriptions of procedures for seeking and obtaining consent from participants. The main ethical considerations were concerned with: 1) obtaining participants’ informed consent, highlighting that they are volunteers and could withdraw at any time while filling the questionnaire; 2) giving them the right to withdraw from the research up to two weeks after the date of the completion of the questionnaire, 3) maintaining anonymity and confidentiality through ensuring all information kept is non-identifiable, 4) bringing to their attention that photos of their workplace and home window views that cannot identify specific locations or people may be presented in the thesis. All the above information was incorporated into Participants Information Sheet (PIS) and summarized in a Consent Form (CF). At the beginning of each session, participants were asked to read the PIS and CF and sign the form if they agreed to participate in the study. Participants were offered a summary of the results. They were also informed that collected information – questionnaires and photographs – would be stored for six years, then destroyed and/or deleted from the researcher’s computer.

During the course of data collection, the need for two changes to the research design became evident: a declaration that there is no need to carry out the survey in the
summertime and a request to repeat the survey in another university in Auckland in order to recruit more participants and equalize the distribution of respondents. Subsequent amendment of the ethics application was approved on 5th of Nov 2012 by UAHPEC; approval from the other university ethics committee followed at the end of Nov 2012. Ethics approval/permission from the local ethics committee was granted upon two conditions. First, to ensure confidentiality and anonymity of the participating university, it was agreed to use pseudonyms. Accordingly, this university is known as the University A. Second, the local ethics committee of the University A allowed to only use alternative methods of recruitment to postgraduate administrators emailing students. As explained in Section 3.3.1, recruitment using a flyer posted on student and online noticeboards and networking sites was not a successful approach.

All participants have signed the CF; no one withdrew. Although participants were not anonymous to the researcher, identification numbers were assigned and pseudonyms used throughout the data analysis and reporting of findings to ensure confidentiality while reporting the results.

3.6.1 **Ensuring the Trustworthiness of the Research**

Trustworthiness in qualitative research is akin to reliability and validity issues identified in quantitative research. Trustworthiness of the study is defined as “how much trust can be given that the researcher did everything possible to ensure that data was appropriately and ethically collected, analysed and reported” (Carlson 2010 p.1103). For ensuring the quality of findings and the method used in this study, trustworthiness will be discussed in terms of credibility, consistency and transferability.

3.6.1.1 **Credibility (or Internal Validity)**

In qualitative studies, internal validity or credibility is “the degree of confidence that can be vested in…researcher’s findings” (B. White, 2011, p. 236). Credibility can be determined by the match between the constructed reality of participants and the reality presented by the researcher (Lincoln & Guba, 1985), in Merriam (2009, p. 213) “how congruent are one’s findings with reality?” Thus, a question remains as to whether the sketch-based technique used in this study can extract and capture respondents’ visual perceptions of their
windowscapes and whether the data can be interpreted according to their intentions. A sketch of the environment, although merely a representation of one’s constructed reality of that environment, can more comprehensively present one’s own way of seeing than verbal descriptions with a visual sketch composed of identifiable landscape features. The analysis is based on included and excluded features as well as preference ratings. While labelling the drawn features enriches the data, it also minimizes researchers’ possible subjective biases in coding and categorizing features. It is assumed that omitted features are either unknown to an observer or not considered significant, not because of inability to draw them. To ensure the assumption is valid, respondents were encouraged: 1) to either write their reasons for exclusion of their features under their sketches (see Figure 3-14) or explain it to the researcher, 2) to outline features when unable to draw (see Figure 3-10).

Further credibility was enhanced during the data collection by acknowledging the fact that the researcher is the main instrument of data collection in qualitative studies (Merriam, 2009; Patton, 2002) and understand that it is her responsibility to:

1. Ensure flexibility in arranging time/date/place of interview, allocate enough time for the interview, show interest, encourage reflection and seek clarification when needed.
2. Establish rapport and develop an acceptable level of trust with participants (Lincoln & Guba, 1985).

Accordingly, all participants were sent brief details about the project before their participation in the research. Further, they were ensured total confidentiality of their identities and information provided, and allowed them to withdraw from participation in the research within 15 days of the interview (discussed in depth in Section 3.6 on Ethical Considerations of the study). Before each interview,
the researcher engaged in an informal conversation with informants about her academic, cultural and institutional background,

3. Maintain a consistent method of interviewing by conducting all the interviews by myself and bracketing my view to reach an impartial attitude (Lincoln & Guba, 1985; Patton, 2002).

The following techniques were used during the analysis to enhance the credibility of the findings:

1. Cross-examination of the data by studying the sketches and photographs in their entirely several times, being immersed in the details and getting the sense of the features before categorising them (De Vos, Delport, Fouche, & Strydom, 2011),
2. Thomas’ (2006) criterion for generating concepts grounded in the data were followed rigorously; including: testing and re-testing the categories and recoding the existing data where necessary,
3. Returning to discrete and topically-bounded qualitative responses associated with significant statistical findings and including representative sketches and/or photographs to support findings (Creswell & Miller, 2000; Patton, 2002),
4. Including and analysing negative cases, which broadened my perspectives on the data, helped to identify limitations, make appropriate revisions and incorporate those limitations into the interpretation to provide an alternative explanation (Patton, 2002),
5. Peer-debriefing and discussing data analysis and research process with my thesis supervisor and consulting researchers in different fields of study to allow exploration and clarification of data analysis (Lincoln & Guba, 1985),
6. The similarity of the findings from this study demonstrated in previous photo-based studies

3.6.1.2 Consistency (or Reliability)

Reliability is defined as the extent to which research is consistent to what it measures (B. White, 2011, p. 235). The reliability of qualitative data is always open to question and difficult to demonstrate, as the results are based on human subjectivity where there cannot be one truth (Cater & Porter, 2000). Therefore, the idea of seeking reliability is often
avoided in qualitative research (Ritchie & Lewis, 2003). However, since reliability is a component and criterion of validity, a few points about the reliability of the sketch-based technique should be made. The reliability of the sketch-based technique has been already confirmed by Blades (1990), as he studied whether respondents will produce the same map on two trials separated by a week. Difficulties in applying and analysing sketch-based techniques still call into question the technique’s reliability. In particular, an individual’s drawing ability can directly influence sketch outputs (in data collection stage) and the identification and classification of features (in data analysis stage). This may reduce the reliability of inferences made from the sketches. Strategies were adopted to overcome these weaknesses and strengthen the reliability and validity of the findings. First, participants were advised to write the feature’s name if they were unable to draw it. In addition, after the completion of the questionnaire and taking photos of their office views, a few minutes were spent with subjects to clarify those sections of the sketch that was unclear or ambiguous and ensure that the omission of features was due to reasons other than lack of drawing ability. Features labelling and sketch-photograph matching are two other strategies used to increase reliability. In the next chapter, the overall reliability of the results is confirmed by comparing the findings with those obtained from photo-based literature studies. While similar trend in the results were observed, our research findings provided new insight by using the sketching method.

3.6.1.3 Transferability (or External Validity)

External validity (also called transferability or generalizability) refers to the question whether results are generalizable to individuals or settings other than the population in the original study (B. White, 2011; Gravetter & Forzano, 2012). Qualitative researchers have argued that generalizability is not a goal of qualitative research as it is for quantitative analysis (Lincoln & Guba, 1985; Merriam, 1998, 2009). Qualitative methodology emphasizes transferability an alternative to the notion of generalizability, which defined as the extent to which readers can transfer described experiences of the phenomenon to their settings (Merriam, 1998; Slevitch, 2011). In this regards, researchers have been advised to provide a clear description of the study’s context (how the sample was obtained and who the participants were) to enable readers to compare the “fit” with
their situations (Merriam, 2009; Gravetter & Forzano, 2010). Also, attempts were made to increase the transferability of the research by using thick description, maintaining audit trail and maximum variation sampling as suggested by Merriam (2009). Accordingly, in the result and discussion chapter, a description of participants in each category, how categories were derived, how decisions were made throughout the inquiry, as well as detailed description of the findings with adequate evidence in the form of sketches or photographs will be presented (Merriam, 2009). As explained in section 3.3, maximum variation sampling was achieved by recruiting participants from different faculties, gender, urban background and campuses. At the end, it should be mentioned that since the data stems from highly educated relatively young participants (research postgraduate students mostly between 26-35 years old); the results, at best, may be generalized to population with similar educated background and age group. However, as generalizability was not the goal in this qualitative research, it is not considered that this serves as a true limitation, nor does it limit the quality of the findings.

3.7 Summary

This chapter was opened by criticisms of the field for the tradition of using laboratory-based methods to evaluate landscape preference. It argued that such methods cannot capture the ambience of an urban environment as experienced daily. A need for a method that can assess observers’ preferences in real situations was identified. This chapter continued by introducing Active Perception Technique, which was developed to test limitations of laboratory-based methods by using windowscapes as landscape samples, by open questions and by active drawing in conjunction with photos. The details of data collection and data analysis were provided to present a clear picture of the study. The ethical issues were taken into consideration and approach to the data quality in terms of trustworthiness has also been outlined. The findings obtained from demonstrating APT are presented and discussed in the next chapter.
Chapter 4. Results

This chapter comprises four main parts. In the first and Section 4.1, brief analyses are presented covering:

- Most common windowscape features and their corresponding preference scores
- Sketch and photograph comparisons
- Descriptive statistics for windowscape preference ratings
- Between-context comparisons of windowscape preferences

Section 4.2 analyses the determinants of windowscape preferences. It starts with a discussion of the effect of complexity of views on preferences and carries on to address the following questions:

- What is the active perception of the participants regarding a particular feature in terms of drawing, omitting or exaggerating its size?
Chapter 4. Results

- Does the presence of a particular feature influence preference for the view?
- Does site (home or office windowscapes) have any influence on preference for each feature and the window view?

Section 4.3 answers the question whether personal characteristics of the observers influence preferences for a particular feature within their view. In particular, this section evaluates the effect of gender, age, and urban background on preference for each feature. Information on the ethnic background of participants was collected as an indication of cultural diversity; however, no statistical analysis based on ethnicity was conducted, as sample sizes were too small.

How do different combinations of common urban features influence preference for windowscapes? This question is answered in Section 4.4; while Section 4.5 proposes a new area of research for landscape preferences by exploring the relationship between the sequence in which participants drew their recalled features and preference for the view. The final section discusses the relationship between results obtained from APT and earlier landscape preference studies.

To recap, participants were asked to draw what they could remember seeing from their windows. Then, they were instructed to list the order in which they drew the features and rate their preferences for each on a Likert scale marked from Strongly Like, to Strongly Dislike. Finally, they were asked to rate their preferences for the view in general using the same Likert-scale. Each participant’s sketched view was compared with a photograph of the view.

Out of 158 participants, 157 sketches from home views and 153 sketches from office views were collected (310 sketches in total) (see Appendix B). Not all participants had access to windows in their workplaces or their places of residence so office and home view numbers are not identical. The sketches were analysed using the content analysis technique. Quantitative analysis was used when the need arose. QSR International’s NVivo 10 qualitative data analysis software, digital achieving technique (explained in Section 3.5) and SPSS version 21.0 were used to manage the data streams and support the analysis. The items considered for the analysis were: (a) each feature drawn or missed from the sketches, (b) each sketch as a whole and (c) preference scores for features and the views. Non-parametric tests were used for statistical analyses. In particular, categorical variables were compared by Pearson’s chi-
square test (or Fisher’s exact test\(^1\) when expected values were <5 cases) and the Mann-Whitney and Kruskal-Wallis tests were applied to compare the medians. The means of preferences were not used for comparisons due to Likert-scale data not being convertible to a continuous numerical scale for analysis (see Section 3.5.1 for further discussion).

4.1 Analysis of windowscape preferences

This section begins with identifying common features of window views by studying sketches and photographs. As there was no control over the content of windowscapes, such an approach to the data analysis was necessary. The second part of this section is concerned with a comparison of the sketches with their corresponding photographs based on the features that have been identified. A review of the overall statistics of the responses to windowscapes is presented, followed by an examination of the differences found between the evaluation of home and office windowscapes.

The dataset comprises responses from 158 participants - consisting of 310 sketches, plus 304 corresponding photos of the views. The average number of features within windowscapes’ photographs was six, on average four features were drawn in each sketch. Accordingly, the data include more than 1240 drawn features.

4.1.1 Preferences for Windowscapes’ Features: An Aggregated Analysis

In order to find the most common windowscape features, all drawn and labelled features were compiled in an Excel spreadsheet and imported into NVivo. NVivo was set to group similar features together: e.g. road(s) or street(s) were merged into the word road. The results of this analysis using a word cloud of the phrases in which font size is associated with relative frequency are shown in Figure 4-1. Since the research was conducted in an urban area, it is not

\(^1\) The Fishers’ exact test calculates the exact probability of the Pearson \(\chi^2\)-test (Field, 2007, p. 690).
surprising that (distant) building appeared as the most frequently drawn and/or labelled features of the views. This was followed by tree, road, harbour, the sky, and island respectively.

The frequently drawn features were divided into seven main classes (Error! Reference source not found.). The first category includes those buildings that either blocked or partially blocked the views, with the distant buildings located in background of the views. A distinction between distant and blocking buildings was made because of the high frequency of the use of the word distant in the sketches.

Preference scores for each feature are shown in Figure 4-2. Office and home view sketches are analysed together and detailed analyses of each feature are presented in Section 4.2. A straightforward result of this analysis is that, in an urban context, natural features were preferred over built ones. In total, only 1\% (n = 4) of natural features were rated as Disliked and none as Strongly Disliked, whereas, 31\% (n = 129) of built features were rated as Disliked or Strongly Disliked. Large bodies of water and the sky were the two most preferred, and blocking buildings were the least preferred features of urban windowscapes. The majority had

<table>
<thead>
<tr>
<th>Table 4-1 Features classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drawn Features</strong></td>
</tr>
<tr>
<td><strong>Blocking Buildings</strong></td>
</tr>
<tr>
<td>Neighbour’s house(s), Neighbour’s building(s), windows of a nearby building, hotel, staircase, wall, roof and any other buildings located in the immediate foreground (e.g. apartment building)</td>
</tr>
<tr>
<td><strong>Transport Infrastructure</strong></td>
</tr>
<tr>
<td>Road(s), Street(s), driveway(s), motorway, cars, parking lot, carpark, railways</td>
</tr>
<tr>
<td><strong>Distant Buildings</strong></td>
</tr>
<tr>
<td>Sky Tower, Harbour Bridge, Crane tower, Grafton Bridge, hospital, CBD, Random houses, and any other buildings located in the background of the views</td>
</tr>
<tr>
<td><strong>Greenery</strong></td>
</tr>
<tr>
<td>(fruit) tree(s), grass, domain, garden, flower, hedge, bushes, shrubs, (potted) plants</td>
</tr>
<tr>
<td><strong>Islands/Mountains</strong></td>
</tr>
<tr>
<td>Rangitoto island, Brown Island, Mount Eden, One Tree Hill, Volcanoes</td>
</tr>
<tr>
<td><strong>Sky</strong></td>
</tr>
<tr>
<td>Sky, Clouds</td>
</tr>
<tr>
<td><strong>Large Bodies of Water</strong></td>
</tr>
<tr>
<td>Waitemata Harbour, Water, Ocean, Sea, Boats</td>
</tr>
</tbody>
</table>
no preferences for transport infrastructure and Not Sure responses accounted for 46% of the total who had some forms of transport infrastructure in their views.

Figure 4-2 Feelings attached to the most common features of the view

- Buildings in the immediate foreground that blocked (or partially blocked) the views,
- Transport Infrastructure (e.g. motorways, streets, driveways),
- Human-made features that can be seen in the distance (e.g. distant buildings, sky tower, bridge etc.)
- Greenery (e.g. gardens, trees, and parks),
- Mountains/Islands,
- Sky,
- Large bodies of water (e.g. Waitemata Harbour)
Chapter 4. Results

4.1.2 Sketches and Photographs Comparison

Participants’ sketches and the corresponding photographs were compared to identify the most and least memorable features in windowscapes. It can be argued that the sketching ability of the participants can be a potential confounding factor for what has been included or excluded from sketches. However, as mentioned before, participants were advised to write down the name of features in their views instead of drawing them if they found it hard to draw. This approach is believed to reduce or eliminate this shortcoming of the technique.

The initial expectation was that features creating strong (positive or negative) preferences, found to be water bodies, sky and blocking buildings, would be rarely omitted from the sketches; greenery among natural urban features and distant buildings among urban built features would be least memorable and frequently omitted from the sketches. Some of these expectations were borne out, whilst the findings demonstrated that in spite of strong positive responses towards a view of the sky, only a minority (12%) included it in their sketches (see Table 4-2). Section 4.2.5 reports on the conditions under which the sky is more likely to be noticed and drawn as a feature of a windowscape.

An unexpected finding in the sketches and photos comparison was that twenty participants drew the harbour, roads and the Auckland City Hospital when these were not visible. Sixteen of these anticipated seeing roads out of their windows and only one drew the hospital by mistake. One possibility to explain the inclusion of the hospital is the frequent sound of the rescue helicopter coming into the hospital. One participant, whilst admitting to drawing the hospital by mistake, argued that hearing the sound of hospital helicopters often led to this misperception (Figure 4-3). Three participants found they anticipated seeing the sea out of their window, while such views could in fact only be seen if they had been in upper levels of their buildings. The mistaken inclusion of the harbour in a sketch might be interpreted as an indication of a desire to have

<table>
<thead>
<tr>
<th>Features</th>
<th>Drawn in the Sketches No.</th>
<th>Omitted from the Sketches No.</th>
<th>Features Within the Photos No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Large bodies of Water</td>
<td>37</td>
<td>0</td>
<td>34</td>
</tr>
<tr>
<td>2. Blocking Buildings</td>
<td>103</td>
<td>3</td>
<td>106</td>
</tr>
<tr>
<td>3. Transport Infrastructure</td>
<td>189</td>
<td>8</td>
<td>181</td>
</tr>
<tr>
<td>4. Mountains/Islands</td>
<td>26</td>
<td>5</td>
<td>31</td>
</tr>
<tr>
<td>5. Greenery</td>
<td>244</td>
<td>86</td>
<td>330</td>
</tr>
<tr>
<td>6. Buildings in the Far Distance</td>
<td>129</td>
<td>74</td>
<td>203</td>
</tr>
<tr>
<td>7. Sky</td>
<td>23</td>
<td>161</td>
<td>184</td>
</tr>
</tbody>
</table>
this feature in their view. It is also interesting to note that the presence of large bodies of water was recalled and drawn with exaggeration even in the cases where the water was hardly visible in the horizon (see Figure 4-93).

Figure 4-3 A participant drew the hospital and helicopter by mistake. Note that the helicopter is rated as Strongly Disliked while the hospital was rated as Strongly Liked

4.1.3 Preferences for Windowscapes

Table 4-3 summarises the key statistics for the distribution of preference responses. (Note: the total is reduced to 309 since one participant did not report his preferences for his (office) view). The median of participants’ preferences towards their windowscapes was four (or Liked) on the Likert scale with a standard deviation of 1.01 a tight distribution. The distribution of the preferences has a negative skew [-0.748] towards positive preferences (Liked or Strongly Liked). More than 70% of the preferences were for Liked and Strongly Liked (see Figure 4-4).

No significant influence of gender or age on windowscape preference was observed, (gender: U = 11806, z = -.172, ns, and age: H (2) = 2.55, ns). In addition, urban background did not have a significant effect on windowscape preference, U = 11011.5, z = -.97, ns.

<table>
<thead>
<tr>
<th>N Valid</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>309</td>
<td>7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Value</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>309</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>4.00</td>
<td></td>
</tr>
<tr>
<td>Mode</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>1.020</td>
<td></td>
</tr>
<tr>
<td>Skews</td>
<td>-0.748</td>
<td></td>
</tr>
<tr>
<td>Std. Error of Skew</td>
<td>.139</td>
<td></td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.170</td>
<td></td>
</tr>
<tr>
<td>Std. Error of Kurtosis</td>
<td>.276</td>
<td></td>
</tr>
</tbody>
</table>

Figure 4-4 Distribution of feelings attached to the window-views
## Chapter 4. Results

### 4.1.4 Comparison between Office and Home views

#### Between-Context Comparison

Table 4-4 shows the most frequent features appearing in both home and office views. All the features drawn and/or labelled were listed and uploaded to NVivo. Buildings and trees were the most frequently appearing features in both settings, as might be expected with motorways more frequently appearing in office sketches than home sketches, where it was only driveways in home sketches. Garden features such as shrubs, fences, hedges and decks were frequent in home views. These findings are in line with the fact that the majority of participants (64%, \( n=101 \)) lived in Auckland’s suburbs, whereas 86% of participants’ workplaces were located in the CBD campus (see Figure 3-7 and Figure 3-8). Figure 4-5 presents two typical examples of home and office views.

![Figure 4-5 Two examples of office (left) and home (right) views](image)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Office Feature</th>
<th>Count</th>
<th>Home Feature</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>building</td>
<td>180</td>
<td>building</td>
<td>146</td>
</tr>
<tr>
<td>2</td>
<td>trees</td>
<td>99</td>
<td>(fruit) garden tree</td>
<td>125</td>
</tr>
<tr>
<td>3</td>
<td>road</td>
<td>52</td>
<td>garden/shrubs</td>
<td>55</td>
</tr>
<tr>
<td>4</td>
<td>domain</td>
<td>23</td>
<td>neighbour</td>
<td>49</td>
</tr>
<tr>
<td>5</td>
<td>sky</td>
<td>22</td>
<td>road</td>
<td>46</td>
</tr>
<tr>
<td>6</td>
<td>window/wall of nearby building</td>
<td>19</td>
<td>fence</td>
<td>33</td>
</tr>
<tr>
<td>7</td>
<td>harbour</td>
<td>18</td>
<td>cars</td>
<td>24</td>
</tr>
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<td>8</td>
<td>cars</td>
<td>17</td>
<td>harbour</td>
<td>24</td>
</tr>
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<td>9</td>
<td>motorway</td>
<td>15</td>
<td>distant</td>
<td>21</td>
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<td>people</td>
<td>14</td>
<td>deck</td>
<td>18</td>
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<td>11</td>
<td>distant</td>
<td>13</td>
<td>sky tower</td>
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<td>14</td>
</tr>
<tr>
<td>14</td>
<td>sky tower</td>
<td>9</td>
<td>balcony</td>
<td>11</td>
</tr>
<tr>
<td>15</td>
<td>parking lots</td>
<td>7</td>
<td>driveway</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 4-6 shows preferences for home- and office- windowscapes. No significant difference between preferences attached to the office (\( Mdn = 4 \) or Liked) and

![Figure 4-6 Comparison of windowscape preferences in office and home](image)
home \((Mdn = 4\) or Liked\) windowscapes was found, \(U = 11346, z = -.789, \text{ns}\). However, the percentage of home views rated as Strongly Liked was slightly larger than for office views.

**Within-Context Comparison**

The possible effect of the location of office and home (city centre or suburb) on preferences of the views was tested using the Mann-Whitney \(U\)-test. A significant difference between preferences when comparing office and home buildings within the city was observed. Preferences for office windowscape located in suburbs \((Mdn = 5)\) were significantly more positive than those within the city centre \((Mdn = 4)\), \(U = 697.5, z = -2.134, p < 0.05, r = -.17\). The same result was also seen when preference for home views in the city centre \((Mdn = 4)\) and the suburbs \((Mdn = 4)\) were compared, \(U = 1960.5, z = -3.273, p < 0.005, r = -.26\). This result may be related to low density population in suburbs compared to the city centre; in fact 35% of (home and office) windowscapes within the city centre were partially or completely blocked by a building located in the immediate foreground of the view. This figure was only 9% for suburb views. Moreover, a higher percentage of suburb window views (94%) contained greenery compared to the city-centre views (83%).

Figure 4-7 shows a boxplot of the distribution of windowscape preferences in each location. The boxes show the interquartile range of data and the horizontal line (within the boxes) shows the median value. As it can be seen, the majority of the suburban views in both home and office contexts were rated as Liked or Strongly Liked. A number of responses were judged to be outliers accounting for 0.66% of the total number of office views and 2.55% of all the home views. Studying the outliers in detail could be fruitful for understanding what causes a suburban view to be regarded negatively (Disliked or Strongly Disliked).
The only office windowscape classified as an outlier was a view through an oddly-shaped window blocked by an internal wall (Figure 4-8). The participant could see part of a tree through her window; but, its positive effect was not strong enough to produce a positive preference for the whole view (note that the tree rated as Liked and the wall as Strongly Disliked).

![Image](image1.png)

Figure 4-8 An office view in Epsom campus of the University of Auckland is rated as Strongly Disliked.

In the home context, four suburban views were rated as Disliked and identified as outliers. In three of them, neighbours‘ buildings, and in one sketch, a street was rated as Strongly Disliked (Figure 4-9), but other features within these views were rated from Not Sure to Strongly Liked.

![Image](image2.png)

Figure 4-9 Two home views in suburbs of Auckland that were rated as Disliked. Note that in sketch (a) the participant drew the neighbour’s building with clear exaggeration and omitted the distant trees, whereas in sketch (b), trees were significantly smaller than they were in reality.
Further Analysis on Home Views

Table 4-5 presents the housing type and the numbers of participants living on different floor levels. The majority of the participants (56%) were living in the (attached or detached) single-family houses. This was anticipated as 65% of the participants were living in Auckland’s suburbs. Cross-tabulations were used to assess the associations between windowscape preferences and housing typologies and the floor level. The Strongly Disliked category was merged into Disliked category because of its low frequency. Chi-Square test shows that there is a statistical association between preference scores and housing type; $\chi^2 (6) = 24.88$, Cramer’s $V = .28$, $p < .001$. The distribution of preferences across housing types and floor levels is presented in Figure 4-10. Fisher’s exact test also indicated that the floor level has a statistically significant influence on windowscape preferences, Fisher’s exact test $= 25.2$, Cramer’s $V = .24$, $p = .001$. The median preference scores for each building type and floor level is summarized in Figure 4-11. Note that no participants were living on the ground floor of apartments. Windowscapes from detached and attached houses were positively preferred and it seems that windowscape preferences in these two housing types are not related to floor level. Contrastingly, in high-rise and mid-rise apartments, windowscape preferences increased with the floor level. The majority of the

<table>
<thead>
<tr>
<th>Housing Type</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Attached or Detached House</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Floor</td>
<td>67</td>
<td>42%</td>
</tr>
<tr>
<td>Floor 1 to 4</td>
<td>21</td>
<td>13%</td>
</tr>
<tr>
<td>Low-rise Apartment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floor 1 to 4</td>
<td>17</td>
<td>11%</td>
</tr>
<tr>
<td>Floor 5 to 8</td>
<td>16</td>
<td>10%</td>
</tr>
<tr>
<td>Floor 9 upward</td>
<td>19</td>
<td>12%</td>
</tr>
<tr>
<td>Mid- or High-rise Apartment</td>
<td></td>
<td></td>
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<tr>
<td>Floor 1 to 4</td>
<td>17</td>
<td>11%</td>
</tr>
<tr>
<td>Floor 5 to 8</td>
<td>16</td>
<td>10%</td>
</tr>
<tr>
<td>Floor 9 upward</td>
<td>19</td>
<td>12%</td>
</tr>
</tbody>
</table>

Figure 4-10 Preference of the views across different housing type and floor level

![Preference of the views across different housing type and floor level](image-url)
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112 participants living at level nine or above Strongly Liked their views. This result may be due to the fact that the mid- or high-rise apartments were located in the city centre with high-density housing where openness of the view is influenced by the storey level (for literature on this topic see Section 2.5.1.3). Attached and detached houses, however, were scattered in the suburbs (see Figure 4-12).

4.2 Determinants of Windowscape preferences

This section analyses each group of features presented in Error! Reference source not found.. Responses and observations by the participants were divided into two main categories: built and natural features. In each section, examples are given to illustrate the results and anecdotal observations.
4.2.1 Complexity

In other words, the complexity of the view, here, refers to the number of drawn features. A dot plot was used to evaluate the relation between the number of drawn features and windowscape preferences. As only four windowscapes were rated as Strongly Disliked; it was decided to merge them into the disliked category. A correlation was found between the increase of number of drawn features and windowscape preferences (see Figure 4-13). For instance, in the Strongly Disliked and Disliked category, the number of drawn features varied from one to five with the mean of 3.5. On the other hand, in the Strongly Liked category, the range of the drawn features expanded and varied from two to twelve features with the mean of 4.9.

Between-Context Analysis

The median of features within each windowscape sketches is five. Based on this observation, windowscapes were classified as less than average (1-4 features), which here will be referred to as having simple views, and average or more (+4 features), which here will be referred to as having complex views. Frames of the windows (if they were drawn and numbered) were excluded from this analysis. No significant relationship is found between the numbers of features and home windowscape preferences, \( U = 26.85, z = -1.45, ns \), whereas preferences for office views increases with the number of drawn features (\( U = 2123.5, z = -2.8, r = -.23 p = 0.005 \)) (see Figure 4-14).

![Figure 4-13 Dot-plot comparison between the number of drawn features and windowscape preferences](image)

![Figure 4-14 Comparison of windowscape preferences for simple and complex views](image)
Figure 4-15 Examples of photographs of windowscapes and their corresponding sketches with low and high complexity. These views were rated as (a) disliked, (b) strongly liked, (c) liked, and (d) liked.
### 4.2.2 Blocking Buildings

A blocking building describes a building located immediately outside a window, which interrupted the lines of sight. Given that blocking buildings were found to be the least preferred features of the views (see Figure 4-2), it is not surprising that views with blocking buildings were rated significantly lower than views without them, $U = 6348$, $z = -4.37$, $p < 0.001$, $r = -0.25$. The same result was obtained when the window-views were controlled for their level of complexity (for simple views: $U = 807$, $z = -3.83$, $p < 0.001$, $r = -0.36$; for complex views: $U = 2634$, $z = -2.03$, $p < 0.05$, $r = -0.14$). The difference, however, was more significant for the views with a lower level of complexity (see Figure 4-16). Preferences for the views with blocking buildings did not differ significantly in home and office contexts, $U = 602$, $z = -1.076$, ns.

Greenery was noted in sixty-three views having blocking buildings of which 30% (n=19) omitted the greenery content from their sketches (see Figure 4-17 for example). The views with blocking buildings and greenery were perceived significantly more positively than the views with blocking buildings and no greenery (see Figure 4-18), $U = 300.5$, $z = -3.04$, $p < 0.005$, $r = -0.34$. The presence of greenery in views with blocking buildings significantly improved their overall ratings.
sky also was found to have a positive impact on preferences associated with these views, \( U = 389.5, z = -3.88, p < 0.001, r = -0.43 \). However, the sky was drawn in only 25\% \((n = 12)\) of these sketches.

**Types of the views with blocking buildings**

Windowscapes with blocking buildings were grouped into three categories depending on their depth of view (or degree of openness): Blocked Views, Semi-Blocked Views, and Long Views (see Figure 4-20).

- The Long View is a combination of foreground and background in which the horizon is still visible,
- The Semi-blocked View is also a combination of foreground and background that has been enclosed by constructions in the background,
- The Blocked (Close-up) View contains visual barriers near the viewer that obstruct visual access.

As it was expected, a strong relationship was found between the increase in depth of view and windowscape preference, \( H(2) = 19.28, p < 0.001 \). Figure 4-19 presents these differences visually. A post hoc Bonferroni test was performed and found no significant differences between blocked and semi-blocked views, \( U = 236.5, r = -0.12, \ ns. \) However, long views were rated significantly more positive than blocked views \( (U = 230, r = -0.52)\), or semi-blocked views \( (U = 119.5, r = -0.4)\).

![Figure 4-19 Boxplot of preferences for windowscapes with blocking buildings](image-url)
Chapter 4. Results

A. Blocked Views
(a) Office
(b) Home

B. Semi-Blocked Views
(c) Office
(d) Home

C. Long views
(e) Office
(f) Home

Figure 4-20 Coding scheme for coding the views with blocking buildings and their corresponding examples.
As Figure 4-21 shows, although long views were partially obscured by blocking buildings, they created negative preferences only for 7% of observers, with the majority (80%) rated as Strongly Liked or Liked. It was interesting to note that, with an increase in depth of view, the percentage of negative preferences for blocking buildings increased (see Figure 4-22). Note that the percentages of blocking buildings that were positively preferred remained almost the same. More detailed analysis of Long Views, Semi-blocked Views, and Blocked Views are presented below.

**Blocked Views**
Buildings located immediately outside the window (e.g. Figure 4-23) completely filled 15% of office views (23 out of 154) and 11% of home views (16 out of 157). The prominent feature within these views is a portion of a building façade and no sketches of blocked views had more than five features. Hence, they were low in complexity. It was not therefore surprising to find that 41% of the respondents had negative preferences towards their views (see Figure 4-21).

The context of the views (home or office windowscapes) was found to have no significant effect on preferences with regard to the blocking buildings, $U = 128$, $z = -1.21$, $ns$, or the blocked views in general, $U = 153.5$, $z = -.374$, $ns$. 

![Figure 4-21](image_url)
Twenty-three observers in this category also had greenery in their views. A significant difference was found between preferences for blocked views with greenery ($Mdn = 3$) and without it ($Mdn = 2.5$), $U = 92$, $z = -2.27$, $p < .05$, $r = -0.37$ (see Figure 4-24). Greenery was only omitted from two blocked view sketches, highlighting the significance of this feature for this subgroup of participants. Figure 4-25 presents two examples of the blocked views with and without greenery.

![Figure 4-24 Preferences for blocked views with and without greenery](image)

Visual access to the sky was also found to have a positive effect on preferences for blocked views. Analysing the blocked views by the photographs, blocked views with the sky visible ($Mdn = 4$) were rated more positive than views without it ($Mdn = 3$), $U = 68$, $z = -2.14$, $p < 0.05$ $r = -0.35$. However, five out of ten participants who had the sky in their blocked views omitted it from their sketches, which might call into question the importance of this feature in affecting the windowscape preferences.

**Semi-blocked View**

This section includes those views with blocking buildings located in their foreground as well as middle ground (see Figure 4-20 (B)). Such views were rated as Disliked by 27%, and none was Strongly Disliked, with 47% (7 out of 15) of the views being Strongly Liked or Liked (see Figure 4-21). The following differences between semi-blocked and blocked views may have contributed positively to preferences for the former:
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- The larger number of features and the higher level of complexity within these views, (see Section 4.2.1 for more results and discussion). The median number of drawn features within semi-blocked views was seven, while this figure for blocked views was only three.

- Presence of greenery in 86% (n = 13) of the semi-blocked views compared to 63% (n = 24) in the blocked views. Greenery was omitted from eight views, which makes 62% of the overall views with greenery.

- Presence of sky in 80% (n = 12) of the semi-blocked views compared to 24% (n = 9) in the blocked views. However, the sky has been omitted from four sketches (33% of the total views with the sky).

Preferences for semi-blocked views did not differ significantly between home and office contexts, \( U = 28, z = 0, \text{ns} \). In home views, none of the blocking buildings were rated as Liked or Strongly Liked; whereas, three participants had positive preferences for five blocking buildings within their office views. Possible determinants of preferences for these buildings are suggested on pages 122 to 131.

Long Views

Thirty-two home and office views were coded into this category. Despite the presence of blocking buildings in the views, participants’ visual range stretched to the horizon where they could see the harbour (n = 15), or streets (n = 18), and/or a parkland (n = 20). As shown in Figure 4-21, 80% of the long views were positively preferred, - the exception were those views in which a road or motorway was noted. Blocking buildings in long views were Strongly Disliked or Disliked by 69% of observers. The contrast between preferences for blocking buildings and windowscapes indicated that presence of this feature could not influence preferences for long views. To illustrate this point more fully, preference for blocking buildings in blocked views was compared with preference for blocking buildings in long views.

Figure 4-26 The harbour and the blocking building both have been exaggerated in the sketch
views with large bodies of water. Mann-Whitney U-testing showed that blocking buildings within waterscape views ($Mdn = 2$ or Disliked) were rated significantly more negatively than those in blocked views ($Mdn = 3$ or Not Sure), $U = 128.5, z = -3.1, p < .005, r = -.43$. That is while long views were rated significantly more positively than blocked views (see page 116).

Although greenery was present in 94% of the long views, it was omitted from 47% ($n = 14$) of the sketches. This was more so the case for the sky where it was omitted from 78% ($n = 25$) of long view sketches. The context of the views (home or office) has no effect on preferences for the long views, $U = 64, z = -.45, ns$. There were no blocking buildings in home views that were positively preferred, while five buildings in office views were rated as Liked or Strongly Liked.

**Depth of View and Greenery**

This section looks at whether the influence of greenery on views with blocking buildings depends on depth of view. 62% ($n = 23$) of blocked views, 87% ($n = 13$) of semi-blocked views and 94% ($n=30$) of long views provided visual access to greenery. While the median rating for blocked views with greenery was four (or Liked), the same figure for blocked views without greenery was 2.5 (or between Not Sure and Disliked). The positive contribution of the presence of greenery within blocked views is also emphasized by the fact that only 8% ($n=2$) of participants omitted it from their sketches. However, with an increase in the depth of view, greenery gradually loses its positive power, as 38% of the participants with semi-blocked views and 47% of ones with long views forgot to include it in their sketches. The amount of greenery was also found to be underestimated in views with longer depth of view. Figure 4-27 illustrates a case where the greenery in a view was drawn much smaller than it appears in

![Figure 4-27](image)

Figure 4-27 The exaggeration in the size of the distant buildings especially sky tower, while greenery was drawn smaller than it appears in the photo
reality. A further example is shown in Figure 4-28 where the trees in the sketch were labelled as only being “a little green”.

**Determinants of Positive Preferences for Blocking Buildings**

Blocking buildings were rated as Strongly Liked or Liked by 15% (n = 15) of observers. The purpose of this section is to find the conditions under which blocking buildings contribute to positive preferences. From an analysis of the sketches and their labelling, the following reasons are identified as possible causes for blocking building to contribute to positive preference:

1) **Context of the View:**

Contexts (office or home) of the views are found to be an influential factor to positively prefer a blocking building (U = 968.5, z = -1.04, p < .005, r = -.1). A blocking building in home view is negatively evaluated by 70% of the participants; only one participant assigned positive feelings towards a building in the home view (see Figure 4-29). In office views, while 56% of blocking buildings evoked negative feelings, 15% (n=11) rated the blocking building Liked or Strongly Liked.
2) **Ability to watch the occupants in the blocking buildings:**

Participants who positively preferred blocking buildings within their office views mentioned or drew occupants of the buildings and their movement within the building e.g. people going up and down stairs. For example in Figure 4-3, it can be seen that the participant drew the chairs in the classrooms. A further unique example was the case of two participants, who were in a relationship with each other, could see each other through the window of an adjacent building. In these cases, it leads to strong positive preferences for the buildings and the views (see Figure 4-30). However, seeing the occupants of the buildings in home views was noted as the main reason that blocking buildings were Disliked or Strongly Disliked (see Figure 4-9 (a)).

![Figure 4-30](image-url)

Figure 4-30: Being able to see her significant other in the adjustment building made her to Strongly Like the blocking building. She asked her partner to stand by the window when the photo was taken.

3) **Bright colours of blocking buildings:** Two of the participants expressed their positive feelings toward the same obscuring construction in their office views. The use of colour in the sketches, remembering the preferred building as the first feature and showing low preferences toward the grey nearby building (see Figure 4-31) may indicate the positive and significant influence of bright and contrasting colours of buildings on preferences.

The orange building is one of the university’s halls of residence, which in the second sketch was labelled as “student apartment”. This raises the possibility that the sense of association may have led to the positive preferences. However, seven participants rated the same building within their waterscape views as Strongly Disliked or Disliked (see Figure 4-26). Another point that should be noted is that five who negatively preferred the building used to enjoy a wide view to the harbour before its construction, while the two participants, who rated the building as Liked had only recently moved into their offices.


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Figure 4-31 Examples of where the bright colour of a blocking building resulted in a positive preference for the view

4.2.3 Transport Infrastructure

In this section, we look at the contribution that roading, parking facilities and railways make to preference for or against the view.

Roading

Sketches in which motorways, streets, roads, and driveways are drawn have been included in this section. This includes fifty-five office sketches and forty-eight home views (see Table 4-6). Examples of windowscapes with different types of road are given in Figure 4-32.

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</tr>
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<td>Motorway</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Street/Road</td>
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<td>37</td>
</tr>
<tr>
<td>Driveway</td>
<td>2</td>
<td>7</td>
</tr>
</tbody>
</table>

Figure 4-32 Examples of three different kinds of thoroughfares within home windowscapes
Cars were omitted from the majority (64%) of the sketches that included roading. A participant explained his reason for omitting cars from his sketch as follows “I took cars for granted when I drew the road.” Among the sketches in which cars were drawn, ten distinguished cars from roads by allocating different numbers (compare Figure 4-33 (a) & (b)). All except four assigned the same preference score to both of these features, while cars in the remaining four were ranked lower than road networks. One of the participants explained her reasons by remarking: “I dislike the noisy sound from vehicles on the road. It makes me distracted from work, sometimes, I am getting headache when I open the window.” It was decided to use the preference scores for the cars than the roading for statistical analysis.

The majority of driveways and streets within the views were rated as Not Sure (see Figure 4-34). Motorways were rated as Disliked or Strongly Disliked by 46% of their observers, with 29% of them being positively preferred. One of seven participants who Liked the motorway in his view stated “this is the motorway that goes to my home and I can check the traffic before heading home from the office” (see Figure 4-35). As it can be seen in Figure 4-34, the proportion of roading rated with no clear preference (i.e. rated as Not Sure) decreased with increase in the size of the thoroughfare.
Influence of roading on preferences of the windowscapes

No significant differences were found between preferences for windowscapes with \((Mdn = 4)\) and without \((Mdn = 4)\) roading, \(U = 10289.5, z = -1.07, ns\); and not even when home and office windowscapes were analysed separately (for office context: \(U = 2776.5, z = -0.296, ns\); for home context: \(U = 2199.5, z = -1.67, ns\)).

As previous studies reported that greenery had a positive effect on preferences of urban landscape it was decided to control the views by the presence of greenery. As it was expected, Mann-Whitney testing indicated there was a significant difference in preferences for views in which both greenery and roading were visible \((Mdn = 4)\) and those which had greenery but without roading \((Mdn = 4)\), \(U = 7368, z = -1.99, p < .05, r = -.12\). In this subgroup of views, some between-context differences appeared. While presence of roading had no effect on preference of office views \((U = 2170, z = -2, ns)\), in home views roading negatively affected home view preferences, \(U = 1470.5, z = -2.55, p < .05, r = -.22\). The home view with greenery and roading were rated significantly lower in preferences \((Mdn = 3.5)\) than views with greenery but without roading \((Mdn = 4)\).

**Between Context Analysis**

The comparison made between sketches and the corresponding photographs showed that omission or inclusion of roading depends significantly on the context of the views (Fisher’s exact test = 7.17, \(p < 0.05\)). While all the participants who had visual access to road networks from their home views included them in their sketches, 13\% \((n = 8)\) of participants omitted

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1 For each feature, ‘between context analyses’ was carried out to understand if context of the view (home or office view) has any influence on preference for the feature or windowscapes in general.
road networks from their office-view sketches. In eight home sketches and eight office sketches, road networks were drawn although no roads were evident in the photographs (e.g. Figure 4-36).

![Figure 4-36 Example of a case where the sketch included a street which was not visible to the participant](image)

The distribution of different kinds of road networks across contexts (see Table 4-6) is not balanced: motorways are mostly visible through office windows and driveways at home. Between-context analyses therefore were conducted for features labelled as roads and streets. Preferences for these features differ significantly between home and office views, $U = 390.5$, $z = -2.615$, $p < 0.01$, $r = -0.22$. While the median of preferences for road networks was the same in home and office views (3 or not sure), as Figure 4-37 shows the percentage of roads negatively preferred was larger in home views than in office views. A participant who rated the road in his office view asLiked; explained “the road gives me a sense of motion outside the office. I mean in office everything is static, but watching something dynamic (cars), especially after several hours of working, well simply I like it.”

![Figure 4-37 Comparisons of preferences for roads in home and office view](image)
Parking Lots

A parking lot is defined here as an area or building reserved for parking cars. Parking lots were drawn in 25 sketches. In the case of four participants who included parking lots in their home sketches their photos were taken outside (rather than through their windows) while looking down from a balcony (Figure 4-38).

Influence of road networks on preferences of the windowscapes

Presence of parking lots within a view has a significant effect on windowscapes’ preferences, $U = 3449, z = -2.6, p < 0.05, r = -.12$. Windows facing onto parking lots ($Mdn = 3$) were rated significantly lower in preference than views without them ($Mdn = 4$).

Between Context Analysis

No significant differences were found between preferences for parking lots in home and office views, $U = 55.5, z = -.928, ns$. However, a higher percentage of car parks in home views were rated as Disliked or Strongly Disliked compared to office views (see Figure 4-39). Only one participant rated a parking lot in her home view as Liked and she has explained that this was because it meant she could check on her car through the window (Figure 4-38).
Road Networks vs. Parking Facilities

A Mann-Whitney test showed a significant difference between preference scores for road and parking lots, $U = 890, z = -2.26, p < .05, r = -.2$. As Figure 4-41 shows although the majority rated both of these features as Not Sure, the larger percentage of parking facilities was Disliked or Strongly Disliked. A similar trend was evident in the sketches of the ten participants, who had both of these features within their views. Six rated both road network and parking lots views as Not Sure; while parking facilities were lower in preference than road networks in the remaining four sketches (e.g. Figure 4-40).

Note that neither of these features was visible in the photos provided by this participant.

**Railways**

Three participants had railways in their views but the sample was too small to use statistical testing to conclude whether or not this feature affected windowscape preference. However, the reaction of these three participants to almost the same view was so different that it raises intriguing questions for future study.

The three participants were living in the former Railway Station building, renovated to provide budget accommodation, mostly occupied by students. Views of the railway in the windowscape were negatively preferred by the two female participants living in the same unit: shown in sketches (a) and (b). The participant, who drew the sketch (b), omitted the buildings and the greenery in the background. This participant explained that she did not look
out of the window frequently and it was only the disturbing sound from trains and cars during the night that made her recall and draw them. The other participant also could not recall the greenery in the background but drew and Strongly Liked the tree in the immediate foreground of the view (which is hardly visible in the photo she provided). Other features within her view including the buildings in the distance were rated as Strongly Disliked. The third observer rated his view as Liked. He could see the parkland of the Domain. The park, railway, and people playing in the far distance were all positively preferred. It may merit further research with a larger sample to find whether gender is a confounding variable in preferences for the railway, or whether the presence of parkland in a view can alter preferences where there are railways in views.

Figure 4-42 The sketches of three participants with railway in their home views.
4.2.4 Buildings in the Far Distance

This section covers the responses to those urban built features (building blocks, houses, bridges, etc.) located in background of views. Different attitudes in drawing and labelling distant buildings made it necessary to split this section into two sections: landmarks and distant buildings. Participants grouped distant unknown buildings as one feature and labelled them as e.g. random houses, CBD, apartments, (distant) buildings, city, and (distant) suburbs. Landmarks such as the Sky Tower were usually labelled and rated separately in the sketches; indicating that in the eyes of the observer, they stood out from the other buildings (see Figure 4-43).

Figure 4-43 Distant buildings
Chapter 4. Results

**Landmarks**

Prominent landmarks of Auckland were noted in forty-eight sketches (see Table 4-7). Landmarks were drawn with clear exaggerations (Figure 4-44). Only two (the hospital and the museum) were omitted from sketches. The Sky Tower, in particular, was drawn in home views even if it was only visible as a silhouette on the horizon (Figure 4-45). A participant who could see both the Sky Tower and the Harbour Bridge from her home referred to them as “two most iconic features of the city: they cannot be missed or forgotten.”

<table>
<thead>
<tr>
<th>Table 4-7 Frequency of Presence of Landmarks</th>
<th>Auckland Landmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harbour and Grafton Bridge</td>
<td>11</td>
</tr>
<tr>
<td>Auckland City Hospital</td>
<td>9</td>
</tr>
<tr>
<td>Auckland War Memorial Museum</td>
<td>6</td>
</tr>
<tr>
<td>Sky Tower</td>
<td>22</td>
</tr>
</tbody>
</table>

Figure 4-44 The harbour bridge and the sky tower both have been exaggerated in the drawing. Compare the building in the foreground and the sky tower in the photo and the sketch of example number 2.

Figure 4-45 The participant claimed the sky tower could be seen from in the horizon of his home view; but his camera could not capture it.
Landmarks created positive preferences for a majority of the observers (see Figure 4-46). A participant described his reasons to Strongly Liked both the Sky Tower and the museum by remarking that: “They feel like important elements in the city architecturally and I like the range of approaches to the environment that they display” (see Figure 4-45). The Sky Tower was the only landmark that was sometimes negatively preferred. The participants who rated the Sky Tower as Strongly Disliked or Disliked, argued they did not find it aesthetically pleasing.

**Influence of landmarks on preferences of the windowscapes**

A significant difference was observed between preferences scores of windowscapes with and without the landmarks, $U = 5935, z = -2.295, p < 0.05, r = .12$. Since large bodies of water and the Domain were unavoidable features of the views with the harbour bridge and the museum, it is not obvious whether the difference is the result of the presence of these two positively preferred features, due to the landmarks or both. Therefore, the analysis was repeated by excluding all the water views. It was found windowscapes with landmarks were rated significantly more positive than those without, $U = 4011, z = -2.195, p < 0.05, r = .13$.

**Between Context Analysis**

Preferences for the landmarks did not differ significantly between home and office views, $U = 301.5, z = -.425, ns$. However, when only looking at the sketches with the Sky Tower, significant differences were found between home- and office-views and the preference score for this feature, $U = 28, z = -1.98, p < 0.05, r = -.43$. Interestingly, the sky tower is rated higher in preferences in home-views ($Mdn = 4$) than in office views ($Mdn = 3$).
Distant buildings were visible in eighty-nine office- and home-view sketches. A majority of observers (47%, \( n = 42 \)) expressed positive preferences for distant buildings within their views, with only 14% rating them as Disliked, and only 3% as Strongly Disliked. Preferences for the blocking buildings (\( \text{Mdn} = 2 \)) were significantly lower compared to distant buildings (\( \text{Mdn} = 3 \)), \( U = 2420, z = -5.935, p < 0.001, r = -4.27 \); suggesting that the position of the building within a view has an effect on preference (Figure 4-47).

A reason for differences in preference for blocking and distant buildings is suggested in a participant’s statement: “[the distant buildings] are far enough away that you can perceive them as a bunch of little houses, rather than as a single big house in your face. Also they tend to blend in with their surroundings well, and don’t protrude above the treeline much”. The blocking building was rated as Disliked and distant suburbs and houses as Liked (Figure 4-48). It is interesting that, although trees were mentioned in his explanation for liking the distant buildings, they were omitted from his sketch.

Figure 4-47 Comparison of preferences for distant and blocking buildings

Figure 4-48 Feelings attached to the buildings depends on the location of them within the views

Another participant explained her reason for rating a distant building in her park view as Strongly Liked by stating: “I feel comfortable to see both of the park and the buildings. It seems that it is a beautiful place that people can go but not a hardly accessible forest” (see
Figure 4-49). Lights from distant buildings during the night may be another reason for preferring such features, however, only two participants raised this point in their sketches (see Figure 4-52 sketch (a)).

Comparison of photos and sketches revealed that 71 participants ignored distant buildings and omitted them from their drawings: distant buildings were the most omitted human-made feature of urban windowscapes. The complexity of the view was found to have a significant effect on omission of distant buildings, $\chi^2(1) = 6.9$, $p < .01$ with the odds of omission being 3.5 times higher in complex views than simple ones.

**Influence of distant buildings on preferences of the windowscapes:**

Views with the distant buildings\(^1\) were positively preferred by the majority of observers (84%, $n = 74$). This finding is not surprising as 80% of the views towards distant buildings were high in complexity. By comparison, in views containing blocking buildings only 14% ($n=5$) of the sketches had more than four drawn features.

Along with the distant buildings, 23% ($n=21$) of the views provided visual access to large bodies of water; greenery was noted in 91% ($n=81$) of the views. The presence or absence of water features had no significant effect on preferences of views with distant buildings, $U = 387.5$, $z = -.18$, $ns$. Presence of greenery seems not to be a factor influencing the preferences of

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\(^1\) Those sketches from which distant buildings are omitted were excluded from this analysis.
views to distant buildings, as those eight views not offering visual access to greenery still created positive preferences in their observers.

Participants with no greenery in their views towards distant buildings were living between levels nine and thirty-three of high-rise buildings across the Auckland CBD, with a panoramic cityscape that was positively preferred (see also pages 111-111). Figure 4-52 presents photographs and sketches from four of these participants who were living in the same building block, with two living on the ninth floor and two on the thirteenth. The sky tower, a tower crane, the sky, and distant buildings (or “a forest of buildings” a participant put it) were the features noted in photographs. These four participants rated their views as Strongly Liked, although some differences in active perceptions were evident in the sketches. For instance, the sky tower was omitted from one sketch (d), while it was rated as Liked or Strongly Liked in the other sketches. Moreover, participants expressed different preferences for distant buildings (two rated them as Liked, one as Not Sure and the other rated them as Disliked). The harbour was drawn in the sketch of a participant who was living in the ninth floor, although it was barely visible even from the thirteenth. One interesting finding was that a participant provided both night and day sketches for the view that differed significantly from each other (see (a) in Figure 4-52).

The distant buildings were omitted from the daytime sketch and only the “blue sky” was recalled. In the night-time sketch, all the features within the view were drawn with a brief annotation “light of the crane red blinking and other buildings...makes night time view pretty”. She also emailed night and daytime photographs of the view.

Between Context Analysis

No significant difference was found between preferences for distant buildings within home and office views, $U = 993$, $z = -1.63$, ns. In addition, the omission of distant buildings from the sketches did not depend on the context of the views, $\chi^2 (1) = 1.82$, ns. Preferences for the views to distant buildings did not differ significantly between home and office contexts, $U = 2595.5$, $z = -.93$, ns.
4.2.5 **Sky**

A representation of sky (blue colour) and/or its components (sun, moon, clouds) was present in 26 office-view sketches and 19 home-view ones. Figure 4-51 shows a sketch with the sky; two other examples can be seen in Figure 4-52 sketches (a) and (c).

As presented in Table 4-2, the presence of the sky within the view was often left unnoticed and was omitted from 76% (n=84) of office view and 80% (n=77) of home view sketches. In other words, only a minority of participants considered the sky worth seeing as a feature of the windowscape. A very strong relationship was found between drawing the sky

![Figure 4-51 An example of sketches with the sky and their corresponding photographs](image)

![Figure 4-52 Strongly liked views to the distant building with no greenery](image)
Chapter 4. Results

Influence of the sky on windowscapes preferences

The majority of participants who recalled the sky showed positive preferences towards their windowscapes (see Figure 4-53). The omission or inclusion of the sky, however, was found to have no significant influence on preferences of the views, (for simple views: \( U = 257, z = -0.91, ns \), for complex views: \( U = 1058, z = -1.4, ns \)).

As no differences were found between windowscape preferences and omission or inclusion of the sky, these two groups were merged together. The purpose of the following analyses is to determine if the presence of the sky within the views can influence preferences. It was so in preferences of simple views: \( U = 1677, z = -2.8, p = 0.005, r = -0.24 \). The simple views with the sky (\( Mdn = 4 \)) were rated significantly higher than those without it (\( Mdn = 3 \)). Only ten complex windowscape did not provide visual access to the sky and no significant difference was found between preferences of complex views and presence of the sky, \( U = 1058 \), \( z = -1.4, ns \). Figure 4-54 shows examples of simple and complex views with and without the sky. Both complex views in Figure 4-54 were rated as Liked, while the participant Liked her simple view with the sky, the simple view without the sky was Strongly Disliked.

and the complexity of views, \( \chi^2 (1) = 33.52, p < .0001 \) (see Figure 4-53). The odds of omission of the sky from sketches were eight times higher in complex views than simple ones. In other words, with the increase of numbers of features within a view, the probability of disassociating the sky and considering it as an unimportant feature of windowscapes increases markedly.
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Between Context Analysis

Looking at the office and home views separately, it became evident that the presence of the sky had no effect on preferences of the simple views within the home context, $U = 517.5$, $z = -1.86$, $ns$. However, a significant difference was found in preferences of the simple views with and without the sky in the office context, $U = 308$, $z = -2.36$, $r = -.3$, $p < .05$. This difference between contexts may be because, at home, the majority of simple views without the sky were facing a garden (see Figure 4-55), whereas in the office, blocking buildings prevented a view of the sky. A between-context analysis was not carried out for complex views, as earlier analyses showed that the presence of the sky had no effect on preferences of these types of views.
4.2.6 Greenery

Table 4-8 lists the different types of greenery found in the sketches. In 32% (n=86) of the cases where greenery of some type was visible participants did not include it in their sketches. Analysis were carried out to determine 1) possible reasons for the omission of greenery from sketches, and 2) whether there is a connection between windowscape preferences and the presence of greenery.

Greenery was omitted from 21% (n = 32) office and 35% (n = 54) home views sketches. A Chi-square test shows a strong association between the context of the views and the omission of greenery, $\chi^2 (1) = 8.26, p < .01$. As indicated by the odds ratio, it is 2.15 times more likely that greenery will be omitted from home view sketches than from those for office views. There was no significant difference between simple and complex views in omission of greenery, $\chi^2 (1) = 2.1, ns$. Figure 4-56 shows two examples where participants did not draw greenery in their sketches.

![Figure 4-56](image)

**Table 4-8 Urban greenery in Sketches**

<table>
<thead>
<tr>
<th>Greenery</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large green areas (e.g. Domain, sport fields and parks across the city)</td>
<td>57</td>
</tr>
<tr>
<td>Trees</td>
<td>136</td>
</tr>
<tr>
<td>Garden</td>
<td>51</td>
</tr>
</tbody>
</table>

Influence of Greenery on Windowscape Preferences

Greenery was positively preferred by 95% of the observers (see Figure 4-2), strongly suggesting that the presence of greenery may positively affect preferences. Accordingly,
preferences for views with and without greenery were compared. 12% (n = 38) of the overall views contained no greenery. A Mann-Whitney test showed that participants with no greenery rated their views significantly lower in preference (Mdn = 3) than those with greenery in their views (Mdn = 4), U = 3368.5, z = -3.6, r = -.2, p<.001.

Between context analysis

Presence of greenery has a significant effect on preferences for office views (U = 590, z = -3.74, p < .001, r = -.3), but no significant difference was found between preferences for home-views with and without greenery (U = 1086, z = -1.48, ns). Half of the office views (see Figure 4-57) without greenery (n = 9) were rated as Not Sure, but this value falls to only 30% in home views, with 45% reported positive preferences for their home views without greenery. The percentage of windowscapes without greenery rated as Disliked was almost the same in home and office contexts. Those home windowscapes without greenery that were rated as Strongly Liked gave offering panoramic views of the city centre (for some examples see Figure 4-52), as participants were living on upper levels of high-rise apartment blocks.

The following paragraphs discuss in detail the effect of presence of different types of greenery (e.g. parklands, private gardens, and trees) on windowscape preferences.

Auckland Domain

The Domain was drawn in 45 office and home sketches (e.g. Figure 4-58) and positively preferred by all observers (with 74% rated it as Strongly Liked and 26% as Liked). A few participants (7 for office views and 1 for a home view) omitted the Domain from their sketches.
Two reasons for this omission from office views were the complexity of those views and the visual access to large bodies of water (see Section 4.2.8 for more information).

![Figure 4-58 View to the Domain Park from a participant office and its corresponding sketch](image)

(the windowscape is rated as Liked)

**Influence of Domain on preferences of the windowscapes**

The majority of the participants with a view to the park expressed a positive preference for their views (see Figure 4-59). Preferences for these views were significantly higher ($Mdn = 5$) than views without the park ($Mdn = 4$), $U = 41.96, z = -4.94, r = -.28, p < 0.001$.

These views were all high in complexity with a median of five drawn features. Only two of the views with the Domain were rated as Disliked, both of which were blocked with buildings in the foreground, while the park was merely visible on the horizon. These participants drew and rated the park as Liked; although the presence of blocking buildings did not allow them to enjoy their views (see Figure 4-60 as an example).

**Between Context Analysis**

The Domain was rated as Strongly Liked in 76% ($n = 19$) office-view sketches and 68% ($n = 13$) of home-view ones. No significant difference was found between preferences for parks in home and office views, $U = 226, z = -6.3, ns$. The median ratings for the Domain in both of these contexts were 5 or Strongly Liked. Although the statistical
analysis showed no significant difference in preferences for the view to the Domain between home and office context, \( U = 310, z = -0.33, ns \), the median ratings were not identical. The median rating for office windowscapes was 4 or Liked, whereas the same figure for home windowscapes was 5 or Strongly Liked.

**Large Green Areas**

Other large green areas found within participants sketches or photographs were put into this category \((n = 12)\). This section includes features such as university sport fields, and small parks across the city. Although a large percentage of the view comprised managed grass areas, the views were all high in complexity. University sport fields were drawn in seven office view sketches and five homes offered views to small parks. Large green fields were positively preferred by all their observers, with 67\% \((n = 8)\) rated them as Strongly Liked. Because of the small sample, no statistical analyses were conducted.

Comparison of sketches and photographs showed that in all cases where large green fields were visible they were included in the sketches. Interestingly, a park was drawn and rated as Strongly Liked, although the participant could barely see the upper branches of its trees. A rugby playground was also included in one case, despite not being visible in the view (see Figure 4-61).

![Figure 4-61 A participant drew a park while it was barely visible through the window (The view is rated as Strongly Liked)](image)

All the participants showed positive preferences for their views to large green fields, with 58\% \((n = 7)\) rated them as Strongly Liked. Among them were five officemates who could also see large bodies of water in the horizon of their views. In all their sketches, both of these features were rated as Strongly Liked (see Figure 4-62). Large green fields seemed to reduce the negativity of the presence of blocking buildings in home views; as four participants rated their windowscape with buildings in the immediate foreground as Strongly Liked while the
blocking buildings were negatively preferred (see Figure 4-61 for an example). This result is in agreement with R. Kaplan (1983) where the “thereness” of a park was identified as the greatest source of pleasure by those living nearby. A firmer conclusion, however, will have to await the availability of larger samples for testing.

![Figure 4-62 View to a university sport field with the harbour in the horizon](image)

*Figure 4-62 View to a university sport field with the harbour in the horizon (the views was rated as Strongly Liked and Liked by five officemates)*

**Garden Views**

Common features within garden views were hedges and fences, garden trees, lawns, shrubs, vegetable gardens and potted plants. Decks, although noted in eighteen sketches were omitted from this subsection and will be discussed later in Section 4.2.9.

**Influence of Garden on preferences of the windowscapes**

Participants’ gardens were noted in fifty-one home view sketches. This was 58% of the total population who had access to gardens. For the home views, participants were advised to consider the view from the room (either living room or bedroom) where spent most of their time. Therefore, this percentage does not necessarily represent their view preferences. Garden views created positive preferences in the majority of the participants (88%, \(n = 45\)), with only six participants rating their views as Disliked or Not Sure (see Figure 4-63). Mann-Whitney U-testing showed that there was a significant difference between preferences of home windowscape with and without the garden, \(U = 1914.5, z = -3.11, p < .005, r = -.25\). Home-views to a participant’s garden were rated higher in preferences than home-views without gardens (see Figure 4-63).
One of the participants, who rated his garden view as Not Sure, emailed two photos of his home windowscape (see Figure 4-64): “I took one with the curtains closed since often, sadly, that’s how we leave it. My relation to that window isn’t special, really. I don’t have sentimental moments of sipping coffee and looking out the window there. It’s not a home I have feelings for. It’s a way station on the way to someplace I can care about.” The potted plant was the only feature rated as Liked. While the lawn, hedge, and fences have been recalled, he rated them all as Not Sure. Since this study is only focusing on the features seen through the window, the inside features (including the potted plant) were excluded from the analysis.

**Fences and Hedges**

The majority of the gardens (80%, \( n = 37 \)) were enclosed by wooden fences or hedges. Preferences for hedges and fences differed significantly, \( U = 76.5, z = -3.38, p = .001, r = -.53 \), while 81% (\( n = 13 \)) of hedges were rated as Liked or Strongly Liked, fences created positive preferences in 18% of the observers. Fences and hedges within the garden views worked as physical as well as visual barriers. In other words, fences and hedges not only defined the boundaries of gardens but they enclosed the attention of the observers in such a way that they often did not notice the features beyond. All twenty-six participants, who could also see greenery outside their garden, omitted it from their sketches (see Figure 4-65 for two examples). Moreover, a neighbour’s house within the views was also unseen by 64% (\( n = 23 \)) who had them in their views (see Figure 4-66). Eight out of 13 participants who did recall the neighbours’ houses rated them as Not Sure.
Figure 4-65 Examples for omission of greenery which located outside one’s garden

Figure 4-66 Omission of neighbour’s houses from sketches
**Garden Trees**

Garden trees were included in forty-two home view sketches, only nine of which included fruit trees. Three participants had drawn both fruit and non-fruit trees in their gardens. No significant difference was found between preferences for these two kinds of trees, Fisher’s exact test = 1.72, ns (see Figure 4-67). However, in sketches with both kinds of trees, participants rated fruit trees more favourably than non-fruit trees (Figure 4-68). Some kinds of fruit trees were found to be preferred over others. For instance, in one sketch grapefruit, feijoa and orange trees were rated Strongly Liked, while lemon and macadamia nut trees were rated as Liked (these trees were labelled by the participant himself). The only garden tree rated as Disliked was a palm (shown in Figure 4-68-c); the participant wrote an annotation explaining “annoying palm that sheds pollen and leaves.”

**Lawns**

Lawns were recalled and drawn in twenty-one home-view sketches of which 52% were Strongly Liked, with 38% as Liked and 10% as Not Sure. Lawns yielded the same preference scores as garden trees in all but one of the twelve participants who had them both in their views (see Figure 4-69 as an example). The exception was a male in age group 26-35 years who Strongly Liked his lawn but was indifferent to his garden tree.
Four participants omitted their lawns from their sketches. The majority (52%, \( n = 11 \)) of the garden views with lawns rated as Strongly Liked, with 43% being rated as Liked. Two participants were Not Sure (see Figure 4-64). In 28 garden views, lawns were not visible in the photos nor drawn in the sketches. However, no significant differences were observed between preferences for the garden views with and without lawns, \( U = 248.5, z = -1.01, ns. \)

**Shrubs**

Any greenery labelled as shrubs, bushes, or plants was included in this category. But participants frequently merely labelled shrubs as gardens; so these cases were also added to the shrubs’ category (see Figure 4-70). In thirty-five garden views with shrubs, only three were ignored in their sketches. Shrubs evoked positive feelings in the majority of the participants, with 59% rating them as Strongly Liked and 34% as Liked.

Only two participants did not have positive feelings towards the shrubs in their gardens. In one case (rated as Disliked) they were labelled as “mostly weeds,” whilst in the other (which was rated as Strongly Disliked) the observer labelled it as “massive palm bush.” Palm plants
were not always associated with negative preferences and there were several participants who rated them as Strongly Liked (e.g. see Figure 4-66 and Figure 4-69).

The majority of the garden windowscapes with shrubs (97%, n = 32) were rated as Liked or Strongly Liked. The only participant who had no preferences for her view with shrubs rated a passing car and the driveway as Not Sure, while the fence in her view was rated as Disliked (Figure 4-71). No significant difference was found in preferences for garden-views with shrubs (Mdn = 4) and without them (Mdn = 4), U = 194, z = -1.49, ns.

![Figure 4-71 The only garden view with shrubs that have been rated as Not Sure](image)

**Vegetable Garden**

Having a vegetable garden at home is to some extent a matter of choice. Therefore, it is not surprising that all the eight participants who had them in their home-views showed strong positive preferences for them. Five views with vegetable gardens were rated as Liked, with the remaining three being rated as Strongly Liked.

**Pot Plants**

Pot plants (most common were strawberries or flowers) were drawn in eight home-view sketches and were rated by almost all as Liked or Strongly Liked. The most interesting case in this subgroup was a participant with Assyrian ethnicity who compared his potted flowers with the hanging gardens of Babylon (Figure 4-72). He explained that he had not been happy with his view when he moved into the house and therefore planted flowers by the fence helped by his mother, which made him Strongly Liked his view. In his sketch, the potted flowers he planted were exaggerated; while the greenery in the neighbourhood was omitted.
Pot plants in two other cases appeared to have made participants omit borrowed greenery in their views (see Figure 4-73 and Figure 4-102). One, who was living in an apartment, kept her pot plants on the balcony. Despite extreme attention to drawing the details, a big tree in the view was omitted. Regardless of neighbouring buildings in the immediate foreground that blocked her view, she rated it as Liked. She explained her drawing behaviour by stating, “the trees on the right used to be a lot smaller, which is maybe why I still think of the houses opposite as being the dominant feature of the deck, and why I have so many pot plants.” It illustrated how pot plants could change a blocked view and altered it into a Likeable one.

One participant had different preferences for her four potted plants in her view; while one was rated as Not Sure the others were rated as Liked. It was interesting to note that the potted plants were rated more positive than the trees in her view, which were rated as Disliked. She overall Strongly Liked her sea view. Given that the sea was the only feature being rated as Strongly Liked, it seems that preferences for greenery were based on how much they obscured her view to the sea.
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Borrowed Trees

The term borrowed trees is taken from the general concept borrowed view or Shakkei. Shakkei is used in the Japanese garden design as “a technique for enlarging the visual scale of the garden beyond its actual physical boundaries by incorporating a distant view as an integral part of the garden” (Keane, 1996, p. 140). Here, the term “borrowed trees” includes those that do not belong to those who view them through their windows: street trees, trees in the far distance of the views and trees in neighbours’ gardens. Trees within universities campuses were excluded from this category and discussed in details in the next section. The reason for this exclusion was the reaction of the students to the loss of two oak trees from the courtyards of the University of Auckland. The participants felt a sense of association with these trees, which might have extended to the other trees on campuses (see page 153 for more on this).

Borrowed trees were the most common type of greenery seen from windows and were noted in 144 photographs of views. However, borrowed trees were omitted from 56 sketches. The complexity of the views had no influence on the omission of borrowed trees from sketches, $\chi^2 (1) = .103$, ns. The majority (57%, n=50) rated borrowed trees as Strongly Liked, with 33% as Liked (see Figure 4-74). Only nine rated their borrowed trees as Not Sure or Disliked, among them was, a participant who indicated her dislike with the comment “twigs with no leaves” (Figure 4-75). Other trees, rated as Disliked, were located in the foreground and hence obscuring the views.

Figure 4-74 Preferences for borrowed trees

Figure 4-75 The tree branches was rated as Disliked as it was dry
Between Context Analysis

Preferences for borrowed trees did not differ significantly between office and home views ($Mdn = 5$), $U = 11687$, $z = -.635$, $ns$. No significant difference was found between home and office views for the omission of borrowed trees, $\chi^2 (1) = 2.014$, $ns$, and when the views were controlled by their degree of complexity (for simple views: $\chi^2 (1) = 3.556$, $ns$; for complex views: $\chi^2 (1) = .409$, $ns$).

Influence of borrowed trees on preferences of the windowscapes

Preferences for windowscape with borrowed trees ($Mdn = 4$) (see Figure 4-77) were significantly more positively than views with no greenery ($Mdn = 3$), $U = 1747$, $z = -3.33$, $p=0.01$, $r = -.25$.

The Influence of Ownership on the Preferences for Trees

Garden trees could provide rich tactile experiences for their owners, which might create more positive preferences than borrowed trees. To test this hypothesis, preferences for borrowed trees in home views were compared with garden trees. However, ownership of trees was found to have no influence on preferences for trees, $U = 883.5$, $z = -1.76$, $ns$, and the median preferences obtained for both of the trees were the same (5 or Strongly Liked). However, the percentage of garden trees rated as Strongly Liked was considerably higher than borrowed trees (see Figure 4-78). In addition, there was a statistically
significant association between omission of the trees from sketches and their ownership type, \( \chi^2 (1) = 21.06, p < .001 \). The odds of omitting borrowed trees from home views was 16 times higher than garden trees. The differences between active perception of garden and borrowed trees can be seen in Figure 4-79. Consistent with these results, among twenty participants, who had both types of trees in their home views, 90\% omitted borrowed trees from their sketches while 65\% of the garden trees in these sketches were Strongly Liked and the remainder Liked (see page 144 for some examples).

**University Owned Trees**

Trees owned by two universities in Auckland were analysed separately as participants were found to have a sense of association and attachment to these trees. It was hypothesized that this sense of association would influence their preferences for these trees.

The sense of attachment to university owned trees was observed when photos showing the removal of oak trees from a courtyard of the University of Auckland were uploaded on one of the university’s online social network pages. Captions on the photos said, “The last great oak comes down.” The decision to remove the trees was taken due to instability of the ground around the trees. Students’ posts under the photos uncovered their negative affective reactions towards this decision. Therefore, participants with the tree in their view (n=5) were contacted by email and asked about their feelings regarding the removal of the trees. Participants replies (n=3) indicated their sense of attachment to the tree to the extent that one stated “Losing the trees was a personal loss for me...You learn to live without whatever or whoever you have lost but a sense of loss is there for a very long time....” The possible influence of this association was tested by comparing university-owned trees with borrowed trees within office views. Figure 4-80 shows a participant’s view to the courtyard when the trees were still standing.
48 participants could view university owned trees from their office windows but only one forgot to include them in their sketch. These trees were rated as Strongly Liked by a majority of respondents (66%, n = 31) (see Figure 4-81). A further significant proportion (30%) rated them as Liked. Only two participants rated the university trees as Not Sure. Contrary to our expectation, preferences for the borrowed trees (street trees in office views) did not differ significantly from preferences for university trees, \( U = 1842, z = -1.312, ns \). However, there was a significant association between the type of the ownership of the trees and their omission from the sketches, \( \chi^2 (1) = 15.95, p < .001 \) - the odds of drawing university-owned trees is 22 times higher than borrowed trees in office views. These trees were rated as Strongly Liked by a majority of respondents (66%, n = 31). A further significant proportion (30%) rated them as Liked. Only two participants rated the university trees as Not Sure. Figure 4-82 shows a sketch of two university owned trees with the corresponding photograph. Note that only branches of the trees were visible from the window but the participant recalled and expressed positive preferences for both of them.
Influence of university-owned trees on preferences of the windowscapes

The views towards university owned trees were rated by majority (51%, n=24) as Liked (Figure 4-83). Preferences for windowscapes with university trees depended significantly on the complexity of the views, \( U = 176, z = -2.255, p < .05, r = -.33 \). All but one of the complex views with the university trees (95%, n = 20) were rated as either Strongly Liked or Liked, whilst only 62% of simple views (n = 16) resulted in positive preferences for the observers.

The participants, who had the oak trees in their views before they were felled, were also asked whether the absence of the tree had any impact on their window view preferences. One of the participants, who previously had rated her view as Strongly Liked, commented that the resulting increased glare from the window made her keep the curtains closed. The other two participants, who replied, also complained about the glare. One of them explained “the sun feels too bright during the day (at least in summer); however, since there is only one window and one view, I would still look out just as often as before,” while the other Disliked her current view as “the courtyard looks so concrete (her emphasis) without the trees.” These two participants had Liked their views.
4.2.7 Islands and Mountains

Islands and mountains were visible in thirty-one photographs of office- and home-views. Eight of these had hills or volcanoes in the far distance of the view, and the rest looked out onto Rangitoto Island, and Browns Island. Islands were omitted from two office view and three home view sketches. Out of 14 who drew these features in office sketches, twelve rated them as Strongly Liked and two as Liked (Figure 4-85 shows an example). Only one respondent rated an island in her home view as Not Sure (see Figure 4-84). Participants drew these features with clear exaggerations (see Figure 4-85).

Influence of mountains and islands on preferences of the windowscapes

Windowscapes with mountains or islands were rated by 92% of the observers as Liked or Strongly Liked (Figure 4-86). However, in the views to the islands the presence of bodies of water are inevitable; therefore, it is not clear whether this positive preference is due to the presence of water or these topographical features. Further, the only two windowscapes rated as Not Sure were home-views with mountains in their horizon (Figure 4-87).
In both of these views the mountains were rated as Strongly Liked, the presence of other features (including neighbour’s houses, rated as Disliked, and hedge and fences, rated as Not Sure) perhaps led the observers to be ambivalent about their views. Since the numbers of windowscape with these features were very limited it was not feasible to conduct any analysis associated with overall preferences for the views containing mountains and islands.

Between Context Analysis

Mountain views were evenly distributed across the office and home views and a between-context analysis showed that mountains and islands were rated significantly lower in preferences in home views ($Mdn = 4.5$) than in office views ($Mdn = 5$), $U = 53, z = -1.978, p < .05, r = -.38$. Figure 4-84 presents the only topographic feature that has been ranked as Not Sure.

4.2.8 Large Bodies of Water

Bodies of water were found in twenty office- and eighteen home view sketches, of which thirty-six were rated as Strongly Liked, and two were rated as Liked (see Figure 4-88). Interestingly, the sketches revealed that three participants imagined seeing the sea from their windows, although it could only be seen from upper levels of their buildings (e.g. Sketch (d) in Figure 4-52 and Figure 4-89). The photos were taken by the participants in the exact...
direction of the sea (the photo in Figure 4-89 was taken when the researcher was present). It was decided to exclude these cases from the analysis.

Influence of large bodies of water on preferences of the windowscapes

Views to the bodies of water were positively preferred by 92% (n=24) of the observers (see Figure 4-90). Only two waterscape views were rated as Not Sure. These views were blocked by a building in the foreground so the water was barely visible (see Figure 4-91 as an example). Although it was found that the presence of obstructive buildings had no effect on preferences for open views with waterscapes (see page 120), it seems this conclusion may not always hold and depends on how much of the view is blocked by buildings and what proportion offered a view to the body of water.

![Figure 4-90 Preferences for waterscape views](image)

Since no waterscape view was negatively preferred, a question is raised as to whether water bodies can be considered a fascinating feature to enhance windowscape preferences. Waterscape views were high in complexity with the median of five features in the drawing. To measure whether the positive preferences for water can influence windowscape preferences, complex views without water were compared with the waterscape views. Since complexity is found to positively influence preferences (see Section 4.2.1), this approach is considered appropriate. A Mann-Whitney test revealed a significant effect of water on preferences of the views, $U = 1654$, $z = -3.01$, $p < .005$, $r = -.23$, with waterscapes rated
significantly higher in preference \((Mdn = 5)\) than complex views without water \((Mdn = 4)\) (see Figure 4-92).

**Between Context Analysis**

No significant difference was found in preferences for waterscape views between home and office, \(U = 177.5, z = -.68, \text{ ns.}\)

All office windowscapes offering a view to large bodies of water and 94% of home ones were rated as either Strongly Liked or Liked. The statistical analysis confirmed a significant relationship between preferences for views and the presence of water in office or home windowscapes (see Table 4-9).

<table>
<thead>
<tr>
<th></th>
<th>Strongly Like</th>
<th>Like</th>
<th>Not Sure</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
<th>Mann-Whitney U-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Office</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waterscape view</td>
<td>68%</td>
<td>32%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>407</td>
<td>.000*</td>
</tr>
<tr>
<td>(n=19)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complex Views</td>
<td>27%</td>
<td>54%</td>
<td>13%</td>
<td>6%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>without water</td>
<td>(n=82)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Home**

<table>
<thead>
<tr>
<th></th>
<th>Strongly Like</th>
<th>Like</th>
<th>Not Sure</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
<th>Mann-Whitney U-test</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterscape view</td>
<td>60%</td>
<td>35%</td>
<td>6%</td>
<td>0%</td>
<td>0%</td>
<td>431</td>
<td>.008**</td>
</tr>
<tr>
<td>(n=17)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complex Views</td>
<td>30%</td>
<td>37%</td>
<td>17%</td>
<td>13%</td>
<td>2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>without water</td>
<td>(n=83)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P-value < 0.001; ** P-value <0.01

**The Effect of Water on Active Perception of Greenery**

Greenery was noted in 89% \((n = 34)\) of the photographs of waterscapes. This provides an opportunity for a comparison of preferences between these two natural features. Intriguingly, the presence of water bodies captured the eye of 41% \((n = 14)\) of these participants in such a way that they omitted greenery from their drawings and exaggerated the size of the water view. Figure 4-93 shows an example of the drawings. In ten out of twenty sketches with both greenery and water bodies, preferences for water bodies were more positively than greenery, while the remaining were given the same preference.
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It appeared that there is no statistically significant association between omission of greenery from the sketches and presences of large bodies of water within the views, $\chi^2 (1) = 2.35$, $ns$. Separating the data into office and home views, some differences started to appear (see Table 4-10); but statistically no significant differences was found between omission of greenery and presence of water bodies within the home views, $\chi^2 (1) = 1.173$, $ns$. However, in office views there was a significant relationship between presence of waterscape in their office views and the omission of greenery from the sketches, $\chi^2 (1) = 11.951$, $p = 0.001$. The probability (based on odds ratio) of omitting the greenery is five times higher for waterscape views than others.

Table 4-10 Differences in the correlation between omission of greenery and presence of water by looking at Office and Home sketches separately

<table>
<thead>
<tr>
<th></th>
<th>Home</th>
<th>Office</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Omission of Greenery</td>
<td>Drawing Greenery</td>
</tr>
<tr>
<td>Waterscape</td>
<td>4 (27%)</td>
<td>11 (73%)</td>
</tr>
<tr>
<td>Scenes without water</td>
<td>49 (41%)</td>
<td>70 (59%)</td>
</tr>
</tbody>
</table>

Other types of water bodies

The previous section focused on large bodies of water such as ocean, harbour and sea visible in the views. Views in which a pond, a pool, or a stream, were noted excluded from that analysis are briefly discussed here. The rationale for this decision was to normalize the views.

Some of these lesser water features were not visible in the photographs taken from the views. Four participants who added a pond to their office view sketches justify this misperception by stating that they could hear the flow of water. Ponds created positive preferences for these participants, while two officemates had different preferences for their blocked views with a pond. Although it would be useful to determine whether small bodies
of water can influence preferences towards blocked views, there was not enough data to draw a conclusion. A stream was also positively preferred and the view was rated as Strongly Liked. However, like ponds, this feature was not found in the photograph (Figure 4-94). Pools also created positive preferences in observers and were rated as Liked or Strongly Liked in three home view sketches and two office view sketches.

![Figure 4-94](image)

Figure 4-94 A sketch with a stream and its corresponding photo (the view was rated as Strongly Liked.)

### 4.2.9 Daily Life Features

Several features, which are intertwined with everyday life, did not fit into natural or built categories as defined in this research, found to be decking, balcony, outdoor furnitures, and cloth drying racks. This section describes how some of these features were found to affect preferences for the windowscape views, particularly domestic ones.

**Decks and Balcony**

A deck was drawn in twenty home-view sketches and one office view. All but one of the decks in home view were rated either as Liked (32%, \( n = 6 \)) or Strongly Liked (63%, \( n = 12 \)). The only participant who rated the decking in his home view as Disliked was living in university accommodation and complained that the deck was usually muddy. All other views were positively preferred. Thirteen participants assigned the same preference score to their decks as they assigned to their own greenery, with two even rating the decks higher. An extreme observation was that an unfinished deck was not only Liked and rated the same as neighbour’s trees, but also evoked such a positive feeling that the observer rated her blocked view as Liked (Figure 4-95). Outdoor furniture on the decks was drawn in six sketches and rated also as either Liked or Strongly Liked (see Figure 4-96).
The participant who had a deck in his office view, rated it as Disliked and explained that its white colour irritated his eyes and made him close the blinds to halfway despite strongly liking his waterscape view (Figure 4-97).

The participant explained that they had recently painted the deck white and the glare stopped him to enjoy the view for the most part of the day.
Eye irritation caused by glare was also mentioned by two participants working in the same office with a view towards a creamy white roof. The blind in this view was always halfway shut for the glare and the roof was rated as Not Sure (see Figure 4-98).

Participants’ reactions to balconies in their home views were different from their reactions to decks. A balcony refers to “a platform that is built on the upstairs outside wall of a building, with a wall or rail around it” (Mohamed, Prasad, & Tahir, 2008, p. 175). All the eighteen houses that offered views through balconies were located in high-density residential areas, the city centre or suburbs around the CBD. The balconies were of considerably smaller size than decks; and all but two had iron railings. In seven sketches, participants did not draw the balconies and took the photos standing outside where only a portion of the railings was visible (see Figure 4-38 and Figure 4-99). This finding suggests that balconies were considered as an extension of the house that offers more expansive views of surroundings than windows.

Of eight participants who included balconies, three did not assign a preference score to this feature. The remaining \( n = 5 \) rated the balconies on how they enjoyed their views in...
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In general: if a view was rated as Strongly Liked then the balcony evoked the same preference (Figure 4-100).

Outdoor Clothes Lines and Drying Racks

Perhaps the most surprising finding of the research was that outdoor clothes lines or drying racks were recalled and drawn and even rated as Strongly Liked or Liked by three out of four participants who could see them from the window. Figure 4-101 shows an example: the clothes rack and own greenery were both rated as Strongly Liked but a neighbour’s clothes drying rack was Disliked (see Figure 4-102). The participant justified her negative feeling towards the rack by stating “I think I am just jealous, I don’t have one of those but I always wanted one”! The rack had such a significant influence on this participant that she did not recall any other features beyond her fence, including the neighbour’s house; she also omitted the trees in her own garden. A sense of ownership is intruding strongly at this point and confounding the purely visual contribution that the dryers are making. The fact that the not-owned (i.e. neighbour’s) dryer was disliked supports the theory that the positive contribution of one’s own dryer derives from being reminded of a useful amenity rather than its visual aesthetic.
4.2.10 Summary of Preferences for Content of the Views

Figure 4-103 is an expansion of Figure 4-2 and presents a summary of the preferences for each windowscape feature. In general, the majority of urban natural features were rated either as Strongly Liked or Liked, whereas urban built features resulted in both negative and positive preferences. There was a particularly interesting split between the Likeability of natural and built features (Figure 4-103). All the natural features were Strongly Liked by more than 50% those who had them in their views; of the built features, only landmarks were Strongly Liked by 40%; all the other built features were Strongly Liked by 7% or less. This clearly demonstrates that natural, rather than built, features were significantly preferred.

Large bodies of water and the sky were the most preferred features within urban windowscapes, whilst blocking buildings were the least preferred. This was followed by parking lots and motorways. A majority were indifferent to the presence of roads within their views.
One’s own lawn was the least preferred feature in urban natural category, which was followed by shrubs within one’s garden and borrowed trees. The Domain was the most-preferred type of greenery followed by garden trees.

4.3 The Influence of Types of Observer on Preferences

The demographic characteristic of participants who draw each of the aforementioned features in their sketches is summarized in Table 4-11.

**Complexity:** There were no significant differences in preferences for simple or complex views across gender, (Simple views: $U = 1449.5, z = -.066, ns, U = 4540, z = -.56, ns$), nor by age of participants for simple, $H (2) = .293, ns$, or complex views, $H (2) = 3.49; nor by urban backgrounds (Simple views: $U = 1249.5, z = -1.78, ns$, Complex views: $U = 4805.5, z = -.001, ns$).

**Blocking Buildings:** No relationship was found between gender and preferences for semi-blocked or long views. There was, however, a significant interaction with gender for blocked views, $U = 60, z = -2.79, p = .005, r = -.45$, with women ($Mdn = 3$) scoring blocked views more...
positively than men (\(Mdn = 2\)). The same result was obtained when the views were controlled for presence of greenery (blocked views with greenery: \(U = 23.5, z = -2.2, p < .05, r = - .45\), blocked views without greenery: \(U = 6, z = -2.2, p < .05, r = - .58\)).

The statistical analysis showed that less urbanized\(^1\) participants (\(Mdn = 4\)) perceived the blocked buildings significantly more positively than more urbanized participants (\(Mdn = 3\)), \(U = 108.5, z = -2.21, p < .05, r = - .36\). The results were similar when the views were controlled for the presence of greenery (without greenery: \(U = 22, z = -1.3, p < 0.05, r = - .35\); and with greenery: \(U = 34, z = -2.1, p < 0.05, r = - .44\)). However, interestingly, the results suggested that less urbanized female participants (\(Mdn = 4\)) perceived blocked views with greenery more positively than more urbanized females (\(Mdn = 3\)), \(U = 34.5, z = -2.9, p < .01, r = - .55\). Although less urbanized males rated the blocked views slightly more positively (\(Mdn = 2.5\)) than more urbanized males (\(Mdn = 2\)), there were no significant differences between these two groups in preferences for blocked views (\(U = 8, z = - .96, ns\)).

Less urbanized participants were also the majority with semi-blocked and long views, and therefore statistical analysis was not feasible to test the significance of urban background on preferences attached to these views. Age or gender was not an influential factor in determining preferences for long views (for age: \(U = 77.5, z = -.53, ns\); for gender: \(U = 66, z = -1.06, ns\)). Only three participants with long views were in age group +35; thus, the analyses were conducted excluding this group. The small sample of participants did not permit carrying meaningful statistical analyses to assess the effect of gender or age on preferences for semi-blocked views.

**Roading:** No significant differences were found for gender or age and preference for street and road (for age: \(U = 431.5, z = -1.06, ns\); for gender: \(U = 531.5, z = - .48, ns\)). Note that since only five participants with road/street in their views were in age group +35, the analyses were conducted excluding this group. Participants’ urban backgrounds had no significant effect on ratings of streets/roads, \(U = 516, z = - .7, ns\). Similar results were obtained when the tests were repeated for motorways and parking lots (motorways- for gender: \(U = 52.5, z = - .92\),

\(^1\) Less urbanized participants were referred to those who have lived the majority of their childhood in rural areas or small towns; whereas more urbanized population were those who have lived in cities or megacities (see Section 3.3.1 for information on how participants’ urban backgrounds were determined).
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ns; Urban background: \( U = 57, z = -0.44, ns \); age: \( H(2) = 3.56, ns \); parking lots- for gender: \( U = 40.5, z = -0.144, ns \); Urban background: \( U = 25.5, z = -1.73, ns \); age: \( H(2) = 3.27, ns \).

Buildings in the Far Distance: Gender and urban background had no significant effect on landmark preferences, (gender: \( U = 148, z = -0.79, ns \); Urban background: \( U = 305, z = -3.8, ns \)). Similar results were obtained when the effect of gender was tested on preferences of the Sky Tower, \( U = 50, z = -0.31, ns \). A Kruskal-Wallis test showed no significant differences between the age groups and the preferences scores for the landmark features, \( H(2) = 1.43, ns \). As there were only three participants within the age group +35 and only six in the age group 15-25, no statistical analysis was conducted to measure if age influenced preferences for the Sky Tower. Urban background had no effect on how participants’ preferences for the Sky Tower, \( U = 44, z = -0.76, ns \).

Gender was found to have no significant effect on preferences for the distant buildings, \( U = 614, z = -0.19, ns \), or its omission from the sketches, \( \chi^2 (1) = 1.44, ns \). Age also was not a determining factor in influencing preferences for this feature, \( H(2) = 2.27, ns \). No correlations was found between age and the omission of distant buildings from the sketches, \( \chi^2 (2) = 2.08, ns \). Urban background had no significant effect on preferences for the distant buildings, \( U=983.5, z=-0.6, ns \) or the omission of this feature from the sketches, \( \chi^2 (1) = .236, ns \).

Sky: No significant difference was found between omission of the sky and respondents’ characteristics (age: \( \chi^2 (2, N = 209) = 2.68, ns \); gender: \( \chi^2 (1, N = 209) = .34, ns \); urban background: \( \chi^2 (1, N = 209) = .378, ns \)). The sky was positively preferred by all who recalled it, and statistical analysis showed no significant difference between age, gender or urban background and those who rated it as Liked or Strongly Liked (age: \( H(2) = .731, ns \); gender: \( U = 137.5, z = -1.15, ns \); urban background: \( U = 154, z = -.81, ns \)).

Greenery: Gender had no significant impact on the preferences of the views with and without greenery, (for Views with Greenery: \( U = 8943, z = -0.136, ns \), for Views without Greenery: \( U = 104.5, z = -1.7, ns \)). No significant differences were found among the three age groups and preferences of views with greenery or without it, (for Views with Greenery: \( H(2) = 3.98, ns \), for Views without Greenery: \( H(2) = 1.84, ns \)). Moreover, urban background was not a determining factor in the preferences for windowscape with greenery, \( U = 8704, z = -0.22, ns \).
or windowscapes without, $U = 141.5, z = -1.18, ns$. No significant associations were found between omission of greenery and gender ($\chi^2 (1) = 1.56, ns$) or age ($\chi^2 (2) = .5, ns$) nor Urban backgrounds ($\chi^2 (1) = .18, ns$).
Table 4-11 Demographic characteristics of subsample who had following attributes within their sketches and results of possible influence of age, gender and urban background on preferences for each feature

<table>
<thead>
<tr>
<th>Feature</th>
<th>Age(^1)</th>
<th>Gender(^2)</th>
<th>Urban Background(^3)</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15-25 years</td>
<td>26-35 years</td>
<td>&gt;35 years</td>
<td>P-value</td>
</tr>
<tr>
<td>Complexity</td>
<td>Simple Views (n=139)</td>
<td></td>
<td></td>
<td>29%</td>
</tr>
<tr>
<td></td>
<td>Complex Views (n=171)</td>
<td></td>
<td></td>
<td>31%</td>
</tr>
<tr>
<td>Blocking Buildings</td>
<td>Blocked Views (n=38)</td>
<td></td>
<td></td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>Semi-blocked Views (n=15)</td>
<td></td>
<td></td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Long Views (n=32)</td>
<td></td>
<td></td>
<td>34%</td>
</tr>
<tr>
<td>Roading (^*)</td>
<td>Street/Road (n=68)</td>
<td></td>
<td></td>
<td>38%</td>
</tr>
<tr>
<td></td>
<td>Motorway (n=24)</td>
<td></td>
<td></td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Parking Lot (n=24)</td>
<td></td>
<td></td>
<td>28%</td>
</tr>
<tr>
<td>Distant Buildings</td>
<td>Landmarks (n=50)</td>
<td></td>
<td></td>
<td>32%</td>
</tr>
<tr>
<td></td>
<td>Distance Buildings (n=87)</td>
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<td>28%</td>
</tr>
<tr>
<td>Sky</td>
<td>Sky (n=44)</td>
<td></td>
<td></td>
<td>20%</td>
</tr>
<tr>
<td>Greenery</td>
<td>Domain (n=45)</td>
<td></td>
<td></td>
<td>24%</td>
</tr>
<tr>
<td></td>
<td>Garden View (n=51)</td>
<td></td>
<td></td>
<td>33%</td>
</tr>
<tr>
<td></td>
<td>Borrowed Trees (n=89)</td>
<td></td>
<td></td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>University-Owned Trees (n=47)</td>
<td></td>
<td></td>
<td>34%</td>
</tr>
<tr>
<td>Islands/Mountains</td>
<td>Islands/Mountains (n=26)</td>
<td></td>
<td></td>
<td>27%</td>
</tr>
<tr>
<td>Water</td>
<td>Large Bodies of Water (n=36)</td>
<td></td>
<td></td>
<td>31%</td>
</tr>
</tbody>
</table>

1. The influence of gender on preferences for each feature was tested using Kruskal-Wallis H-test.
2. The influence of age and urban background on preferences for each feature was tested using Mann-Whitney U-test

* No percentage is given, because of the small number of participants with driveway in their views.

ns, not significant (P > 0.05)
s, significant (P<0.05)
Age or gender had no effect on preferences reported for the park (age: \(H(2) = .323, ns\), gender: \(U = 134, z = -.836, ns\)). No significant difference was found in preferences for the Domain between participants with different urban backgrounds, \(U = 250, z = -.09, ns\). Age, gender, or urban background had no influence on preferences for the garden views, (age: \(H(2) = 4.728, ns\), gender: \(U = 310.5, z = -.3, ns\), urban background: \(U = 217.5, z = -.4, ns\)).

No significant difference was found between preferences for the borrowed trees and gender, \(U = 847, z = -1.317, ns\), or age \(H(2) = .27, ns\). Urban background was not a determining factor in preference for borrowed trees, \(U = 847, z = -1.317, ns\). The omission of borrowed trees from sketches did not depend on gender, \(\chi^2(1) = 2.67, ns\), age, \(\chi^2(1) = 11.51, ns\); or urban background, \(\chi^2(1) = .006, ns\).

Age and gender had no effect on preferences for university-owned trees (gender: \(U = 208, z = -.65, ns\), age: \(H(2) = 0.73, ns\)). Urban background also was not a determinant of preferences for university owned trees, \(U = 227.5, z = -1.1, ns\).

**Islands/Mountains:** Participants who recalled the presence of mountains or islands in their views were too unevenly distributed across age, and urban background groups (see Table 4-11) to permit meaningful statistical analyses to assess the effect of urban background or age on preferences for mountains and islands. However, it was possible to ascertain that gender had no significant effect on preferences expressed for the topographical features, \(U = 60, z = -1.45, ns\).

**Large bodies of water:** Preferences for large bodies of water were not related to subsample demographic characteristics, found to be age (\(H(2) = .953, ns\)), gender (\(U = 148.5, z = -1.37, ns\)), or urban background (\(U = 154, z = -.89, ns\)).

### 4.4 The Effect of Features on Windowscapes Preferences

In this section, an analysis of the frequency of the appearance of features in each group is carried out with the aim of determining if a combination of common urban features can be found for making predictions about windowscape preferences. All the features appeared in windowscapes rated as Strongly Liked were listed in a spreadsheet and uploaded into NVivo. The results of this analysis are presented in form of word clouds and limited to the top 3% features within each preference category.

Looking at the word clouds in Table 4-13, it is clear there are more features within the word clouds of Strongly Liked window views compared to those in Strongly Disliked &
Disliked categories. This difference is because the preferences for windowscapes also depend on the complexity of the views. Because the research mainly involved an urban situation, the presence of buildings within the views was inevitable; it is not surprising that blocking and distant buildings appeared in all types of windowscape with different preference scores. Blocking buildings are prominent in Strongly Disliked and Disliked category, even in scenes where they framed the view. However, the percentage of the times this feature is mentioned decreases with the increase in positive preferences towards the views. In contrast, the number of times distant buildings are noted in the participants’ sketches increases with increased preference for the views. This increase reaches the point where buildings in the far distance were more frequently mentioned in the Strongly Liked category than buildings in the foreground. This finding should not be taken to mean that the appearance of distant buildings positively affects preferences for windowscapes. Since this research was conducted in an urban area, the presence of distant buildings merely indicates that these windowscapes were offering long views. The presence of road networks in the views also seems to be a determining factor in windowscape preferences. Urban natural features are displayed in green in Table 4-13. As can be seen, there is a correlation between the percentage of the time urban natural features are mentioned in the views and preferences for the view. However, each natural feature seems to have a different power in affecting the windowscape preferences. For instance, own garden trees or the Domain have only appeared in the word clouds of Liked and Strongly Liked categories, suggesting that their appearance is likely to be associated with positive preferences of the views. Borrowed trees, however, appeared in all the word clouds, which do not seem to be associated with windowscape preference. This finding supports the result of Section 4.2.10 suggesting that borrowed trees are one of the least preferred features of urban greenery.

Similar results were found when looking at the data from a different perspective. In each group of windowscape preferences, the features rated the same as the views was identified and counted (see Table 4-12). In Strongly Liked views, for instance, large bodies of water were rated as ‘strongly liked’ in twenty-three sketches, whereas in Dislike & Strongly Disliked views, blocking buildings were negatively preferred in nine sketches. This analysis adds to our earlier findings by indicating the extent to which each feature contributes to overall windowscape preference. Based on this analysis, it seems that the presence of large bodies of water, own garden trees and the Domain can influence the observers to Strongly Liked their
views. Conversely, it is more likely for an observer with blocking buildings and road networks in his/her view to be indifferent or to have negative preferences for the view. The presence of distant buildings in addition to borrowed trees can make a view Likeable.

Table 4-12 Frequency of the features rated the same as the views

<table>
<thead>
<tr>
<th>Disliked &amp; Strongly Disliked Views (n=39)</th>
<th>Indifferent to the views (n=47)</th>
<th>Liked views (n=127)</th>
<th>Strongly Liked views (n=95)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blocking building</td>
<td>23%</td>
<td>Distant buildings</td>
<td>13%</td>
</tr>
<tr>
<td>Road Networks</td>
<td>21%</td>
<td>Borrowed trees</td>
<td>10%</td>
</tr>
<tr>
<td>Parking facilities</td>
<td>10%</td>
<td>Landmarks</td>
<td>9%</td>
</tr>
<tr>
<td>Borrowed trees</td>
<td>3%</td>
<td>Parking facilities</td>
<td>9%</td>
</tr>
<tr>
<td>Road networks</td>
<td></td>
<td>Borrowed trees</td>
<td>8%</td>
</tr>
<tr>
<td>Blocking building</td>
<td></td>
<td>University Owned</td>
<td>8%</td>
</tr>
<tr>
<td>Landmarks</td>
<td></td>
<td>trees</td>
<td></td>
</tr>
<tr>
<td>Garden trees</td>
<td>2%</td>
<td>Blocking building</td>
<td>6%</td>
</tr>
<tr>
<td>University own trees</td>
<td>2%</td>
<td>Islands/Mountains</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Domain Park</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Garden trees</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Own lawns</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sky</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Large bodies of</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>water</td>
<td></td>
</tr>
<tr>
<td>Rank</td>
<td>Strongly Disliked &amp; Disliked Views</td>
<td>Indifferent to the Views</td>
<td>Liked Views</td>
</tr>
<tr>
<td>------</td>
<td>-----------------------------------</td>
<td>--------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>Features</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Blocking Building</td>
<td>43</td>
<td>31%</td>
</tr>
<tr>
<td>2</td>
<td>Road Networks</td>
<td>17</td>
<td>12%</td>
</tr>
<tr>
<td>3</td>
<td>Borrowed Trees</td>
<td>10</td>
<td>7%</td>
</tr>
<tr>
<td>4</td>
<td>University Trees</td>
<td>7</td>
<td>5%</td>
</tr>
<tr>
<td>5</td>
<td>Distant Buildings</td>
<td>5</td>
<td>4%</td>
</tr>
<tr>
<td>6</td>
<td>Parking Lot</td>
<td>4</td>
<td>3%</td>
</tr>
<tr>
<td>7</td>
<td>Cars</td>
<td>18</td>
<td>3%</td>
</tr>
<tr>
<td>8</td>
<td>Park (the Domain)</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>9</td>
<td>Fence</td>
<td>16</td>
<td>3%</td>
</tr>
<tr>
<td>10</td>
<td>Total Number of Drawn Features</td>
<td>139</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.13 Word cloud of frequent features appeared in windowscape.
Figure 4-104 presents the results graphically. The windowscape (a) is likely to generate strong positive feelings in observers; whereas the windowscape (b) is expected to be Disliked, especially by those who view it from their homes. Preferences toward the windowscape (a) may increase by the omission of the distant buildings, and preferences toward the windowscape (b) are related to the number of negative features within the view; in that simpler views (fewer features) are associated with stronger negative responses.

A likeable urban windowscape is a view with...

...a large body of water
...an island or mountains
...the sky although it is less likely to be remembered by the observer
...distant buildings and especially landmarks
...greenery especially parkland
...no obscuring feature (a long view)
...no roading in the foreground (and preferably neither in the background)

A disliked urban windowscape is a view with...

...limited or no visual access to the sky
...roading in the foreground
...limited or no visual access to greenery
...a carpark
...lack of visual privacy
...limited visual access due to the presence of blocking buildings in the foreground (and the middle ground)

Figure 4-104 Graphical presentation of summary of the findings:
Typical liked and disliked Auckland’s windowscapes (Author)
4.5 Influential Anchor Features

This section is intended to determine whether some features contribute more strongly to overall preference of the view. To answer this question, first we calculated the mode of preferences assigned to features within each sketch and then assessed its relationship with overall view preferences using Pearson’s Chi-square test. A strong association was found between the mode of the preference scores for features and overall preferences of the views ($\chi^2 (9) = 132.45, p < .001$) (the Strongly Disliked views were excluded from this analysis because of low frequency). As Figure 4-105 shows the majority of mode values for Disliked and Not Sure views are varied between within 2 and 4; whereas in Liked and Strongly Liked views the majority of the mode values is over 3.

Figure 4-105 indicates that other factors could influence windowscape preferences. Does the time order of drawing correlate with overall preferences of the views? This question emerges from the literature on mental mapping (e.g. (Golledge & Spector, 1978; Hart & Moore, 1973; A. W. Siegel & White, 1975) which stresses the importance of starting points or anchor points (e.g. one’s home) in drawing the sketch maps. Anchor-points theory developed by Golledge and Spector (1978), is closely related to the notion of landmarks in Lynch’s (1960) sense, features in any given environment that stand out from among the other things in the environment. Landmarks are believed to act as “superordinate features in a hierarchical organization or multiple levelling of lesser known, lesser experienced, and more incompletely imaged and remembered environmental features” (Golledge, 1999, p. 17). The anchor point theory expects landmarks to be drawn early in the drawing process.
The picture of a place in one’s mind is formed as a whole; however, in the process of sketching it, one must choose in what order to depict each feature. Here, an extension of anchor point theory is formulated and examined, based upon the argument that individuals begin their windowscape sketching by drawing those features that stand out more than others. It is hypothesized that these initial features can help to indicate preferences for windowscapes.

For this study, office and home view sketches were combined into one pool. In some of the sketches, frames of the windows were drawn and labelled as the one first drawn. The sketches that had only one or two drawn features were excluded from this analysis. Since the frequency of initial features and views rated as Strongly Disliked was very low, these also were excluded from this analysis. Pearson’s Chi-square test was used to determine the influence of mode of preferences of features within each sketch and preferences for initial feature on overall windowscape preferences. A statistical association was found between preference for initial features and overall preferences of the views ($\chi^2 (9) = 80.4$, $p < .001$), suggesting that the feature recalled first have a strong significant influence on view preferences.

As Figure 4-106 presents, landmarks, garden trees, harbour, a deck, parklands, and borrowed trees most frequently appeared as an initial feature in the Strongly Liked and

![Word cloud of frequent initial features appeared in windowscape sketches](image-url)
Liked sketches. In Not Sure and Disliked views blocking buildings and road most frequently were drawn first.

4.6 Discussion of the Empirical Findings

This Section discusses the results obtained from APT in relation to previous landscape preference studies and suggests influential factors on windowscape preferences.

4.6.1 The Influence of Windowscape Characteristics on Preferences

Complexity

Pictorial studies previously reported that there is a positive correlation between complexity of urban scenes and preferences (e.g. Abkar, Kamal, Maulan, & Davoodi, 2011; Herzog, 1992; Tuaycharoen, 2006); however, a few held that there might be an inverted U-shaped relationship between complexity and landscape preferences (e.g. Day (1967); Berlyne (1971)). Such a trend was not found in the current study and windowscape preferences increased with complexity. This result is similar to that of Kaplan, Kaplan, and Wendt (1972) who found a linearly positive relationship between complexity and preference in both urban and natural scenes.

The present study also found the effect of complexity on preferences depends on the context of the views. While the complexity was a significant predictor of preferences for office windowscapes, no relationship was found for home views. There are two explanations for this result. First, simple views from offices mainly overlooked a nearby building, whereas in the home context 26% of the simple views were gardens. To recall, blocking buildings were the least preferred feature of the views, while greenery was positively preferred by most observers. This suggests that the content of the view is more influential than complexity affecting preferences, as also reported by Ulrich (1981) and S. Kaplan (1987).

Second, observers in their office are more likely to be “mentally fatigued” due to the need of staying engaged with their everyday tasks and fighting off distractions compared to when they are at home (Kaplan & Kaplan, 1989). The Kaplans argued that one might recover from mental fatigue by spending time in restorative environment, or simply looking at it. As a complex scene can effectively contribute to restoration (Pazhouhanfar
& Kamal, 2014); it is reasonable to argue that the higher preferences for complex views in offices is the result of observers’ greater need for restoration.

**Blocking Buildings**

Blocked views and obscuring features are one element of Appleton’s prospect/refuge theory, an evolutionary theory of landscape preferences (Appleton, 1975, 1984, 1996). The theory posits that preferences for environments are strongly related to the extent to which such environments provide places for prospect (the ability to see) and refuge (to remain without being seen). In line with Appleton’s theory, empirical studies found buildings at a close distance are negatively associated with preferences of urban landscapes and windowscape (Herzog & Shier, 2000; Kfir et al., 2002; Tuaycharoen, 2006; Verderber, 1986). Even the presence of buildings in the middle-ground of urban scenes led to negative evaluation of the views (Herzog, 1992; Kfir et al., 2002).

In the present study, a blocking building is also found to be the least preferred feature of windowscapes, having a negative influence on likeability. Surprisingly, it was also found that blocking buildings were rated more negatively in the views with greater depth of views (in particular those with large bodies of water at the horizon) than completely blocked views. A possible explanation for this might be that when a view is partially blocked, observers get a glimpse of what has been deprived from them. For example, the presence of an obscuring building not only limits an individual’s visual access to water views, but also deprives the viewer the enjoyment of a wide view of this preferred feature of urban windowscape.

The presence of greenery in views with blocking buildings positively influenced preferences for windowscapes. This finding supports previous research that described greenery as one of the most effective design elements in improving the visual quality of urban areas (e.g. R. Kaplan, 1985; Nasar, 1983; Stamps, 1997; Weber, Kowarik, & Säumel, 2014). The present research adds to this finding by suggesting that the positive influence of greenery is more effective in blocked and semi-blocked views than long views. Such results are important for application: if a view to a blocking building is inevitable when designing a new building, the architect should try to minimize the negative influence of a
blocked view by providing greenery. One way to achieve this goal is using developing technologies such as green walls. However, it should be mentioned that views may occur from many directions and such remedies are not always possible.

Blocking buildings were more negatively assessed in home views than office views. This result is due to different levels of visual privacy needed in these two contexts. At home, the ability to see neighbours through the window led to negative evaluation of the view. Interestingly, this pattern was the opposite for office views: the ability to watch the occupants of blocking buildings led some participants to positively evaluate the building. This finding mirrors those of Meerdink, Weersink, and Rozendaal (as cited in Hellinga, 2013) who found office workers appreciated viewing some sort of activity out of a window as long as their privacy was not violated. Since visual privacy is the affordance of a view, which can only be captured in situ, pictorial studies fall short in this regard.

**Transport Infrastructure**

Previous research suggests the presence of roading and parking lots contribute negatively to preference of a scene (Verderber, 1986; Nasar, 1987, 1988, 1998; R. Kaplan, 1985). Our study, however, found the context of the views can have an influence on preferences for views with roading; such home views were rated more negatively than office views. Such a result is not surprising, as aural components of the urban landscape can have an effect on visual preferences. In particular, we believe that a higher need for acoustic privacy in residential places did not let the participants of our study judge the roading based purely on visual contribution.

The desirability of visual motion in office views can account for another factor that made the office views with roading more likeable. Markus (1967) suggested the dynamic characteristic of the window as one of the criteria for a “successful” window design. However, his study did not provide evidence to support his arguments, as his survey did not “define the properties of the ‘ground’ sufficiently attractive terms…for instance…‘people’ and ‘traffic and shops nearby’” (Markus, 1967, p. 109). In our study, 33% of the participants rated this feature in their office views positively and only 9% complained about the noise from the roads and negatively evaluated the road within their
offices views. Based on these results, it is possible to hypothesise that roading in office views is less likely to evoke negative preferences in observers as long as the balance between the view’s motion and the observers’ acoustic privacy is maintained.

Asphalt covered parking lots created negative preferences in 46% of observers and were the second least preferred features of urban windowscapes. The median preference score for views with parking lot was 3 (or Not Sure). This result contrasts with that of R. Kaplan (1985), who found half of the residents participated in her study liked seeing parking areas out of their home views. A possible explanation for this might be that, in Kaplan’s research, the residents could see their own or neighbours’ cars out of the window; therefore, they had an emotional attachment with their views or, as Kaplan explained, the view provided them with useful social information. However, in this current study, only one participant could see her own car and rating the parking as Liked; the others had no emotional connection with this feature.

**Buildings in the Far Distance**

Lynch (1960) stressed the importance of distant views and panoramas in urban environments and identified them as the main source of enjoyment in the city. Markus (1967) reported that 88% of office workers liked the distant views of the whole city and the surrounding countryside. Tuaycharoen (2006) found a cityscape was rated more positively than two close views of natural features. Similarly, in the present study views to buildings at a far distance (or city views) were positively rated by 84% of the participants. This result can be explained by evolutionary theories, as these views were high in complexity and were offering long views.

**Landmarks**

The significance of landmarks on view preferences is under-researched in windowscape studies. However, a few field studies (e.g. Hidalgo et al. (2006) and Nasar (1990)) have touched on this topic and reported the positive effect of historically significant buildings on visual quality of scenes. Similarly, in Herzog et al.’s study (1976) pictures with churches, an art museum and hall of justice were preferred.
Our study found landmarks to be the most preferred built feature of urban windowscapes. The exaggeration in the size of the landmarks found in most sketches and the fact that they were only omitted from 4% (n=2) of the sketches makes them the most imageable built features of windowscapes. This study also found a positive relationship between the presence of landmarks and windowscape preferences. It was interesting to note that in some cases even a silhouette of a landmark on the horizon has the power to positively influence the observers. Such a result may be related to the fact that the presence of landmarks increases the legibility (one of the four spatial attributes discussed in Kaplan and Kaplan’s framework) of the windowscapes. Landmarks provide useful information regarding the orientation of the views and simplifying them in a way to be easily understood and remembered.

One unanticipated finding was that the Sky Tower was rated significantly more positively in home than office views. This result can be explained by the fact that the Sky Tower was mostly seen during daytime in office views; whereas in home views a participant could also view it during the night. This hypothesis is supported by the fact that one of the participants drew a night time sketch of her Sky Tower view and expressed her fascination with the beauty of the colourful lights during the night. Positive responses towards the lights of city skylines was has been previously reported by Nasar and Terzano (2010).

Sky

Pictorial studies usually exclude the sky from the remaining of the scene and do not study its effect on preferences of landscapes. However, the sky appears to be an influential factor for preferred views (Markus, 1967; Ludlow, 1976; Tregenza & Loe, 2013).

Our study revealed that the influence of the sky on view preferences depends on the complexity of the views. The sky found to have a significant positive influence on the preference of the simple views, whereas it had no effect on complex views. These results let us to partially agree with Lothian’s (2000, p. 246) assertion that, for participants with complex views, “the sky plays literally a backdrop role…and appears to be generally disassociated from the landscape itself.” The presence of sky in a view depends heavily
on the density of the buildings and the probability of having a preferred view increases with the distance between adjacent buildings.

**Greenery**

Greenery, generally, increases the visual quality of an urban scene (Herzog et al., 1982; E. V. White & Gatersleben, 2011); however, some kinds of greenery contribute more strongly to preference than others. For instance, satisfaction with the view increased with presence of park-like environments, whereas views to mowed lawns had no effect in preference of office views (R. Kaplan, 1983, 1985; Lottrup et al., 2013). The difference in preferences of trees and grass might be because the visual effect of trees is three-dimensional (Aoki et al., 1985) and that they are relatively uncontrolled in their form (no straight edges). Instrumental functions of urban trees, shade and shelter, can also explain why trees are valued more than lawns (Gibson’s (1986) affordances).

Similarly, the results of our study showed that views to parkland created positive preferences in 96% of the cases; this was followed by views with personal trees, which were Strongly Liked or Liked by 95% of the participants. Presence of borrowed trees, the second least preferred type of greenery, created positive preferences in 76% of the cases, while 7% of these views were Disliked. This result suggests that in some cases positive feelings toward borrowed trees were not strong enough to influence windowscape preferences.

Positive preferences towards viewing parkland out of the window have been indicated in a large body of research (see Section 2.6.2.2). However, present study found parklands were slightly more positively rated in home views than office views. The difference in rating parkland in home and office views may be related to amenities that a park offers to householders living nearby, such as the possibility of taking children to the playground. Another interesting result was that those who could see both a large body of water and a park out of their windows omitted the latter from their sketches, while exaggerating the size of the water in their drawings. This may suggest the superiority of large bodies of water to greenery in terms of imageability and hence likeability.
APT also indicated that the imageability of greenery depends on ownership and personal association. For instance, having a garden views or even pot plants could negatively affect the imageability of borrowed trees and so they are less likely to be appreciated.

We also found the contextual environment of greenery could significantly influence how it is perceived by an individual. For example, an individual who is surrounded by views to concrete buildings daily may indicate a ‘Strongly Like’ preference at the presence of a single tree right in front, whereas an individual who is surrounded by views to open spaces may indicate only a neutral preference for the same tree. This is not to say that the second individual does not value that tree, but it is of less significance within the context of their surroundings.

Several points have been drawn from studying the participants’ preferences for their garden views. These findings can be added to the limited body of research in this area and help to design attractive gardens.

- Hedges are preferred over fences. This result can be easily explained by biophilia (humans’ predisposition to love of life or love of nature); however, preference for hedges may also be related to their need for caring attention. This provides some explanation as to why 32% of the respondents did not remember to include fences in their sketches. Moreover, well-kept garden hedges may be reminiscent of time spent watering, feeding and pruning them; past tactile experience may come to mind, thereby contributing positive preferences.
- Greenery or buildings beyond the fences or hedges are likely to be overlooked.
- Personal fruit trees appeared to generate stronger feelings in observers than non-fruit trees. However, more research is needed to confirm this result.
- Shrubs and trees can create more positive feelings in an observer than grass lawn.

These results agree with the findings of Palmer (1986) who noted that a lawn with no tree was the least preferred yard whereas presence of a hedge, or small tree and shrubs could create a likeable yard.
Islands and Mountains

Urban scenes toward mountains are considered visually attractive in Nasar (1990). The emergence of policies in Vancouver that aimed to protect views to mountains was the result of urban dwellers’ favourable responses to this natural amenity (Vancouver City Planning Commission, 1980).

Similarly, in our study, islands and mountains were positively preferred and drawn with clear exaggeration, indicating the significance of this feature to the observers. An interesting finding of the present study was that preferences for these features were significantly less positive in home views. This result might be related to the fact that almost all office views looked out to islands, while half of the home views were of mountains faintly visible on the horizon. However, to be certain, further investigation is required to confirm whether islands are preferred over mountains or whether preferences for these features depends on context. Due to limited number of views with these features, it was not feasible to determine if presence of these features in the views has any influence on windowscape preferences.

Large bodies of water

Water is the most influential feature of a view which has a significant positive effect on preferences (e.g. Kaplan & Kaplan, 1989; Ulrich, 1983, 1993; Nasar, 2000). Preferences for water are believed to be related to its survival value in our evolutionary history (R. Kaplan & Kaplan, 1989; Ulrich, 1983).

Large bodies of water, in the present study, were also the most preferred and influential features of windowscapes. Participants recalled even very limited visual access to large bodies of water and the mere presence of this feature within the view was associated with positive preferences. This finding echoes results by White et al., (2010) who found that built scenes containing water were rated more positively than those without, but an increase in the proportion of water has minimal effect on preferences. Therefore, the presence of water in urban views is more important than its extent. The
exaggeration in the size of the water features found in the majority of water view sketches also stresses the value of this feature to the observers.

Greenery was omitted from 41% of water-view sketches; this supports our earlier findings that large bodies of water are superior to greenery in creating positive preferences. In line with this finding, White et al., (2010) demonstrated that responses to built environments where water was present were just as positive as those to entirely natural green space without built form or water. Earlier, Karmanov and Hamel (2008) showed that urban environments with water could have the same healing power as a natural environment, despite a limited amount of greenery.

4.6.2 The Influence of Observers’ Characteristics on Preferences

The present study adds to limited research evaluating the effect of observers’ characteristics on landscape preference. In general, research found age and childhood background can influence the perception of landscape, but the role of gender is not clear.

Results of our study, similarly, showed that observers’ characteristics (found to be age, gender and urban background) had almost no effect on preferences for windowscape features except for blocked views. However, some of the non-significant results may have been due to the small subsamples in each category or using relatively homogeneous study populations (in terms of age and education). To recall, 89% of the participants were 35 or younger and all were postgraduate students. According to previous literature, level of education has a significant effect on landscape preferences (see Section 2.5.2 for more information).

It was interesting to find that the preference for blocked views was affected by gender. While the majority of the females with blocked views were indifferent towards their windowscapes, males mostly showed negative preferences towards their blocked views. This result can be explained by prospect and refuge theory. According to Heerwagen and Orians (1993), being hunters during human evolution, males are now more inclined to prefer prospect-dominant settings. Females, on the other hand, are more interested in refuge-like settings as their ancestors were engaged in different tasks such as
Chapter 4. Results

taking care of children (needs secured places) or gardening vegetables (which resources could be found in more closed settings).

The findings also suggested that the preference for blocked views depends on the urban backgrounds of females. In other words, the less urbanized females are the more likely to have positive preferences for their blocked views. No statistically significant differences were observed between males with different urban backgrounds; although less urbanized males were slightly more positive about their blocked views. It is difficult to explain this result, but it seems that living in high-density places during childhood can affect people in a way that they become more concerned about denial of visual access. These results are in line with previous studies, which reported that childhood environmental backgrounds could determine landscape preferences (see Section 2.5.2). As the subsample of the participants with blocked view was relatively small, more research in this area is needed to confirm these results.

Due to cultural diversity of postgraduate students and small number of people, present thesis did not study the possible effect of cultural background on urban landscape preferences. However, based on previous research, cultural backgrounds seem to play a negligible role on landscape preferences.
Chapter 5. Conclusions

5.1 Overview and Summary of Major Findings

The aim of this work was to develop a method for determining public visual preferences for everyday urban landscapes. Although preferences for natural landscapes have been extensively studied in the past, urban landscape preferences were relatively under-researched. This was largely attributable to the difficulty of assessing qualities of urban environments and shortcomings of the existing methods.

Landscape preference studies were mostly conducted using methods that were passive in two senses. Participants were exposed to scenes in a laboratory environment, where they could only passively perceive each scene removed from their everyday meanings. Participants also could only passively rate the scenes. These methods fall short in that they fail to identify landscape features that capture observers’ attention and are
more influential in affecting preferences. Two factors were identified as possible determinants of preferences:

1) Physical characteristics of the landscape (features and their spatial distribution),
2) Observers’ demographic characteristics (age, gender, level of education, childhood environmental backgrounds, current place of residency).

The novel method of Active Perception Technique (APT) consists of collecting information from a brief sketch, a questionnaire, and a windowscape photograph. APT allowed participants to engage actively with their views by drawing what they could recall seeing out of their windows. APT studied windowscape preferences by applying the two sets of independent variables (landscape and observers’ characteristics) in order to understand their influences on observers’ perceptions. APT has been demonstrated by interviewing 158 postgraduate students of two Auckland universities and asking them to draw their views seen from both their office window and a window at home.

Our results can be grouped into two main categories: 1) preferences for component features of the views and 2) preferences for windowscapes as a whole. Key findings regarding preferences for component features of the views are:

- Natural features are preferred over built ones.
- Buildings obscuring the views in general provoke negative feelings in the observers; however, several factors can positively influence observers feelings; e.g. depth of the views, personal association with the buildings and context of the views. It was also found that gender and urban background have a significant influence on preferences for block buildings.
- Transport infrastructure such as roading and carparks is more likely to be negatively preferred particularly in home views were the visual and acoustic privacy is more valued.
- Landmarks are the most preferred built features in an urban windowscapes which can be attributed to their ability to increase the legibility of the views.
- Preference for the sky depends on the complexity of the views.
- Some kinds of greenery contributes more strongly to the preference than others. For instance, while parklands are the most preferred type of greenery,
mowed lawns are not highly appreciated. Also it was found that the influence of greenery on preference depends on the openness of the view.

- Large bodies of water was the most influential and preferred features of windowscape.
- The influence of culture on windowscape preferences is still remained unknown as cultural diversity of the postgraduate students did not allowed the current study to investigate the influence of this factor on preferences. However, urban background found to have an influence on preferences for blocked views and it seems that people with urban background are more concerned about the denial of visual access.

Key findings regarding preferences for windowscapes as a whole are:

Complexity of the views has positive influence windowscape preferences especially in office environments where the observers are mentally fatigue.

Preferences of the views are positively associated with openness of the views.

Windowscapes with natural features in particular large bodies of water, parklands and island are highly preferred. The absence of negative features such as blocking buildings and roadings can increase the preferences for such views.

APT revealed that the likeability of some features depends on the context of the views and also the personal association of the observers with these features. APT also showed that overall windowscape preferences depend strongly on what features are in the views together within their spatial arrangement. Observers’ characteristics only influence preferences for blocked views. Natural features of urban windowscapes were preferred over buildings and roads. However, it has been found some natural features such as garden, parkland, and large bodies of water are stronger determinants of preference than others.

5.2 Theoretical Implications

Introducing the Concept of Imageability to Preferences Studies

The theoretical framework for this thesis stems from research in environmental cognition, in particular the works of Lynch (1960) and Nasar (1990). These researchers claimed the real world is too complex to be processed completely by inhabitants, so people create their
own version of reality by selecting only those environmental features that produce affective responses. In this work, it was similarly argued that viewing an urban landscape daily could result in some features standing out more than others. Preferences regarding these prominent perceptual features were proposed to determine how the quality of the view from the window was judged.

The Active Perception Technique identifies affective features by means of capturing observers’ mental images of daily views and comparing them with photos taken from their windows. Traditional protocols see photographs as a reasonable surrogate of the visible physical environment. In this present work, photographs were considered to be tools for making an objective record of the view outside. A comparison between photographs and sketches indicated how a person sees the view, which can contrast greatly with the reality documented in the photograph. APT revealed the imageability of windowscape features depended on parameters such as their surrounding context and the complexity of the views. APT also showed that the most imageable feature – that drawn first – was the strongest predictor of preference.

Underlying the Importance of Personal Determinants of Urban Landscape Preference
The results of the study showed that preferences for built features depend on the context of the views (the meanings such as visual privacy) and personal association with these features (see Figure 5-1). The majority of natural features created positive preferences almost without conditions. These results provide support for Bourassa’s tripartite theory and the effect of personal association on preferences for built features.

Based on the results of the present study, it can be argued that part of the preference assigned to built features of urban landscapes is derived from the experiences that people bring into their judgements. However, this factor has received little attention in landscape preferences studies (Cheng, 2007). Moreover, the only method used for assessment of the outside view failed to identify personal association as a possible determinant of view quality (Hellinga & Hordijk, 2014). We suggest that part of the reason why APT found natural features were preferred over built ones was because the role of personal determinants was underestimated in the design of the city. Hence, the current
study encourages future designers to try to align the biological, cultural and personal
determinants of urban landscape preference to create Likeable environments.
Figure 5-1 The conditions under which windowscape features are more likely to be positively preferred
5.3 Novelty

5.3.1 Opportunities

This research has resulted in a novel method to capture preferences for urban landscape. The usefulness of the method has been demonstrated by studying windowscapes. The method has several advantages over existing methods in the field.

APT is a participant-friendly technique in terms of time required. The questionnaire and sketching can be completed in 20 minutes, whereas other active methods (such as visitor-employed photography and field assessments) can take a few hours. Second, respondents find APT pleasurable because it asks them to do something they have never done before. This also can work in favour of recruiting the research participants. For instance, in the present study, some respondents found the method so novel and intriguing that they encouraged their colleagues to participate in the study. A few even approached the researcher while she was interviewing their colleagues and asked if they could also participate in the study.

APT is an inexpensive method, which only requires pencil, paper and a camera. This also gives the method the flexibility to be conducted in any environment. Unlike studies held in a laboratory setting using representation of landscapes, APT deals with actual landscapes. Consequently and also unlike laboratory studies, the researcher does not need to be concerned about the extent to which the results reflect the actual field conditions. However, APT does not let the researcher have any control on scenes and features. Arguably, this is one of its strengths rather than a weakness. APT gives participants the power to identify the factors accounted for their preferences whereas in pictorial protocol studies, the researcher must guess, assume, or else use secondary data to identify them.

Implementing APT on window views has not only reproduced results found using photographic methods; but has extended our knowledge on topics that have not been empirically studied so far, such as:

- Personally owned trees are stronger predictors of preferences than borrowed trees,
- The influence that greenery has on preferences depends on openness of the views,
• Personal association with blocking buildings can positively affect their preference regarding them,
• Visual assessment of roading depends on the amount of noise they generate and the context of the view,
• Presence of the sky within the view is more likely to generate positive preferences in views of lower complexity.

Results obtained from APT show it has a clear potential be useful for policy makers, and planners to enhance the visual quality of built environments and to provide more likable and liveable cities. For instance, this study found that trees owned by observers evoked a stronger positive effect than street trees. Therefore, it may be a better choice to leave maintenance of street trees in residential areas to the local community. Such results also can be used to influence real estate values that will then impact on local taxes. It may also have an influence on productivity of office workers. It could also be used by the Green Building Council in assessing the quality of the indoor environment.

One of the challenges architects face in megacities is the fact that the character of windowscapes are limited by what surrounds the building (neighbour buildings, streets). Within the range of possibilities given by a specific location, APT can help to maximize view preference by specifying how to frame the view and what to include or exclude. As an example, if the provision of a blocked view is inevitable, the architect should try to provide the sky and greenery (e.g. a place to grow pot plants) to increase the view preference. Designing based on APT not only may have a psychological effect for the occupants, but may also have economic effects on the value of buildings.

Although this study has demonstrated APT on windowscapes, the method has a great potential to be used as a decision tool in cultural landscape management. For instance, as cities intensify one of the challenges in management of urban cultural landscapes is what to conserve. APT can help to justify preserving existing view shafts to these features as the city intensifies. Such information can be used to improve the appearance of urban areas and make them more pleasant places to live in. APT also has other uses; including examining the effects of a planning intervention.
In this research, a relatively homogeneous group (postgraduate students) were chosen to test the method. However, APT could be used to show differences in landscape preferences between differing groups, sub-cultures, and special populations. For instance, APT can compare preferences of tourists and local residents, which can guide urban planners and policy makers when allocating land to residential and touristic uses.

Although preference may contain other dimensions of urban landscapes such as tranquillity and security, APT could readily be modified to measure these aspects too. For instance, APT could provide useful information about tranquillity values of visual contact with some cultural heritage such as mosques or churches.

5.3.2 Limitations

The aim of this study to develop a technique for measuring preference for urban landscape when experienced in their actual contexts and obtain initial results which can be a step toward establishing criteria for the design of urban environments to give positive preferred window views. However, there is scope for improvement. Concerns fall into two main areas: the technique and the sample.

APT’s Shortcomings:
APT is based on the assumption that sketches made by respondents faithfully communicate environmental images they carry in their heads, whatever the drawing skills of the participants. This limitation is anticipated in APT and addressed by asking participants to label their drawings or simply list the features they found it hard to draw (e.g. sky and the horizon). Using this labelling technique might minimize the possibility that individual differences in drawing ability confound the results. However, any findings based on features omitted from the sketches should be interpreted with caution. Moreover, it is possible that participants who drew complex images were better at drawing, although such correlation was not noticed while analysing the sketches.

By asking participants to rate daily views, APT makes participants think about their subconscious feelings. However, participants may subjectively aggregate their experiences of their views, placing much more weight on more recent or extreme ones.
Caution should therefore be applied to any assumption that an aggregated perception represents how views have been perceived at any specific time.

Possibly one of the main drawbacks of APT is that the process of preparing the data for statistical analysis is time-consuming. Sketches need to be categorized manually based on their content and then uploaded into a spreadsheet. Moreover, the sketches need to be compared against the photographs to detect omitted features. It may be impractical to apply the method to a large sample.

It should be also mentioned that APT at the moment only captures the possible effect of landscape elements, complexity and openness on preferences and future researchers should try to develop the technique to study other spatial configuration such as coherence which has been shown to be particularly important in landscape preference.

**Participant Sample (Potential Limitation of the Findings):**

Since APT was tested using only postgraduate students, we have no proof of the generalizability of our results. However, one of the principal objectives of this work was to show the applicability of the technique; the representativeness of the research sample was not a priority. Although tertiary students (mainly undergraduate students) have been widely used as participants in surveys of landscape preferences studies (see Lothian (2000); Stamps (1999) for detail reviews); researchers did not reach a consensus if students can satisfactorily substitute for the general public (cf. Tveit (2009) and Yao et al. (2012)). Participants of the present research were overwhelmingly young (<35, 89%) and highly educated (73% Ph.D. students). The generalizability of conclusions drawn from results of the study may well be somewhat limited by differences in level of education, age group and the relatively small number of individuals interviewed. Note especially that there is some evidence that age (Zube et al., 1983) and level of education (e.g. Vecchiato, 2012) seem to affect landscape preferences.

The external validity (generalizability) of the study findings is also limited by 1) the findings only represented the landscape preferences of those postgraduates who had access to window views in their office and/or home; 2) the possibility that those
postgraduate students who were more satisfied with their views might have volunteered to participate in the study.

5.4 Recommendation for Further Research

1. Since the study involved a relatively homogenous group of participants in terms of a socio-demographic background, it is likely that respondents had similar value systems. So, future studies might apply the APT to a wider range of participants to verify that the results and generalisations apply to the greater public.

2. A larger cohort of participants from culturally diverse backgrounds should be used to determine whether culture and ethnicity is a possible determinant of windowscape preference. However, other research has found culture has almost no effect on landscape preferences (Section 2.5.2).

3. APT should be applied to different cities and urban landscapes to determine whether the findings of the present study apply elsewhere.

4. Since the results seemed to indicate a correlation between the preference for the first drawn feature and the overall preference of the view, a promising research direction for future studies in both natural and urban landscapes is work to uncover just what are the overriding features in complex scenes.

5. Another research topic that rises from this thesis is touched on in Section 4.1.4 where APT shows that preference for views depends on the building type and the floor level. This must have many useful implications for mass planning of cities and campuses.

6. A further avenue for future research would be to study the effect of mundane daily features such as clotheslines and drying racks (see Section 4.3.9) on imageability of other landscape features.

7. While this work provides evidence suggesting that the negativity of having a blocking building in a windowscape can be reduced by a view to parkland; more research is needed to confirm this finding.
5.5  Recommendation for Auckland Council

This study is of particular relevance to the City of Auckland which has based its long term planning vision on preference, that of the most liveable city. This work indicates that private views are more relevant for health and wellbeing than building and planning legislation in New Zealand currently considers them to be. It has been noted that views from a private domain are not considered important under the current Resource Management Act (Part 1, 1991). The provision of green spaces within the city is considered to be the primary means of enhancing urban dwellers’ wellbeing. Given Auckland’s privileged location, laying out parks and gardens is not the only way, and providing a view to large bodies of water can provide the same, or superior, benefits. Urban planners and policy makers can consider the value of visual access to large bodies of water on landscape preferences when allocating land to residential and business uses and when preserving existing view shafts to water as the city intensifies.


Bibliography


Bibliography


Appendices
### Questionnaire

**Lifeworlds:**

#### A. University Lifeworld

1. In which faculty are you enrolled?
   - [ ] Faculty of Arts
   - [ ] Business School
   - [ ] National Institute of Creative Arts and Industries
   - [ ] Faculty of Education
   - [ ] Faculty of Engineering
   - [ ] Faculty of Law
   - [ ] Faculty of Medical and Health Sciences
   - [ ] Faculty of Science
   - [ ] Auckland Bioengineering Institute
   - [ ] Other ..................................................

2. Please check the one that applies to you:
   - [ ] I am a PhD student
   - [ ] I am a Master’s Student

3. In which year and month did you enrol in your postgraduate studies?
   - [ ] 2012 month ..............
   - [ ] 2011 month ..............
   - [ ] 2010 month ..............
   - [ ] 2009 month ..............
   - [ ] 2008 month ..............
   - [ ] Before ..................

4. Are you currently a full-time or part-time student?
   - [ ] Full-time
   - [ ] Part-time

5. Do you have a fixed workplace in the university?
   - [ ] Yes
   - [ ] No

#### B. University Workplace Lifeworld

6. How long have you worked in your present work environment?
   - [ ] Less than 6 months
   - [ ] 6-12 months
   - [ ] More than 12 months

7. How many days do you spend in the building during the week? (Days)
   - [ ] 1
   - [ ] 2-4
   - [ ] 5 or more

8. How long do you spend in the building during the day? (Hours)
   - [ ] 1-2
   - [ ] 3-5
   - [ ] 6-8
   - [ ] More than 8

9. How long do you spend working at a computer (average hours per day)?
   (Hours)
   - [ ] 1-2
   - [ ] 3-5
   - [ ] 6-8
   - [ ] More than 8

10. Do you sit immediately next to the window in your work environment?
    - [ ] Yes
    - [ ] No

11. Do you open and close windows of your workplace?
    - [ ] Yes, because.................................
    - [ ] No, because.................................

---

1 APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON 27th June 2012 for (3) years, Reference Number 8234. Also, APPROVED BY THE UNIVERSITY ‘A’ ETHICS COMMITTEE ON 27th November 2012 for (3) years, Reference Number 12/316
12. Do you open and close blinds of your workplace?
   [ ] Yes, because...........................
   [ ] No, because............................

13. Is noise an issue if you open your workplace window?
   [ ] Yes
   [ ] No
   [ ] NA

C. Current Residential Lifeworld

14. Where are you living?
   [ ] CBD
   [ ] Parnell
   [ ] Newmarket
   [ ] Ponsonby
   [ ] Mount Eden
   [ ] Mount Albert
   [ ] Epsom
   [ ] Mount Roskill
   [ ] Other

15. Does your current residence have a garden?
   [ ] Yes
   [ ] No

---

16. Please specify........

   A. The housing type that you are currently living in.

   B. What floor your current accommodation is on.
D. Childhood Lifeworld

Now I want you to think about your childhood

17. Please name the place (city/town or village) where you lived for most of your childhood?

18. How do you describe this place? (e.g. rural/urban; neighbourhood)

19. When you were a child did your home (where you spent most of your childhood) have a garden?
   [ ] Yes
   [ ] No

20. Please specify........

   A. the housing type that you spent most of your childhood in.

   B. what floor your childhood house was on.

---

Housing Types

<table>
<thead>
<tr>
<th>1-3 floors</th>
<th>1-4 floors</th>
<th>2-4 floors</th>
<th>5-9 floors</th>
<th>+9 floors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detached House</td>
<td>Side Attached House (Terraced house)</td>
<td>Semi-Detached House</td>
<td>End Terraced House</td>
<td>Semi-Detached House</td>
</tr>
</tbody>
</table>
**F1. Drawing (Office)**

1. **By using your memory**, could you please sketch or quickly draw the most significant elements of **your office window view**? What are the most significant features that jump to mind should I, a friend, ask you about your window view? *(Don’t look out of your window!)*

2. Please **rate** your emotional reaction to each feature in the view. (“Strongly Like”, “Like”, “Not Sure”, “Dislike” and “Strongly Dislike”)

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Please describe your overall feeling about **your office window view** and **your workplace in general**.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Like</th>
<th>Like</th>
<th>Not Sure</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workplace</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**F2. Drawing (Current Living Room/Room)**

1. **By using your memory**, could you please sketch or quickly draw the most significant elements of the *view seen from your living room/room window*? What are the most significant features that jump to mind should i.e. a friend ask you about your window-view?

2. Please **rank** these elements your emotional reaction to each item in your view. ("Strongly Like", "Like", "Not Sure", "Dislike" and "Strongly Dislike")

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Like</td>
<td>Like</td>
<td>Not Sure</td>
<td>Dislike</td>
<td>Strongly Dislike</td>
</tr>
</tbody>
</table>

3. Please describe your overall feeling about your living room window view and your house in general.

<table>
<thead>
<tr>
<th>Strongly Like</th>
<th>Like</th>
<th>Not Sure</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window view</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please **NUMBER** and **LABEL** each element as you draw!
**F3. Drawing (Childhood Living Room)**

1. Could you please sketch or quickly draw the most significant elements of your childhood living room window view (the house that you spent most of your childhood in)? What are the most significant features that jump to mind should i.e. a friend ask you about your window-view?

2. Please rank these elements your emotional reaction to each item in your view. ("Strongly Like", "Like", "Not Sure", "Dislike" and "Strongly Dislike")

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Like</td>
<td>Like</td>
<td>Not Sure</td>
<td>Dislike</td>
<td>Strongly Dislike</td>
</tr>
</tbody>
</table>

3. Please describe your overall feeling about your living room window view and your house in general.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Like</th>
<th>Like</th>
<th>Not Sure</th>
<th>Dislike</th>
<th>Strongly Dislike</th>
</tr>
</thead>
<tbody>
<tr>
<td>Window view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
### G. Personal information

<table>
<thead>
<tr>
<th><strong>21.</strong> What is your age...?</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] 15-25 years</td>
</tr>
<tr>
<td>[ ] 26-35 years</td>
</tr>
<tr>
<td>[ ] 36-50 years</td>
</tr>
<tr>
<td>[ ] 50 + years</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>22.</strong> ...and your sex?</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] Male</td>
</tr>
<tr>
<td>[ ] Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>23.</strong> Which ethnic group would you describe yourself in? (Optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[ ] New Zealand European (Pakeha)</td>
</tr>
<tr>
<td>[ ] Maori</td>
</tr>
<tr>
<td>[ ] Chinese</td>
</tr>
<tr>
<td>[ ] Indian</td>
</tr>
<tr>
<td>[ ] European</td>
</tr>
<tr>
<td>[ ] Other.........................................................................</td>
</tr>
</tbody>
</table>

To facilitate the process of data collection, we would be grateful if you could provide us with the following information. Please note your email address and your name will not be associated with your survey answers.

Your Name

Email Address

University address

---

Thank you for your time and participating in this survey.

Now I want to take photos from your workplace window-view.
Appendix B: Consent Form

CONSENT FORM

THIS FORM WILL BE HELD FOR A PERIOD OF SIX YEARS

Project title: Environmental Preferences in an Urban Situation
Name of researcher: Leila Mirza

I have read the Participant Information Sheet, have understood the nature of the research and why I have been selected to take part. I understand the voluntary nature of my participation. I have had the opportunity to ask questions and have them answered to my satisfaction.

- I agree to take part in this research.
- I understand that it will take me 20 to 30 minutes to complete the survey.
- I understand that I am free to withdraw my participation at any time, and I understand that I am free to withdraw any data traceable to me for up to 2 weeks after the date of completion of the questionnaire.
- I understand that the information I provide will be used to write Leila Mirza’s PhD thesis and any other related academic publications.
- I understand that my workplace window view will be photographed as a part of this study.
- I agree to provide a photo from my living room window view for the purpose of this research.
- I am aware that my answers to questions and information provided by me will not be reported in a way that personally associates them with me.
- I agree to provide the researcher with my contact details (my name and university email and physical address). I am aware that this information will be collected only for facilitating the process of data collection and will not be associated with my answers to the questionnaire.
- I understand that the electronic form of photos can only be accessed by the researchers involved in this project. The data will be kept for six years, after which they will be deleted from the researcher’s computer. However, I am aware that the photos of my workplace and living room window views might be published in Leila Mirza’s PhD thesis and stored in the University of Auckland library.
- I understand that the information from this questionnaire will be kept securely by the University of Auckland for 6 years, after which time it will be destroyed.

Name __________________________

Signature ______________________ Date ________________

The ethical approval of the survey has been accepted by:
1. The University of Auckland Human Participants Ethics Committee on 27th June 2012 for (3) years, Reference Number 8234.
2. The Auckland University of Technology Ethics Committee (AUTEC) on 27th November 2012 for (3) years, Reference Number 12/316
Appendix C: Sample of Sketches and Photographs

A sample of sketches and photographs is presented here; the complete set of data is available from the author upon request. Each number represents a participant.
The view was rated as “liked”

The view was rated as “not sure”

The view was rated as “not sure”

The view was rated as “not sure”
The participant did not have an office view.

The view was rated as “liked”

The view was rated as “strongly liked”

The view was rated as “not sure”
The view was rated as “dislike”

The view was rated as “liking”

The view was rated as “dislike”

The view was rated as “liking”
The view was rated as “not sure”}

The view was rated as “liked”

The view was rated as “liked”

The view was rated as “disliked”
The view was rated as “not sure”

The view was rated as “liked”

The view was rated as “liked”

The view was rated as “strongly liked”
The view was rated as “liked”

The view was rated as “liked”

The view was rated as “liked”

The view was rated as “disliked”
The view was rated as “liked”

The view was rated as “strongly liked”

The view was rated as “strongly liked”

The view was rated as “liked”
The view was rated as “strongly liked”

The view was rated as “not sure”

The view was rated as “liked”

The view was rated as “disliked”
The participant did not have an office view

The view was rated as “strongly liked”

The view was rated as “liked”
Appendix D: Papers Published from this Thesis

