

How do Female Cyclists Perceive Different Cycling Environments?

- A photo-elicitation study in Stockholm, Sweden

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Abstract

This paper aims to identify and investigate the perceptions of less frequent female cyclists', defined as not cycling year-around or daily, of different cycling environments in Stockholm. Previous studies have shown that although Sweden has a high level of gender equality, it has a relatively lower number of female cyclists. Therefore, this study aspires to better understand how this group of women reason when they choose certain cycling paths to facilitate cycling infrastructure and planning from a gendered perspective. This is done by examining what impacts females' decision-making when practising cycling. Several barriers have previously been identified by previous research, such as traffic safety, social safety, and physical barriers. Yet these barriers are subject to personal perception. To investigate these perceptions, a semi-structured photo-elicitation interview method was used. Using social practice theory as an analytical framework, the analysis showed that greenery, in combination with isolation or poor lighting, seasonality, narrow, and non-separated cycle path and elevated routes were regarded as difficult impacting female's decision-making. Furthermore, the analysis uncovered two themes which were lesser explored by previous studies: racial discrimination, and the difficulty of wearing religious attire when cycling. Both could be a topic of future research to make sure females of all cultural, religious, or ethical backgrounds feel comfortable cycling. This research is significant to further facilitate cycling and urban planning policies, as it has identified different barriers that could have an impact on female cyclists' behaviour as well as having explored cultural and socio-demographic factors.

Keywords: cycling, photograph elicitations, female, safety, social practice theory

Sammanfattning

Denna studie syftar till att identifiera och undersöka kvinnliga cyklister, som ej cyklar regelbundet. Att cykla mindre regelbundet definieras i denna uppsats som att inte cykla dagligen eller året runt. Studien undersöker dessa cyklisters uppfattningar av olika cykelmiljöer i Stockholm. Tidigare studier har visat att Sverige har en hög nivå av jämställdhet, men inte när det gäller kvinnliga cyklister. Således, strävar denna studie till att bättre förstå hur denna grupp av kvinnor resonerar när de väljer vissa typer av cykelvägar. Detta görs för att kunna förbättra cykelinfrastruktur-och planering ur ett genusperspektiv. Detta görs genom att undersöka vad som påverkar kvinnors beslutsfattande när de använder cykel. Flera barriärer har tidigare undersökts och identifierats i forskning, till exempel trafiksäkerhet, social trygghet och fysiska barriärer. Dessa barriärer kan dock uppfattas olika beroende på individens uppfattning. För att undersöka dessa uppfattningar, har en semi-strukturerad foto-eliciterings intervju metod använts. Genom att använda 'social practise theory', som ett analytiskt ramverk, visade analysen att grönska, i kombination med isolering eller dålig belysning, säsongsvariationer, smala och icke-separerade cykelbanor samt upphöjda rutter ansågs vara svåra och påverka kvinnorna i deras beslutsfattande när de cyklar. Dessutom, avslöjade analysen två teman som inte har undersökts i stor utsträckning i tidigare forskning: rasdiskriminering och svårigheter att bära religiösa kläder när man cyklar. Båda dessa ämnen skulle kunna forskats vidare på för att se till att alla kvinnor, oavsett kulturella, religiösa eller etniska bakgrunder, känner sig trygga att cykla. Denna studie har bidragit till att främja cykling och stadsplanering policy, eftersom studien har identifierat olika barriärer som skulle kunna påverka kvinnliga cyklisters beteende samt utforskat kulturella och socio-demografiska faktorer.

Nyckelord: cykling, foto-elicitering, kvinnor, trygghet, social practice theory

Preface

This paper concludes my three-year-long bachelor's degree. During the first two years of my bachelor's degree, I studied Urban Planning in the Netherlands. This is where my initial interest in cycling began. I came back to Sweden during my third year of studies and soon came to realise that I felt that fewer females were out on the streets cycling. This sparked my enthusiasm for understanding how we can better accommodate all cyclists, not only the ones better accustomed to it. Firstly, I would like to thank my supervisor Shelley Kotze, whom I am very grateful to have had as a mentor throughout this project. Thank you for your support when I felt stuck and uninspired. I would also like to thank Ruth at Cykelfrämjandet, who helped me reach out to several women that had completed a cycling course previously. Your engagement was invaluable. Lastly, but not least, I want to thank all the women that participated in my study about their perceptions and experiences of cycling. I learnt a great deal from interviewing them!

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1. Introduction

1.1 Problem statement and research gap

Cycling has several advantages as a mode of transport that can be used for different purposes and for people of all ages, as well as a mode of transport that does not release any emissions or greenhouse gases. Embracing cycling and its infrastructure gives us a more attractive, social, and sustainable urban environment (The Traffic Administration Office, City of Stockholm, 2022). However, cycling serves different purposes for diverse groups of people. There are several reasons that could influence why people cycle or not. Our individual needs and attitudes impact our decision to cycle, for instance, socio-economic affiliation and cycling skills and knowledge. Factors such as safety, weather, health as well as physical infrastructure, e.g., separated cycling lanes and cycling passages, and how the infrastructure is maintained could all impact a person's willingness to cycle (STA, 2020).

Gender and mobility are two researched topics that often intersect. Feminist geographers have provided research regarding the difference both between but also among the gender groups, indicating that women are often expected to carry out particular activity types, such as household and caregiving chores. This relates to the notion of spatial and temporal fixity, which tells us how a person can be fixed in time or space to a certain activity. Women have been shown to be more dependent on car usage as it increases the flexibility of choosing when and how to conduct their daily scheme (Schwanen, Kwan & Ren, 2008). Further, women have a different perception of safety, as well as vulnerability in traffic situations and public space, compared to men. A 'Eurobarometer' survey collected across the European Union, showed that the proportion of females that have never used a bicycle was higher compared to men (European Commission, 2013). This survey gave rise to a study looking at if women's participation in cycling was linked with Gender-Equality Index (GEI). Sweden scored highest in GEI, having a higher percentage of non-cycling women than other Scandinavian and Northern European nations (Prati, 2018). Accordingly, previous research has found women to be more constrained in space and time, as well as having a different perception of safety. Moreover, cycling is a sustainable mode of transport, however, less utilised by women in a Swedish context, despite its high gender equality. The cycling environment, that is the physical infrastructure but also other factors such as weather

or maintenance have been shown to influence the desire to cycle. Thus, it begs the question of whether there are certain cycling environments that could be altered to better serve female cyclists in Sweden?

1.2 Purpose and research questions

The aim of this study is to identify and investigate how females, that are either not daily or year around cyclists ¹ perceive certain types of cycling paths. The aim is to understand how these women reason when they choose certain cycling paths to further improve and facilitate cycling infrastructure and planning from a gendered perspective. Thus, the research questions are as follows:

How do female cyclists' perceptions of cycling environments impact their decision-making within cycling as a practice in terms of:

- i. What physical, traffic and social barriers do female cyclists identify in terms of cycling?*
- ii. How do these barriers impact the behaviour of female cyclists when practicing cycling?*
- iii. How do cultural or socio-demographic factors impact females decision making with regards to cycling?*

To contribute to this research gap, the paper begins with an overview of previous literature that has been identified on the topic of cycling barriers and gender-specific barriers. This is followed by the theoretical framework of social practice theory (from now on referred to as SPT), which will be used to analyse the elements: *materials, competences, and meanings*, and how they relate to the practice of cycling. The chapter on the study area and methods will provide information about the geographical context of the study, and the method of photo-elicitation interviews that were employed within the study. The results will present the findings relating to social safety, traffic safety and physical barriers. Lastly, the discussion will relate these findings and deepen the interrelations between the elements of the SPT, as well as discuss cultural and socio-demographic factors and how they could be further researched.

Besides targeting geographical, urban-and transport planning as well as environmental research fields, this study also aims to target policy makers and different governmental bodies and officials

¹ The target population and sampled population for this study will hereby be referred to as “less frequent cyclists”

who aim to encourage cycling for a larger portion of the population, whether it is on a local, regional, or national level.

Finally, consistent with the proposed research questions, this study will target several barriers, behaviours and cultural factors. The barriers incorporate physical barriers; variation of seasons, greenery and elevation, traffic barriers; separated and other types of cycling lanes and social barriers; fear of crime and the behaviour of other road users. The behavioural components mainly centre around caregiving responsibilities, thus being a mother and how it could impact the female cyclists. Other behavioural factors include the motivation, such as a positive affiliation or the 'how know' knowledge of cycling. Lastly, cultural factors embrace the female cyclists migrant background, as different cycling cultures can affect the way a cyclist perceives their surroundings.

2. Literature review

This literature review will begin by presenting an overview of current literature relating to gendered cycling perceptions, before going more into depth on physical, social and traffic factors and concluding with previous research on cultural, socio-demographic, and motivational factors.

2.1 Gendered cycling perceptions

Several studies have investigated the so-called 'gender-cycling gap'. A review of previous research revealed that women cycle less because of risk perceptions, physical and socio-cultural reasons, such as insufficient cycling infrastructure, feelings of safety and factors such as age, health, and number of children (Grudgings et al., 2018). Female cyclists are more risk-averse, i.e., more cautious of risks, in comparison to male cyclists, something that impacts their sense of safety when choosing to cycle (Aldred et al., 2017; Carroll et al., 2020; Grudgings et al., 2018; Mitra & Nash, 2019). Furthermore, the portrayal of who cycles is of relevance as the normative cyclist is frequently mentioned to be 'male', 'confident' and, in the majority of cases, 'white' (Barajas, 2020; Graystone, Mitra & Hess, 2022; Russell, Davies, Wild & Shaw, 2021), whereas females are reported as feeling less confident when cycling (Alred et al., 2017; Graystone et al., 2022; Grudgings, 2018). Even when gendered cycling is researched, many studies have a bias towards more experienced and enthusiastic female cyclists (Grudgings, 2018; Rivera Olsson & Elldér, 2023).

2.2 Physical barriers

2.2.1 Greenery

Dense greenery, such as trees, prevents good visibility, especially having an impact on the fear of crime. This was identified by female cyclists in a Welsh study, where experienced and less experienced cyclists rated different cycling paths in accordance with traffic and social safety indicators (Xie & Spinney, 2018). In contrast to this finding, off-road greenways, a path with dense vegetation, were found to be the preferred choice of route compared to the actual choice, by a range of cyclists, of different genders, educational levels and cycling skills, in a university town in Ireland (Manton et al., 2016). Additionally, a German study found that women were more willing to alter their route to cycle through more greenery, i.e., trees along a cycle route, in comparison to men. It was also found that those who cycle for work or errands and leisure or only

leisure purposes were more willing to cycle an alternative route for more greenery compared to those who mostly cycle to work or for errands (Nawrath, Kowarik & Fischer, 2019). This suggests that there is an overall positive association of greenery when females cycle for leisure. However, dense greenery could also raise fear and thus lower the perception of social safety.

2.2.2 Seasonality

Climate and seasonal variations can have an impact on cycling. A Swedish study, examining winter versus summer cyclists' perceptions, in two Swedish towns, found that female summer cyclists, defined as cycling to work from April to October, viewed precipitation, temperature and road conditions as more important factors, compared to their male counterparts, when choosing to cycle. Moreover, the results showed that all the summer cyclists would be more willing to cycle during winter if the maintenance of cycle paths was improved. It is of importance to understand that climate and season change not only the weather conditions, but also the hours of daylight and thus the darkness a cyclist will experience. Studies have shown that darkness will negatively impact commuter cycling, whilst having a particular impact on female cyclists (Bergström & Magnusson, 2003).

2.2.3 Elevation

Topography seems to impact cycling behaviour. Hillier terrain has been shown to negatively impact cycling. According to Heinen, Van Wee and Maat (2010), there seems to be a mismatch between how elevation impacts different types of cyclists. They conclude that the experience level, as well as different conditions and attitudes in different countries could play a role in explaining the difference how cycling uphill is perceived. Moreover, female cyclists have been shown to disfavour steep slopes more compared to their male counterparts (Hood, Sall & Charlton, 2011).

2.3. Traffic safety

Safety has been studied in terms of traffic safety, generally regarded as feeling safe to cycle in heavy traffic and on all types of roads (Xie & Spinney, 2018).

2.3.1. Separated lanes

An article that systematically assessed findings of how cycling that is separated from motor traffic varies by gender, found that out of 40 studies, 23 found clear evidence of females having higher

levels of preference to cycle in a motor traffic-separated cycling lane, compared to males. This preference is likely to do with female's risk perception, as cycling in separated lanes increases their overall sense of comfort and protection (Aldred et al., 2017). A study of cyclists who reported having cycled at least once in the past year showed that the female cyclists were, on average, more willing to cycle further than men in order to take a preferred route, i.e., being off-road and isolated from car traffic (Krizek, Johnson & Tilahun, 2005). Furthermore, a literature review presented how inexperienced and female cyclists value the importance of specific bicycle facilities, and inexperienced cyclists, especially find the continuity of bicycle lane's very important (Heinen et al., 2010).

2.3.2. Different types of cycling lanes

Besides strong indications of female cyclists preferring separated cycling infrastructure, another study found that the number of female cyclists increased once a painted cycle lane was introduced (Graystone et al., 2022). However, a different study found that red-coloured or dashed-lined bicycle lanes were experienced as less safe by females regardless of traffic levels. The female cyclists did nonetheless rate these cycling lanes as safer when a bicycle road mark, i.e., the image of a bicycle drawn on the road, was present. The study showed that frequent cyclists, i.e., cycling 4-5 days a week, viewed dashed-line bicycle lanes as safer if the cyclists were already acquainted with a mixed traffic environment (Rivera Olsson & Elldér, 2023).

Various studies have found the width of cycling paths matter, as wider paths could minimise the risks of having a conflicting situation with other cyclists or pedestrians (Manton et al., 2016; Russell et al., 2021; Werneke, 2015; Xie & Spinney, 2018). Manton et al., (2016) found that 42% of participants viewed roundabouts in the presence of a cycling route as alarming.

Having to cycle alongside parked motor vehicles can be a barrier for cyclists (Clark et al., 2019; Manton et al., 2016). However, it seems that cyclists that cycle more than once a month, are less likely to negatively experience the presence of parked vehicles compared to those cyclists that cycle less than once per month for errands or work (Clark et al., 2019). Contrary to this finding, another study found that the risk the doors could impose was rated as strongly negatively influencing approximately 40% of daily cyclists. Out of cyclists that report never cycling or cycling very irregularly only 15% stated a strong worry about being hit by a door while cycling (Sanders, 2015).

Therefore, it seems that overall cycling tendencies, such as the cyclists' purpose and perhaps the experience of cycling in certain environments, could impact the way different cyclists perceive certain road attributes.

2.4 Social safety

2.4.1. Fear of crime and dark

Social safety, with reference to emotional fears and crime e.g., physical or mental abuse, relates to the fear of crime (Xie & Spinney, 2018). Being female and a cyclist that never cycles, or only a few times a year or month, was shown to be greater related to feeling unsafe due to fear of crime (Fowler, Berrigan & Pollack, 2017). A US study found that both male and female cyclists associated undesirable street behaviour, including gun violence and assault, as the most cited personal., i.e., social., safety barrier when cycling. Many of them also stated that this barrier was more concerning when cycling in darkness (Schneider, Wiers & Schmitz, 2022). In addition, another study found a significant correlation of female cyclists rating unsafety in terms of fear of crime or theft, in comparison to males (Fowler et al., 2017). The feeling of social safety has been found to decrease in isolated and/or environments with poor street lighting (Russell et al., 2021; Schneider et al., 2022; Xie & Spinney, 2018).

2.4.2. Car drivers' behaviour

Interaction with drivers of motor vehicles has been reported by different cyclists, e.g., abuse or harassment (Alred et al., 2017; Fraboni et al., 2022; Graystone et al., 2022). Women tend to experience higher threats interacting with a car driver compared to men, specifically in suburban locations (Graystone et al., 2022). Additionally, females that never ride or infrequently ride bicycles rated greater feelings of unsafety due to car drivers, relative to the male non-riders. When cycling was considered, females and males showed similar safety perceptions of interaction with drivers (Fowler et al., 2017). This brings us to the transition of cultural and normative aspects of cycling. Namely, that research suggests that people who cycle in low-cycling cultures are more sensitive to cyclist-driver interaction than people cycling in high-cycling cultures (Fraboni et al., 2022).

2.5. Cultural and socio-demographic perspectives

A Danish study examined how residents born outside of Denmark perceived cycling in Denmark in contrast to their country of origin. The study's aim was to look at how migrating from one cycling culture to another could have an impact on cyclists' safety perception. It found that the age of learning to cycle had a significant impact on the persons cycling behaviour. Interestingly, different ages correlated with different impacts. Learning how to cycle before the age of five corresponded with higher safety perceptions, while learning to cycle at a later stage, from 11 years and onwards, corresponded with higher cycling frequency (Basaran, Kristoffersen & Haustein, 2021; Chatterjee et al., 2012). This study also created a 'cycling norm index' in which different countries, as well as regions, were ranked. The Americas and Africa showed the lowest scores of 2.45 and 2.0 respectively while Europe had an average of 3.7. (Basaran et al., 2021).

Safety perceptions are also affected by how cyclists understand and process key information in traffic, such as traffic signs. Not being fully aware of these, due to language or cultural barriers, impacts safety negatively, and can increase fear when cycling (Barajas, 2020; Basaran et al., 2021).

Besides experience and cycling norms, socioeconomic demographics, such as caregiving responsibilities, matter. Caregiving responsibilities have been presented as potential barriers for women to take part in cycling (Barajas, 2020; Bararan et al., 2021; Grudgings 2018; Haustein et al., 2020; Russell et al., 2021). This phenomenon has been coined with concepts such as 'mobilities of care' or 'mobility biographies' (Basaran et al., 2021; Xie & Spinney, 2018). Although having children could be a constraint for female cycling, it has also shown that children could act as an incentive for women to cycle, especially so for leisure purposes. Previous studies have also shown that mothers take breaks from cycling when raising their children, most likely due to the complexity and impracticalities they are faced with when cycling together with children (Sersli et al., 2020).

When analysing how mothers, both migrant and native Canadians, viewed cycling with their children in regard to SPT, different meanings and 'know-how' skills were found. A few women stated that they wanted to ride with their children so the children could develop better physical skills to ride a bicycle, some of them mentioned that this was due to not having developed this confidence themselves during their childhood. Further, some of these women reported that it was

often more uncomfortable or difficult to cycle when the child rode their own bike instead of being a ‘passenger’ (Sersli et al., 2020).

2.6. Cycling motivations and constraints

To summarise, three types of constraints to cycling can be considered. The first one is structural, exemplified by different cycling infrastructure such as coloured paths and separated lanes. The perception of existing cycling infrastructure has been shown to correlate with the intent to cycle (Gravenstine et al., 2022). The second constraint is intrapersonal, which includes the perception of safety, earlier demonstrated as the social and traffic safety, i.e., social safety exemplified as being abused by car drivers and traffic safety as preferring wider cycling roads to avoid conflicting situations (as mentioned in section 2.3 and 2.4). The third type is interpersonal, which would be influenced by personal surroundings on cycling behaviour, e.g., the importance of cycling with young children (Sersli et al., 2020).

The reasons and motivations behind cycling vary. Inner motivation is one motivational aim that is constructed by adjectives such as affiliation, enjoyment, and the appreciation of nature. Further, experience plays an important role in motivation, e.g., recent participation and the number of years a person has cycled. Demographics are another motivational dimension. The main demographic mentioned in this study is gender, but other factors include age, children in the household, health, and income (Gravenstine et al., 2012). While some studies have found a positive correlation between having children and cycling (Emond, Tang & Handy, 2009; Forsyth & Oakes, 2015), others have found that a higher number of children in the household negatively correlates with cycling behaviours (Gravenstine et al., 2012; Piatkowski & Bopp, 2021).

However, it is important to understand that these factors do not act in isolation. The effect can be described as layered, e.g., being of lower or higher class, of varying cultural backgrounds, could affect motivations and barriers (Molina, 2004). Further, the factor of age is negatively correlated with cycling, even as this group often enjoy more free time, they do not cycle as much as younger cyclists (Gravenstine et al., 2022).

2.7. Summary

As has been described, women have different perceptions of safety than men, relating both to traffic and social indicators. Physical barriers have previously been researched, such as

topography, climate conditions and greenery, however greenery showing mixed results. Further cultural and socio-demographic factors go some way to explain different cycling preferences among female cyclists. The physical material, the skills, the confidence, and the meaning we associate with cycling bring us forward to the next chapter, namely the theoretical framework of SPT.

3. Theory

This chapter will present a theoretical overview of SPT (Social Practice Theory), a theory that has been used in research concerning transport and explicitly cycling behaviour (Ihlström, Henriksson & Kircher, 2021; Larsen, 2017; Ravensbergen, Buliung & Sersli, 2020; Scheurenbrand et al., 2018; Spotswood et al., 2015). This theory proposes that human movement is embodied in shared social customs and builds on three key elements: *meanings, competencies, and materials*. Before going more in-depth into SPT, a brief description of other commonly used theoretical frameworks within transportation will be discussed along with the use of SPT in other research areas.

3.1. Choice of theoretical framework

Previous research within transportation studies has included various theoretical frameworks. One of them is the rationalist-instrumental theoretical framework that argues that a traveller makes judgments based on pure objectivity, i.e., maximisation of utility (Schwanen & Lucas, 2011) and time and money (Kent, 2022). Other frameworks relate to psychology and temporal-spatial components, e.g., ‘theory of planned behaviour’, a framework that bases behaviour choice on the intention of the individual., which has been specifically used in studies of cycling as a mode of transport (Ajzen, 1991; Bird et al., 2018; De Souza, Sanches & Ferreira, 2014; Kent, 2022; Lois, Moriano & Rondiella, 2015; Milković & Štambuk, 2015). A main critique towards the rationalist and psychological frameworks in transportation studies is the focus on the individual rather than emotional or symbolic factors impacting the way we chose to travel (Kent, 2022).

Another framework used in transport studies is time-geography, concentrated on activities and accessibility. Originally developed by Hägerstrand, this framework conceptualises transportation and transport planning based on time and space in terms of accessibility (Schwanen & Lucas, 2011). This framework has been illustrated by different transport and cycling studies, e.g., how caregivers counter mobility challenges with respect to travel times and schedules and how space-time restrictions face elderly that cycle or walk (Berg et al., 2014; Eyer & Ferreira, 2015). Although these examples illustrate how some demographic groups perceive a mode of transport, the time-geography framework has faced criticism for not embracing the desires, understandings and needs of the individual (Kent, 2022).

Therefore, as the purpose of this study is to understand how less frequent female cyclists perceive and view different cycling environments, a theory that integrates how cycling practice is sustained over time is preferred. Several different approaches to SPT have been embodied in literature, with slightly diverging emphasis on elements that constitute what makes up a practice, e.g., a certain state of emotion, or the skills that make up the practice of cycling. Collectively they all incorporate some type of tangible structure, cultural explanation, and individual ability, all being regarded as important for this study as it aims to understand how different cycling environments are perceived by non-daily or non-all year around and female individuals (Kent, 2022). SPT has been used in several research fields and topics, including public health, human geography, and transportation studies (Blue et al., 2016; Delormier, Frohlich & Potvin, 2009; Harries, Rettie & Gabe, 2019; Haubrieck & Wehrhahn, 2020; Kent, 2022).

3.2 Social practice theory

Human activities are formed and facilitated by the construction of rules and meanings, simultaneously being portrayed by the movement of human activities. These activities are in turn dependent on practical knowledge that can be explained by two phenomena -agents and structures. These two phenomena represent a duality, meaning they are two essentially interdependent occurrences (Shove, Pantzar & Watson, 2012).

The structures can be described as rules and resources that are repeatedly intricated in institutions. The presence of structural effects of larger collectivities does not necessarily depend on the activities of the specific individual however, the collectivities and larger structures would come to an end in case all the individuals ended the practice (Giddens, 1984). Accordingly, the daily activities that social actors (people), take part in, are based on the features of the social system (Shove et al., 2012). The social system can be defined as “*reproduced relations between actors or collectivities, organised as regular social practices*” (Giddens, 1984, p.25).

The theoretical framework that is presented in this chapter is based on the theoretical understanding that Stove, et al. (2012) developed, based on a selection of ideas that originated within science and technology. The focus lies on the spatial and temporal dimensions of how technologies, i.e., configurations that work, are composed, and transformed over time. Practice is sustained by users, e.g., the practice of mountain biking has been developed by enthusiastic practitioners (Stove et al., 2012). It is about both production and development as this practice theory acknowledges the

dynamic relationship between those producing and those consuming new schemes and arrangements of a practice. How can we then try to explain what practices consist of, according to what Stove et al., (2012) present in their explanation of SPT?

The practice of cycling requires skills, including rules and norms that make up the practice. These norms could include meanings to both frequent cyclists as well as less frequent cyclists. The practice of cycling can be seen as a co-occurrence of elements employed while cycling (Shove et al., 2012). The elements being materials, meanings and competences. This makes cycling appear as an entity, as the elements rule out how cycling can be accepted over time (Kent, 2022).

How cycling is then actually performed is another aspect. It is through the performance of this practice that a pattern can emerge and replicate. When the practice is replicated continuously, an interrelationship between the elements will be strengthened over time. The individual practising cycling, such as in this study, a female, will be seen as a carrier, who participates in a practice that sustains these elements. The purposes and skills surpass the individual to also show features that represent the whole practice of cycling. That explains how the individual carrier, is essentially ‘carrying’ the practice forth (Shove et al., 2012).

In addition, the so-called ‘bundle of practice’ is significant. This bundle can be described as a narrative, by understanding the perspective of a mother driving their child to football training every weekend, while also needing to complete other errands throughout the week, which could be done by other transport modes. Thus, many things related to a transport practice are part of an interconnectedness, illustrated by entities, elements, carriers and ‘bundles’ (Kent, 2022).

The understanding of human action in SPT is socio-material, that is that the social and material components are seen as integrated into the practice rather than acting as external barriers. SPT explains that people can be a part of several practices simultaneously, with networks and intersections. Although this is a positive aspect of the theory it can also be seen as a limitation, as these networks and intersections make it more difficult to understand the boundary of a practice. Another difficulty with SPT is the issue of understanding the pure effect of individual action. This again relates back to the interaction of practices, meaning it can be a theoretical limitation to locate the difference between the outcome or impact of social practice. Finally, a methodological limitation relates to how SPT research commonly explores the practices, and not the agents of the practice. Again, the boundary of a practice can be complex to explore, which could require SPT

studies to adopt more mixed methods, combining qualitative and quantitative methods, particularly focusing on the convergence of practices and contexts (Keller, Halkier & Wilska, 2016). This is further discussed in the methods chapter, section 4.2.1.

3.3. The elements: Materials, competencies, and meanings

To further explain the elements that a practice consists of the *materials, competencies and meanings* will be explored. These elements are exemplified in Figure 1 below:

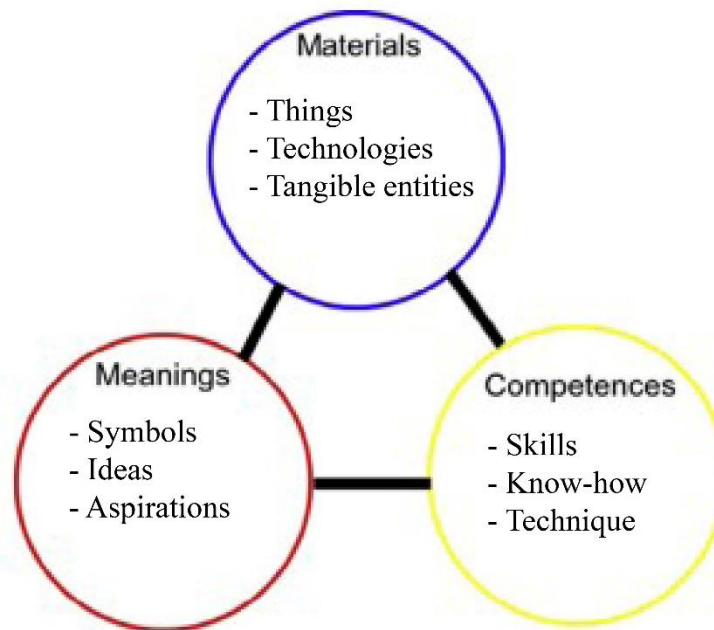


Figure 1. Examples of the three different elements that make up a practice, based on Shove et al., 2015., in this figure shown by an illustration linking three separate circles together (Spotswood et al., 2015, p.24)

Figur 1. Exempel av de tre olika elementen som utgör en praktik, baserade på Shove et al., 2015, som i figuren illustreras av hur de tre figurerna är sammankopplade (Spotswood et al., 2015, p.24).

The *materials* needed for a practice to function, in this case, the practice of cycling incorporates objects, technologies, and physical structures. Physical structures can be exemplified by physical infrastructure, e.g., separated cycling lanes to shared cycling spaces (Shove et al., 2012). Whilst materials related to cycling can also include things like topography and weather (Cass & Faulconbridge, 2016; Larsen, 2017).

Competence is another element in SPT. An important aspect of this element is how knowledge can change depending on the situation or if the individual ‘know-how’ changes between practices. This can be illustrated by the competencies of cycling such as the knowledge of traffic rules, steering,

and balancing. Some people might not have the skills or knowledge to carry out cycling in specific environments (Shove et al., 2012). A study in the UK showed that many cyclists felt uncomfortable with not knowing what clothes could be suitable when cycling. Furthermore, these cyclists thought that the fitness required for commuter cycling was unattainable as they thought their own energy levels did not measure up to their general perception of cyclists (Spotswood et al., 2015). *Competencies* can also be pictured as feeling confident enough to cycle with children, the ability to cycle when being weighed down and the knowledge of carrying items along when cycling (Ravensbergen et al., 2020).

Importantly, knowledge of traffic rules can be tricky to obtain. This relates to the notion of how *competencies* accumulate and build during a person's life. It is about the practice-based experience and the critical stages of the creation of the skills and knowledge, such as the settings where a person is integrated into the practice (Stove et al., 2012).

The third element is referred to as *meanings*, which can be described as emotional meanings, desires, symbolic ideas, and motivational knowledge. This element is more abstract compared to the other two elements, but meanings are inherently linked to the practice (Shove et al., 2012).

Meanings affiliated with cycling can have two contrasting beliefs; those that think of cycling in terms of freedom and being healthy while there are those who view it as an unsafe mode of transportation. An ethnographic study in Copenhagen summarised *meanings* to be associated with the practicality of cycling being fast, affordable, and efficient. The interviewees described how cycling is a way to maintain a healthy lifestyle, thus increasing daily activity and movement while commuting to work (Larsen, 2017). In addition, a British study found that the practicality of cycling, besides being affordable and efficient, also corresponded with being brave, aggressive, and committed (Spotswood et al., 2015).

In relation to the aforesaid, the divergence of cycling with reference to independence and threats, the meaning of cycling is associated with relaxation and leisure, or stress and danger, when linked to commuting, as suggested by a British study analysing different categories of cyclists in accordance with SPT. Fewer cyclists, who cycle for work or daily errands, in combination with the general perception of cyclists being adventurous, somewhat aggressive, and notably dedicated, creates the idea and tacit knowledge of cycling not being a practice for '*normal people*' (Spotswood et al., 2015).

The relevance of explaining and coming to understand these three different elements is the idea of these elements being linked together and integrated to stabilise a certain practice over time. The connections between the elements need to be renewed for the practice to persist (Shove et al., 2012).

3.4. Interrelation between the elements

A representation of how these three elements are connected and linked together can be found where the elements of *material* often signify driving alongside cars and other vehicles which aligns with the *meanings* of cycling thus being related to adrenaline. These two elements encourage a certain type of cyclist, often consisting of a person less risk-averse, i.e., dominantly male cyclists (Larsen, 2017). This is exemplified when Swedish cyclists were asked to explain how they felt cycling in a shared space, i.e., not separated from cars. One of the participants associated cycling in shared space as unsafe, which integrates the meaning of unsafety with a material object, a certain type of cycling infrastructure, i.e., non-separated cycling lanes (Ilhström et al., 2021).

In opposition, there are times when the elements are not integrated, for instance when cyclists cycle on pavements, thus breaking the traffic rules (i.e., *competencies*) while believing it to be easier to cycle on the pavement (motivation). The materialistic element, in this instance the pavement, is thus mismatched with the other elements in cycling practice (Ilhström et al., 2021). Thus, pavement cycling can become regarded as normal in cycling practice, due to the integrated elements that reinforce the idea of unsafe conditions while the pavement creates a space where the cyclist feels less exposed.

3.5. Summary

SPT is a theory that has been used to study cycling as a practice, that exists due to the co-occurrence of three elements: *materials*, *competencies*, and *meanings*. These elements convey certain qualities that sustain over time due to carriers, individual participants, that carry the cycling practice onward with objectives, aspirations, and experiences. The SPT framework, with its three elements, will be used to explain the findings of how less frequent women perceive certain cycling paths. The theory, and the three main elements, is thus intended to guide the analysis and coding of semi-structured interviews, part of a so-called photo-elicitation, that will be presented in the following chapter.

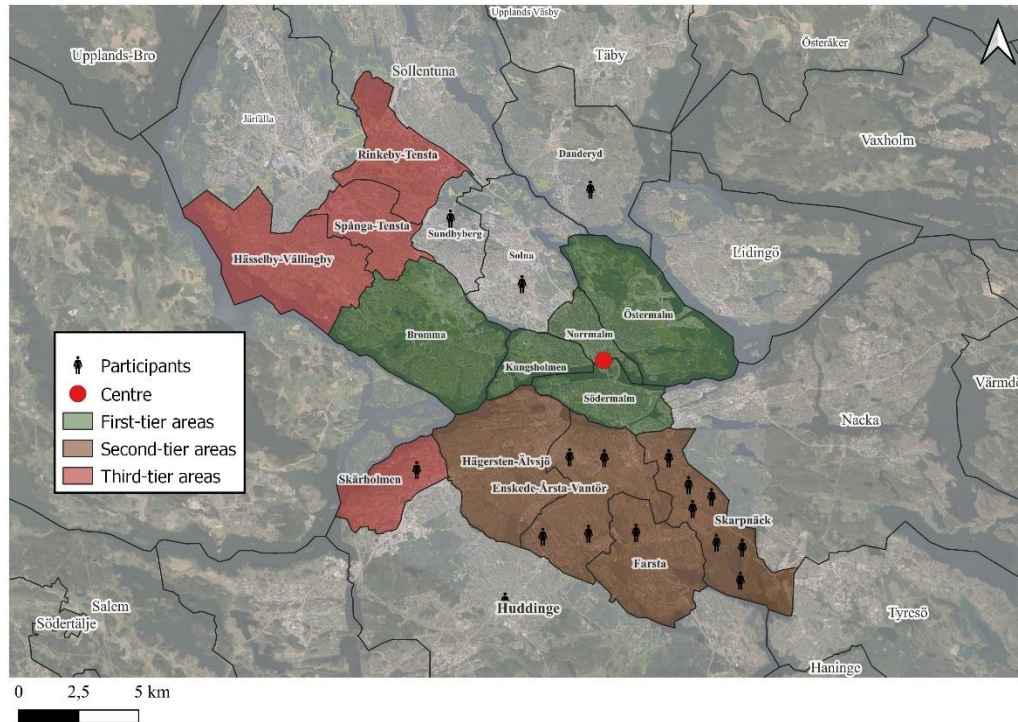
4. Methods

This methods chapter will begin by giving the reader an overview of the study area of Stockholm. The motivations for and application of the qualitative method of semi-structured photo-elicitation interviews are presented and discussed, with its advantages and disadvantages. Moreover, the photographs, sampling method and demographics of the participants are laid out. Finally, the practicalities are referred to, such as how the interviews were conducted, consent and anonymity, coding, and a section on positionality.

4.1 Study area

The study takes place in the county of Stockholm in Sweden, one of Europe's fastest growing capital regions, with projections of the population growing to 3.4 million inhabitants by 2050 (Region Stockholm, 2018). In 2021, the population was registered at nearly 2,4 million inhabitants (Eurostat, 2021), with 36% of the population being born abroad or having two parents born abroad (Statistics Sweden, 2022a). Not only does Stockholm have a high 'foreign' population² but the city is spatially segregated. To illustrate the spatial segregation of Stockholm, Sandberg (2023) describes the municipality of Stockholm, consisting of thirteen boroughs, as a subdivision of three geographical tiers (see Map 1).

² In the following chapters referred to as 'foreign background'



Map 1. Showing the municipality of Stockholm in colour, with its three-tier spatial segregation. Further, the location of where the participants live is shown.

Karta 1. Stockholm stad syns i färg, med de tre olika nivåerna av rumslig segregation. Visar även var deltagarna bor.

The geographical tiers can be described as the first one, tiers in closer proximity to the city centre, have higher incomes, educational levels, and the lowest percentage of the foreign population. Further out, thus the third tier is instead categorised by boroughs with lowest income and having the highest percentage of residents with a foreign background (Sandberg, 2023). Many of these boroughs, in both tier 2 and 3 were built between the mid-60s to the mid-70s with a goal of providing a million new dwellings in Sweden, as a part of the welfare state's aim of "good housing for all" (Arroyo, Yahia & Johansson, 2022, p.6). Along with these newly constructed houses and a widening of the city, the region's metro system expanded. The metro underground system was developed between the post-war period of 1945 to 1978 parallel with the expansion of dwellings into the suburban boroughs, with a metro network comparable with its current structure and form (Svane & Weingaertner, 2006).

4.1.1. Cycling in Stockholm

The outer boroughs have proportionally less supply of the public transport system, making it difficult to count on transport in-between these boroughs (Rokem & Vaughan, 2019). As for cycling, a study that compared cycling in the inner urban area versus suburban areas of Stockholm, found that pollution and congestion were factors that hindered cyclists who cycled in the inner urban areas, compared to the suburban areas (Wahlgren & Schantz, 2014). This poses a problem, with statistics showing that households in the outer boroughs are more dependent on car usage, in contrast to statistics showing that a large proportion of those not owning a car, consist of residents with a foreign background (Rokem & Vaughan, 2019). The borough of Skarpnäck was home to 7 out of 18 participants. The borough had a population of approximately 46 000 inhabitants in 2022, with a slightly higher number of women compared to men with roughly 27 % of the inhabitants having a foreign background (Municipality of Stockholm, 2023). In a citizen survey conducted 2020 in Stockholm municipality, 37 % of the inhabitants answered that they would like more cycle lanes which corresponded with the residents of Skarpnäck. Moreover, 14 % of the inhabitants of the boroughs responded that they were very or quite dissatisfied with the supply of cycle lanes in Stockholm, in contrast to 12 % of the municipality. However, when comparing the statistics for the satisfaction of maintenance for cycle and pedestrian lanes, the borough's inhabitants were marginally more satisfied (Municipality of Stockholm, 2021).

Some of the development goals for the future of Stockholm include targets aiming for a region with a focus on accessibility and explicitly targeting cycling in their future policies and vision, aiming at increasing cycling as a part of their regional bicycle plan. Specifically, the target for 2030 is for one-fifth of all journeys to be taken by cyclists. That would mean an increase from the 10% share that was reported 2020 and 2022 (Region Stockholm, 2022). The regional bicycle plan emphasises the inclusion of broader groups of cyclists, as cycling has been shown to be less prominent in, for instance, groups of the elderly and people with a foreign background (Region Stockholm, 2020). The geographical features of Stockholm; hilly boroughs, a diverse climate, with its distinct seasons and an extended supply of public transport, means that the conditions for the city to implement and become a successful cycling city differ from e.g., Amsterdam or Copenhagen, two cities also located in North-western Europe (The Traffic Administration Office, City of Stockholm, 2022).

Stockholm has 820km of cycleways, which is more than double of that Copenhagen, another Scandinavian city known for its cycling culture (Haustein et al., 2020; Region Stockholm, 2022). Stockholm has a slightly higher cycling density, when counting cycleways, tracks and lanes. Even with a great scope of cycling infrastructure, it does not necessarily equal high cycling, as the bicycle share 2011/2013 was nine times higher in Copenhagen in comparison to Stockholm (Haustein et al., 2020). A great cycling network does not automatically mean more women will cycle, and this study aims to look into female cyclists in Stockholm and what potential barriers and factors could delimit them. However, about 17% of the cycleways do not provide any standard cycling infrastructure and almost 60% of the cycleways do not live up to the regions standard (Region Stockholm, 2022). Separated bicycle tracks are not as common in Stockholm, by comparison to Copenhagen, as many bicycle lanes are just lanes painted on the streets. Stockholm is currently working on several bicycle infrastructure projects, however, several of them concern improving smaller sections of the already available infrastructure rather than developing new infrastructure (Koglin, 2015). As the city is working on expanding the cycling infrastructure, whilst being the most populous municipality and region of Sweden (Statistics Sweden, 2022b), it was deemed appropriate as a study area.

4.2 Semi-structured ‘photo-elicitation’ interviews

4.2.1 The choice of a qualitative method

Aiming to answer how female cyclists perceive certain cycling paths and environments, a qualitative interview method aligns with the research questions and aim of the research. An interview conversation is a source of knowledge about individual and social aspects of our entities as human beings (Brinkmann, 2014). Why a semi-structured interview is preferred over a structured interview is because a structured interview is more similar to a questionnaire, with answers that can be compared between participants. As the female cyclists have been sampled from various backgrounds, a semi-structured interview allows for their individual perspectives and opinions to be heard as this type of interview gives the perspective of the participants as well as allowing the researcher to bring the focus back to the initial theme in case the interviewee would get distracted (Brinkmann, 2014).

More specifically, the interview method utilised within this study was the use of images and interviews combined, i.e., photo elicitation. Photo elicitation can be defined as “*the use of*

photographs to evoke verbal discussion” (Thomas, 2009, p.244), and is a way to use photographs to generate conversation and interaction between the researcher and the participant that might not have been possible without the photographs as discussing each photo can help to facilitate new information and understanding. As mentioned in section 3.3., the framework of SPT would ideally be explored with a mixed-methods approach. However, given the scope of this study, using photographs to interview female participants was a productive way to get as much information as possible. If quantitative methods had been combined with the interviews, for instance, surveys or counting measures, more time and special equipment would have been required.

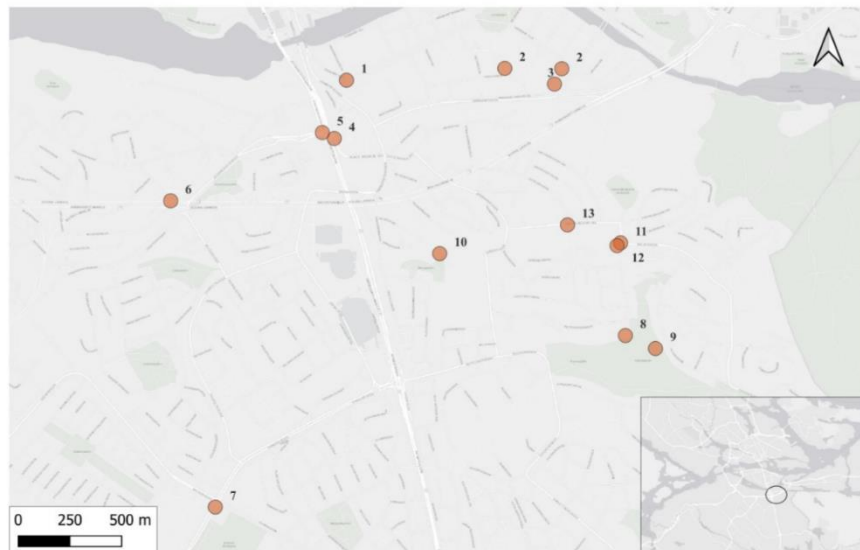
The reason behind this choice lies in the nature of the suggested research questions, with a focal point on perceptions of specific environments (cycling paths). Using photographs can help to convey a lot of information about a place, and the SPT elements a practice such as cycling can involve and how these can be connected to space. Photographs can thus be an essential way to answer questions such as *“What is this place like?”* (Rose, 2008). The photographs can help the participants to not only think of the material structure of the road, but also associate meanings and skills as the photographs are taken at different times of the day, with varying degrees of traffic and natural and recreational ambience.

There are several ways to conduct photo-elicitation interviews. Two common ways are often depicted, one of two being researcher-produced, when the researcher takes the photos used when interviewing and the other being participant-produced, when the interview participants are asked to take photos themselves that are later discussed (Alexander, 2013; Bignante, 2010; Clark Ibanez, 2004; Soaita & McKee, 2021). In this study, the researcher-produced option was chosen due to practical reasons. As the time scope of this study is limited, there would not be enough time for the latter option to be executed. A potential weakness for the researcher-produced photos is that the selection could become biased towards what the researcher finds relevant (Soaita & McKee, 2021). However, the polarisation of research-driven versus participant-produced photography should rather be seen as a continuum between poles, according to Hall (2009), by which researcher-produced images often follow a more theoretically led frame compared to participant-produced images producing theoretical insights from the practice and images themselves (Soaita & McKee, 2021). As previous literature has demonstrated, certain cultural and physical factors appear to influence how certain groups feel about cycling and cycling environments. These factors, based on previous literature, are identified by the researcher in different environments in the study

area to make sure the photographs used to interview the participants cover a range of different variables, thus being theoretically framed.

4.2.2 The photographs

The photographs were taken at the beginning of April 2023, during the morning as well as evening hours, at several locations throughout the southern inner suburbs of Stockholm's municipality (see Map 2). As not all locations would be displayed during both daytime and evening hours, some were only taken during daytime hours and some only during evening hours. This was based on the findings in the literature review where factors such as light and visibility are described as important for safety when choosing a path to cycle. For example, out of the physical and traffic variables discussed in the previous findings of cycling routes (see sections 2.2 and 2.3) not all variables would be shown in both daytime and evening hours as it would require at least two dozen images to be shown for each participant being interviewed. After reflecting on a balance between different variables and locations, 13 images were chosen (see Appendix, page 64-65) for the interviews.



Map 2. The locations where the photographs were taken in the boroughs of Enskede-Årsta-Vantör, Skarpnäck and Södermalm, all part of Stockholms municipality.

Karta 2. Platserna där fotografierna var tagna, i stadsdelarna Enskede-Årsta-Vantör, Skarpnäck och Södermalm, alla ingår i Stockholm stad.

4.3 Conducting the interviews

The interviews were held during April and May 2023. The participants were sampled through a cycling organisation and local neighbourhood Facebook groups, as well as snowball sampling. A reflection on the sampling and the ethics and positionality is given as well as description of coding the interviews.

4.3.1 Sampling procedures

A Swedish cycling organisation named ‘Cykelfrämjandet’ (a national cycling advocacy organisation, hereby referred to as ‘Cycling organisation’) was contacted, as they aim to improve cycling conditions as well as to encourage more people to cycle through so-called ‘cycling courses’ (Cykelfrämjandet, 2023). Therefore, it was thought to be an appropriate way to reach out to less experienced cyclists (as that was the initial target population). An email was sent out to the cycling course leader, who responded positively and forwarded the request to 600 female participants from previous years’ courses. Ten women responded as willing participants; however, the course leader stressed the worry some of the women were feeling regarding the study, e.g., *“I do not have an education so why would she want to know what I think?”*.

To counter this, the course leader proposed an online meeting with a dialogue on practical matters, such as the style of interviewing and research ethics. However, the meeting got cancelled, partly due to the Muslim holiday of Ramadan, which meant several of the women fasting lacked energy. The course leader suggested an alternative way to get a hold of more participants, which was to join one of the cycling courses to interview female beginner cyclists. The issue was the timing, as the cycling courses did not begin until early May. Nevertheless, the course leader said that two women were available for interviews, both women seen as ‘role-models’ for other immigrant women that had participated in the cycling courses, which meant that a snowballing strategy could be used to research out to more women.

In the end, I decided to also recruit female cyclists from local neighbourhood Facebook groups. I first contacted the moderators to make sure I would not violate any of the group’s rules. Once approved, a post was sent out, whereby I targeted non-daily or non-all year around female cyclists. I received around 13 messages from women of different demographic profiles (see table of all the participants in the Appendix, page 66-68). The women all cycled for different purposes, including

local errands, work and leisure and had all learnt to cycle at different ages, ranging from 3 to over 40 years old. Further, the migration background varied as 10 of the women were born abroad while 8 were native to Sweden. Snowball sampling was also employed, and the women were asked to refer any other women that would be willing to participate (Esaiasson, Gilljam, Oscarsson, Towns & Wängnerud, 2007). In the end, 18 women were interviewed, 11 recruited via Facebook and the other 7 via the cycling organisation and through snowball sampling.

When I had conducted all of the interviews, I came to realise that two of the women recruited via Facebook, were quite frequent and experienced all-year around cyclists, and were thus excluded from the further coding and analysis.

4.3.2 Conducting the interviews

Before conducting the interviews an interview guide (see Appendix page 69-70) was written. The interview guide was written both in Swedish and English as some interviews were held in Swedish and some in English, depending on the preference of the participant.

A few introduction questions were formulated around how the participants started cycling and at what age, and in which situations they cycle at present. By asking these types of questions first, a good atmosphere was created before moving on to the thematic questions, structured quite loosely, depending on what photos and topics the women wanted to discuss. These questions related to themes, all cohering to findings in previous research about cycling, safety, and gender, e.g., questions relating to cycling alone, cycling in greenery, cycling in the dark, cycling in different infrastructure as well as socio-demographic questions. The socio-demographic questions were asked last, to not make the participants feel intimidated by too personal questions at the start of the interview (Esaiasson et al., 2007).

The interviews were conducted online either via WhatsApp, Messenger (Facebook platform) or via phone number. This was mostly to do with practical matters, as most women had young children and/or worked full-time, meaning they had busy schedules to uptake and lived in different parts of the region. There are advantages and disadvantages of conducting interviews via phone and not in-person. The advantages are often practical., such as flexible scheduling and reduced travel time, as aforementioned. Other benefits include that phone interviews can be done from the interviewee's home, a setting that could be more comfortable compared to one in public that could be loud and uncomfortable (Johnson, Scheitle & Ecklund, 2021). As expected, slight technical

audio issues arose during some of the interviews, especially those via the Facebook platform Messenger, with varying sound quality. Another issue was that the photographs sent to the women via email or Messenger, depending on their personal preference, varied in accessibility. Some of the women could more easily view the photos simultaneously while others had to go through them one by one.

4.3.3. Consent and anonymity

To make sure all participants were aware of the notion of informed consent, defined as transparent information, e.g., purpose, reasons and consequences of the research were presented, both via email and Facebook contact, as well as during the interview, to make sure the participants could decide if they wanted to participate (Smith, Todd & Waldman, 2009). To satisfy the confidentiality of the participants the promise of anonymity with falsified names, i.e., pseudonyms, were given, both during the initial contact phase via the cycling organisation and Messenger, the Facebook communication platform, as well as during the actual interview (James & Busher, 2009; Smith et al., 2009). The interviewees were asked for their permission to record the interviews, whereby information about storing the audio files on the University of Gothenburg's One drive was given (University of Gothenburg, 2023). These audio files were stored appropriately on One drive, along with the transcription Word files.

4.3.4 Coding

The transcription was done manually and by 'transcribe' tool in Microsoft Word. The interviews held in Swedish (most of them) were translated manually and in Word before coding. After transcribing the interview material, the transcripts were conceptualised into different codes, based on the SPT elements of *materials, competence, and meanings* (Smith et al., 2009). Among these codes, patterns emerged that could partially be explained by categories found in previous literature, such as physical barriers, social and traffic safety as well as cultural and socio-demographic barriers. An example demonstrated was weather, e.g., snow and ice, as even if 18 out of 19 women did not cycle during winter, and it was mentioned and categorised as a material element, also relating to their skills and negative associations to poor road maintenance.

4.3.5 Positionality

When conducting qualitative research, it is important to be aware of how ethnicity, gender or social origin could influence the research (England, 1994; Gomez & Jones, 2010; Winchester, 1996). As the researcher, I am positioned by certain demographic attributes such as *being female*, *being young* and *being white* (England, 1994). To illustrate this the notion of ‘betweenness’ can be used, describing the world that exists between the researcher and those intend to research. As I cannot understand their world due to my different personal background and experiences, I instead need to recognise the ‘betweenness’. My research is thus a story of how these female cyclists perceive certain environments based on their lived experiences, which will be understood as a narrative between their world and mine (England, 1994). Being a female, myself is helpful, as it increases the sense of equality between the (female) interviewees and the interviewer (Kendall, 2008). That being said, the cultural aspects were noticeable. As a white female researcher, I did experience the importance, yet complex nature of positionality when one of the non-white women expressed how it was wrong of me to say “*I understand*” while she was explaining her experience of white male cyclists. She stated, “*You will never experience this, but I still want to share, but thank you for trying (to understand) but you will never be in my shoes*”. After this interview, I was more cautious of automatically adding phrases such as “*I understand*” or “*I get what you are trying to say*”, nevertheless trying my best to be empathic and compassionate.

4.4 Summary

The study area of Stockholm and the qualitative research method, namely photo-elicitation, have been chosen to help answer the study’s aim as well as research questions. By using photographs, taken in Stockholm, of different types of cycling environments based on factors found in previous literature, the female cyclists were given the opportunity to reflect and identify barriers when cycling. The themes from the social practice theory i.e., *materials, competence and meanings* were used to code and analyse the interview data, collected between 16th of April to 3rd of May and will be presented in the results and analysis by the three themes that were discussed in the literature review: social safety, traffic safety and physical factors.

5. Results & Analysis

These results are based on individual photo-elicitation interviews with female cyclists, that are either not daily or all-year around cyclists, with different socio-demographic characteristics (see table 1 in Appendix 66-68). All the photos used are found in Appendix 64-65³.

The results will be presented in accordance with SPT, grounded on the three elements of *material, competence and meaning*. However, due to these elements overlapping, the findings are presented according to three main themes that appeared during the interviews, as they were coded from the three elements of *material, competence, and meanings*: Social safety, traffic safety and factors relating to the physical environment. This structure can better explain the perceptions while considering the interrelationship between the three elements. Two of the results, relating to wearing religious attire and white male bicyclists did not fit into the three identified categories and are thus further discussed in section 6.2.1, as they call for further research.

5.1. Social safety

The first findings, presented as three sub-themes, were connected to the notion of social safety. Social safety has been shown to relate to fear of crime and often limits females in their mobility in public spaces (Xie & Spinney, 2018). The fear of social safety related were discussed regarding darkness, how car drivers behave as well as fear of crime and violence in relation to cycling in more socially vulnerable, ‘socialt utsatta områden’, areas (The Swedish National Council for Crime Prevention, 2018).

5.1.1. Cycling when its dark

There were three photographs taken during evening hours, photos 3, 10 and 12, but the participants were also asked to imagine how they would have felt cycling when it gets dark in the remaining photographs. As expected, the three photographs taken during the evening were perceived as less safe, but four other photos, 1, 4, 8 and 9, were also spoken about in terms of cycling in the dark.

³ The photographs shown alongside the text will not be in chronological order, due to how they were discussed throughout the interviews. For further detail of how the photographs were numbered, see appendix i.

A materialistic feature found was the industrial character and lack of houses that Johanna and Dorthe discussed regarding photo 1, located underneath a bridge, as well as by Natasha when she analysed photo 10, showing a bridge in a seemingly isolated area. Natasha points out that due to the isolation and lack of residential properties, she doubts that anyone would be there if something would happen. The industrial appearance made these women feel less safe to cycle through at night. Dorthe explained how the bridge makes it easier to hide, “*you do not know what is happening behind a corner or so, it’s a bit less pleasant to cycle there during the evening*”. Besides the natural darkness, lighting was also discussed. Natasha, Mary, Emma and Julija all commented on how they thought there was not enough light in photo 10. Aminah explained that the lighting in photo 10 would be insufficient at night as there are not many people around, posing that light is an important materialistic feature. A lack of proper lighting on cycling paths or isolation has been shown to decrease social safety, as found in several studies (Russell et al., 2021; Schneider et al., 2022; Xie & Spinney, 2018).



Photo 1 (to the left), path under bridge, for pedestrians and cyclists and photo 10 (to the right), a bridge with no lighting for pedestrians and cyclists. *Foto 1 (till vänster), väg under bro, för gångtrafikanter och cyklister och foto 10 (till höger), bro utan belysning för gångtrafikanter och cyklister.*

Photo 9 was also mentioned in terms of lack of light and isolation at night. When imagining photo 9, a gravel path going through an open field, with no lamps, five of the women said it would alarm them to cycle there at night. Ulrika, Amanda, and Mary all mentioned the materialistic feature of the absence of a lamp, or enough light entering the field. Linda and Marcia described the path as “*desolate*” and said that they would not feel comfortable to cycle there, thus associating negative meaning to the path at night, when it is dark and isolated.



Photo 9, a path going through a residential neighbourhood and an open field. *Foto 9. En väg som går igenom ett bostadsområde och ett öppet fält.*

Furthermore, Linda voiced her concern and said that she would not cycle on a path, such as in photo 10, alone at night, while Ulrika, Emma, and Amanda clearly stated that they would not cycle here at all at night. This could partly be explained by the different cultural meanings these women have when cycling at night and in darkness. Salma reasoned that she would not feel uncomfortable cycling in such darkness as displayed in photo 10. Further, when discussing photo 5, a cycling path passing through a tunnel, Raha, originally from Iran, voiced her opinion of cycling at night and in dark environments:

“I feel safe at night too, I have learned that since I moved to Sweden because if I should feel unsafe in the dark, then I would feel insecure all winter and I don't want that.”

Raha and Salma thus have a weak but contrasting neutral association with the darkness of the cycling paths whereas most of the other females felt they feared for their personal safety. Darkness has been shown to negatively impact commuter cyclists, in a Swedish study, and particularly female cyclists (Bergström & Magnusson, 2003).



Photo 5. A cycle path underneath a bridge. *Foto 5. En cykelbana under en bro*

When the women discussed cycling when it is dark, Dorthe, Ulrika, and Emma, all highlighted the fact that if they would have to cycle a path at night when it is dark, they would use their confidence as a cyclist and cycle faster to get by the scarier part of the route quicker. The skills and knowledge they possess can thus differ depending on the situation they are in, for instance at night, which helps them to escape a frightening cycling environment quicker. The women that mention this have all learnt to cycle quite early in life, before or when being 5 years old as well as having answered that it is common to cycle in their families. This could be linked to the understanding of mediating factors, such as having a personal history of cycling as a child as well as learning to cycle before the age of five has shown to correlate with higher safety perceptions, which was found in a Danish study that examined both residents of foreign-born and native Danish background (Basaran et al., 2021; Chatterjee et al., 2012).

There were, however, two photographs taken at dusk, photo 3 and photo 12, that were discussed with a more positive meaning. Linda explained how photo 3 had enough movement for it to feel safe to cycle at night while Natasha, Mary and Emma said the light was sufficient on photo 12, Josefin reasoned that:

“It feels a lot safer when the darkness isn’t so ‘compact’ when the lamps are not blocked by bushes etc., for example here on photo 12 when there are lamps on the side of the house that make sure the area is well lit.”

This quote illustrates this link between the material structure, the lamps, and the meaning of the darkness feeling less overwhelming.

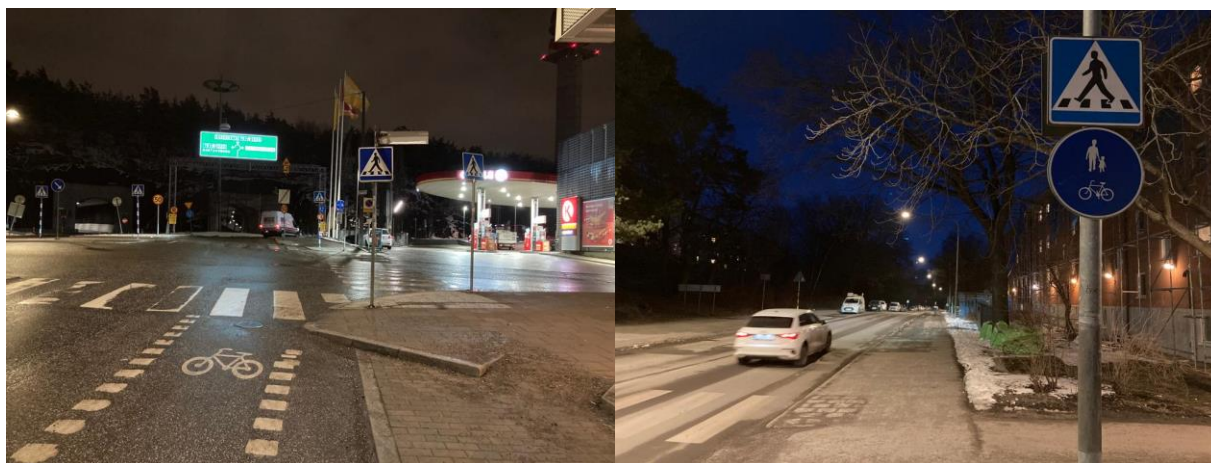


Photo 3 (to the left), a dashed cycle lane with a transition to a pedestrian crossing, and photo 12 (to the right), a shared cycle and pedestrian path alongside motor traffic and residential area. *Foto 3 (till vänster), streckad cykelbana som leder till ett övergångsställe, och foto 12 (till höger), en gemensam cykel och-gångväg vid sidan av biltrafik och bostadsområde.*

To summarise the finding about cycling when it is dark and on isolated paths, it seems that light and amount of activity were important material attributes, which corresponds to previous research that lighting is an important feature for feeling higher levels of social safety, in addition to isolated areas being associated with fear and lowered social safety (Russell et al., 2021; Schneider et al., 2022; Xie & Spinney, 2018). This meant the women had a negative emotional meaning to the darker cycling routes which were isolated or when insufficient light was apparent.

5.1.2. Dealing with other road users

There was one photograph that was particularly meaningful to the women, concerning car drivers' behaviour. Photo 13, an ordinary road, with a speed limit of 20 km/h, with no separate cycling lane, was described as unsafe and risky by the majority of the women. Mary said that it is important to be mindful of the cars overtaking, which signifies a certain level of knowledge, i.e., competence, of the traffic rules. Salma goes on to discuss traffic rules, *“it's perfectly okay to drive on the road if the road doesn't exceed or has a maximum speed of 50km”*, implying she has the confidence that allows her to cycle through this type of cycling environment. As both Mary and Salma are born and raised outside Europe, this finding goes against previous findings that illustrated how immigrants in the US and Denmark would fear cycling in certain environments due to cultural or language difficulties in understanding traffic information (Barajas, 2020; Basaran et al., 2021).



Photo 13, a motor traffic road, alongside a pedestrian path. *Foto 13. En bilväg, vid sidan av en gångtrafikantväg.*

However, Natasha, feels less certain and voiced her concerns:

“I don't know what to expect and how normal it is that cyclists are everywhere and what drivers are supposed to do in this kind of situation? So, but this is maybe like immigrant problem or let's say mindset. Like I don't know what to expect from drivers.”

This statement relates to the cultural association of the meaning of this cycling environment. Natasha feels insecure, relating to her lack of knowledge of traffic rules in a new country, thus cycling in a new context, as discussed above in relation to immigrants feeling insecure about cycling where they do not feel comfortable with knowing the traffic information (Barajas, 2020; Basaran et al., 2021). This situation shows the complexity of traffic rules and perceptions, i.e., meanings of cycling in different environments as the feeling and knowledge of where you are allowed to cycle could change depending on your foreign background.

5.1.3. Shootings and socially vulnerable areas

Two of the women, one Swedish native, Ulrika, and one woman born in Egypt, Salma, both expressed their feelings about cycling in places where there have been shootings or places that are spoken badly about in media, mentioning the Swedish so-called ‘utanförskapsområden’ (socially excluded areas). Ulrika referred to photo 8 and said:

“... it is possible that it would have felt different if I had not known about the area... if it had been in Kista... I might have thought it was scary because you also kind of do not know about Kista, hear negative...”

Ulrika then continued discussing this topic but in relation to photo 4, saying that if this bike path would have been in a so-called ‘utanförskapsområde’, and someone would ask her if she would bike there at night she would have answered, “*absolutely not*”.



Photo 4, a shared cyclist and pedestrian path, in an alley with trees. *Foto 4, en gemensam cykel-och gångväg, i en grand med träd.*

Salma also referred to photo 8, when she initially mentioned the emotional meaning of cycling where there has recently been a shooting. Salma once had a frightening experience cycling in her neighbourhood, Flemmingsberg, whereby two men started arguing with a knife. She explained:

“you also have to take care of yourself, you hear about shootings everywhere... to protect yourself, so if I think there are gangs in any area... or only there are shootings there, then it is not wise to just cycle there.”

Salma also said she tries to cycle where she feels safe and where she knows that there has been no shooting. These findings, relating to how these two women relate the fear of cycling to areas where they hear or witness a crime, are directly linked to the element of meaning as it represents the emotional meaning they attach to cycling in certain environments. Fear of crime, or violence, has been shown to correspond to females, of both regular and non-regular cycling habits, feeling frightened to experience crime or theft (Fowler et al., 2017).

5.2. Traffic Safety

Perception of traffic safety has been researched in terms of gendered differences, and is a type of safety that relates to cycling with other motor traffic and how this is regulated with different types of bicycling facilities, as discussed in the literature review, section 2.3. The width of the cycling lane was mentioned using positive phrases by several of the women as making them feel comfortable cycling alongside other pedestrians or in shared paths. A red-coloured lane was appreciated as it made the women feel that it was clear that this path belonged to cyclists. Cycling next to parked vehicles was also an appearing theme, which several of the women saw as fearful due to the risk of car doors injuring them, the narrowing of the path and sharing space with motor traffic. Further, separation from other traffic is discussed, as several of the women said they preferred when there was no motor traffic and mention a dashed lane that goes through a busy road, photo 2, as hectic and worrisome.

5.2.1. Colour and width of cycling lane

Photograph 6 displays a red-coloured, wide cycling lane with dashed lines. The photograph, particularly its red-marked feature, was mentioned by six participants, thus being one of the most mentioned features when compared to the other photographs. Females of different cycling experiences, ages, and backgrounds, all highlighted how much they appreciated the red colour on this path (Amanda, Julija, Marcia, Aminah, Josefin and Dorthe). A red colour is an object in the physical structure.



Photo 6, a dashed red coloured cycling lane crossing a motor traffic road. *Foto 6, en streckad rödfärgad cykelväg som korsar en motortrafikväg.*

Besides the feature of the actual colour, several of the women go on to explain how car drivers, many of them being car drivers themselves, will notice and recognise cyclists easier when a cycling lane is painted in red. Aminah explained:

“I drive a car, so I said I drive a car often like every day I drive over the bike path, so if it's different colour I'm more attentive if it's bike path and I have time to brake and stuff...”

Thus, the notion of these women's skills and knowledge of car traffic and driving, makes them feel more confident being acknowledged as cyclists in this type of cycling environment. It was clear to several of the women that the motorists will understand where the cyclists can cycle (Dorthe, Sandra, Johanna, Emma and Julija). The feature of a painted cycling lane has been researched before, in relation to female cyclists. It was found that female cyclists increased once a path was painted, although not specifying colour (Graystone et al., 2022). However, another study found a higher safety correlation when female cyclists rated painted cycling lanes in combination with a bicycle symbol painted on the path (Rivera Olsson & Elldér, 2023).

Besides the colour of the cycle lane, the notion of width was brought up by several women. The width can be indicated as a material feature as it incorporates a physical structure in the design of the cycling infrastructure. Amanda, Linda, and Josefin all shared their liking of photo 4, a pathway without separation between pedestrians and bicyclists, mentioning the width. Further, the width

and amount of space in photo 6, a red-coloured dashed bicycle-only lane, however two-directional., was brought up by nearly half of the women (Amanda, Sandra, Aminah, Linda, Josefin, Dorthe, Mary, Ulrika). Lastly, the shared space of photo 7, which displays a pedestrian and bicyclist pathway, is found to be appreciated by four of the women, with regards to its width (Amanda, Linda, Josefin and Dorthe). Several previous studies have found the width of the lane to impact safety as a wider path will decrease the risk of getting into a conflicting situation with other road-users (Manton et al., 2016; Russell et al., 2021; Werneke, 2015; Xie & Spinney, 2018). As most of the photographs mentioned by the women were either shared with pedestrians, i.e., other road-users, or two directional., i.e., shared with more cyclists, this corresponds to previous literature.



Photo 7, a shared cyclist and pedestrian path passing through an alley with trees. *Foto 7, en gemensam cykel-och gångbana som passerar igenom en allé med träd.*

There seems to be no socio-demographic pattern when it comes to the width of a path, and many of the women repeatedly mentioned it, namely Linda, Josefin, and Amanda, who are all different ages, cycle for different purposes and are with/without children. To summarise the women's preference for wide lanes, it seems to be when the lane is shared with other road users, i.e., pedestrians, or the bicycle road must cater for bicyclists heading towards both directions.

5.2.2. Cycling alongside parked cars

When the women discussed photo 13, they were asked how they would have interpreted the road, which is shared with cars, if there would have been cars parked along the pavement. The attribute of a parked car thus represents a material object. Julija explains how it does not feel good if cars

were parked on this road, she went on to explain how the visibility gets worse and how it affects safety as there is less space to share with the other road users. This goes in line with previous studies, that found that cycling alongside parked vehicles was a barrier to cycling (Clark et al., 2019; Manton et al., 2016).

This, in turn, corresponds with the attached meaning, for instance, fear, that Sandra and Ulrika shared, as well as stress that Josefin and Natasha felt. Ulrika said that the fear of car doors relates to having to ride next to cars, that would see her as being 'in the way'. In a US study it was found that of those that cycled on a daily basis, 40 % rated the risk of car doors as high, compared to only 15 % of those that cycled irregularly (Sanders, 2015). As Ulrika would describe herself as someone that cycles for errands and for leisure but not daily, it shows that this topic is quite complex as different experiences and backgrounds might impact the way the fear of car doors is imposed. It could relate to the emotional meaning of not feeling comfortable but also to the amount of confidence, competence, and knowledge of not knowing that you are allowed to cycle on a path such as photo 13. The women that mention negative feelings about parked cars in photo 13 are all different types of cyclists, the majority cycling to leave children at kindergarten, to do groceries, or going to work but also some cycling for leisure.

5.2.3. Being separated from other road users

A considerable amount (9) of the photographs were taken in cycling environments where they were separated from cars and public transport, while only photo 5 clearly depicts a distinction between pedestrians and cyclists. Photo 5 was mentioned by many women as a separate marked lane they liked (Amanda, Raha, Amy, Johanna, Julija, and Josefin). The separation between pedestrians and cyclists is a materialistic feature, as it is a physical structure created to separate the two modes of transportation. It is a way to structure a cycling environment, which Natasha notes, describing the liking of the tunnel in photo 5, and stating it as "*very organised*". However, photo 4, which has no distinct separation between pedestrians and cyclists, is not described in terms of unsafety by most of the women. Natasha and Marica even go on to say that they do not find pedestrians problematic in this type of cycling environment.

The positive association, i.e., meaning, the women feel about separation is mainly noted in terms of cars or public transport. Natasha, Marcia, Johanna, Aminah, and Josefin all commented on the fact that there is no motor traffic in photo 4 as something positive and that makes them feel safer.

However, photo 11, a shared pavement separated from car traffic, is mentioned by Josefin and Sandra as perhaps a bit “*too narrow*” for pedestrians and cyclists but also note that it could have to do with it not being a clear line, again relating it to the physical object of colour, lines, or different pavement structures.



Photo 11, a shared cyclist and pedestrian path passing through a residential area, motor traffic and some greenery.

Foto 11, en gemensam cykel-och gångbana som passerar igenom ett bostadsområde, biltrafik och lite grönska.

A literature review that looked at 40 bicycling studies, found that 23 of them showed evidence of female cyclists rating separated cycling lanes, from motor traffic, higher compared to male cyclists. The author explains it to be related to females often having a different risk perception, prioritising comfort and feelings of safety (Aldred et al., 2017). This corresponds with the meanings the women relate to these paths. For instance, in photo 2, a path with car traffic and public transport, a negative connotation is highlighted by many of the women. The tram is described as a worrisome object by Josefin, Amy, Aminah, Ulrika, Dorthe, Emma, and Julija. Amy described how it scares her how other people do not pay as much attention when cycling on photo 2:

“It seems like there's more chance for a bicyclist to get hit when there's something like a tram or something like that around.”

Amy, Linda and Dorthe relate the fears to their knowledge and skills, such as being unsure and not confident about how to act with all this traffic. These three women have all cycled since a young age, and Dorthe and Linda even cycle to work with varying frequency. Due to the worrisome

physical objects, i.e., cars and trams, Emma, Mary, and Josefin would walk their bike across this road. Thus, they were not feeling confident enough to continue cycling in this type of environment. Further, Amy, who learnt to cycle young but mostly cycles for leisure, and Aminah, who learnt to cycle as an adult via the cycling organisation, state how they would feel uneasy to cycle here as unexperienced cyclists, but Amy goes on to reason that perhaps with more experience it would not bother her to cross tram tracks like displayed in photo 2.



Photo 2. A dashed cycle lane crossing a roundabout with signal light, tram and motor traffic. *Foto 2. En streckad cykelbana som passerar en rondell med signalljus, spårvagn och biltrafik.*

As such findings relating to traffic safety were mainly discussed in terms of separation and clearly marked bicycle lanes, such as a coloured or wide lane, i.e., material elements. The preference for coloured paths corresponds with previous literature (Graystone et al., 2022), as well as the mentioning of liking to cycle on wide lanes (see section 2.3.2. in literature review). Further, parked vehicles caused fear as the women were nervous about car doors injuring them, which has been found in earlier studies (Clark et al., 2019; Manton et al., 2016).

5.3. Factors relating to the physical environment

Greenery, relating to trees, bushes, nature reserves, was found to impact social safety as the women feared being attacked or harassed and limiting the overall visibility of the path. Seasonality was another theme that related to features of snow, ice, and gravel as well as the temporality such as cycling during winter versus summer. Finally, elevation was featured as a theme relating to hilliness, both in terms of cycling with others (children), as well as having physical strength and confidence, found to be mentioned by a majority of the female cyclists.

5.3.1. The contrasts of greenery

Greenery was a topic that was touched upon with very conflicting perceptions. Overall, greenery had a positive affiliation with the women. Salma, Aminah, Dorthe, and Julija, all with different cycling backgrounds and ages, but not being raised in Sweden, spoke about how great it feels to cycle in nature. Objects such as flowers, trees and fresh air were mentioned by Aminah as things she likes to see while cycling. The positive meaning that made her feel this enjoyment is thus coupled with the material nature objects, e.g., trees. Julija mentioned how she grew up with a lot of greenery around her and cycled along green tracks, located outside the city, as a young girl. She mentioned that brightness, linking back to section 5.1.2. ('cycling when its dark') and green cycling environments "... *entice me more than anything*".

When the women were asked if they would have felt any different to cycle during spring and summer, greenery is mentioned. Mary, Emma, and Amy all said that it would be nicer to cycle in photo 8, initiating that the physical object, i.e., the trees, has a more negative meaning when it is winter, and to some degree darker. Moreover, Raha, said that she feels safer and always prefers to cycle in nature, again referring to photo 8. Sandra explained her association with photo 8 to leisure as well as Josefin, Ulrika, and Julija all stated that the path is lovely and nice, Ulrika adding that it reminded her of a green path she used to take to work that she enjoyed.

Photo 9 is also discussed in a positive manner when the women relate it to leisure, summer, and greenery (Ulrika, Maryam, Josefin and Salma). This is an interesting finding as a study in Germany found that female cyclists, are more willing to alter their route to cycle through routes with more trees and greenery, compared to male cyclists (Nawrath et al., 2019). It was also found that those that mostly cycle for leisure were even more willing to cycle an alternative route if it was greener, something that did not present itself in these interviews as both women that cycled to drop their children at kindergarten and to go to work as well as leisure cyclists spoke positively about greenery.

Additionally, cycling in nature reserves was spoken about when a follow-up question was asked relating to how the interviewees would perceive the cycling environments if they were greener (as the photos were taken in transition from winter to spring). The women have contrasting emotional motivations, i.e., meanings, when sharing their relationship to cycling in nature reserves. Ulrika expressed her joy of cycling through nature reserves with her family for leisure, while Natasha and

Emma bring up memories when they experienced fear of cycling through a nature reserve. Emma had a very bad experience cycling through a nature reserve with a friend when she was younger, witnessing a flasher, while Natasha says she chooses not to cycle in nature reserves, not even in daylight, due to the isolation. The meanings are thus both positive and negative, causing the women to associate different meanings to the practice of cycling in nature, as Emma says she would not cycle alone or at night through a forest or nature reserve while Natasha strongly expresses her dislike of cycling at any given time in a nature reserve.

This finding corresponds to previous research, which examined how women experienced recreation in urban greenery, whereby different women in the US stated that being in nature felt 'freeing' and 'peaceful', nonetheless experiencing fear and vulnerability. The women reported that when they were recreating alone, they felt more afraid compared to recreating with others, with several of the women reporting that this fear stemmed from having been harassed in the past while recreating outdoors (Wesely & Gaarder, 2004). This links back to Emma's narrative of not wanting to cycle alone through a forest or nature reserve, due to her childhood experience of witnessing sexual harassment. Another US study, investigating which concerns female runners had while running in urban parks, found that the greatest fear was the fear of being attacked, and some of the women shared personal experiences of physical assault (Roper, 2016).

Regarding the photographs, many of the women discussed how photos 8 and 9 had too dense greenery, for instance, the bushes in photo 9 and trees in photo 8. Linda and Aminah mention that they do not appreciate the bushes in photo 9 if they cycle there at night. They both implicitly state that the bushes in combination with desolation make them fear for their personal safety, again relating back to the research (Roper, 2016; Wesely & Gaarder, 2004). The physical object of the bushes is unfavourable for these women, as they feel fear and unsafe cycling due to these objects at night, again linking the material., bushes, to the meaning of unsafety.



Photo 8. A shared cyclist and pedestrian path passing through a forest-like environment. *Foto 8. En gemensam cykel-och gångväg som går igenom en skogsliknande miljö.*

Finally, Natasha and Amanda brought up the fact that they do not like to cycle through a forest at night when imagining photo 8 in the evening. Natasha brought up the fact that the trees make it difficult to see what could be concealed, which makes her feel that she would want to escape as she does not feel safe. This type of reasoning was also found among female cyclists when both female and male cyclist rated different types of cycling environments in Wales, UK, whereby the women said that trees would block the visibility and would cause them to fear their social safety, in terms of violence and crime (Xie & Spinney, 2018). Thus, it seems that the season, the isolation, and the time of the day were important when it comes to cycling in green environments.

5.3.2. The impact of seasonality

A common characteristic was that all women, besides one, cycled only during spring, summer, and autumn or only during the summer. The women shared that they did not feel comfortable nor confident cycling during winter, naming snow and rain as weather conditions they did not like. This relates to a Swedish study that found that female cyclists ranked precipitation and temperature as important factors when choosing to cycle (Bergström & Magnusson, 2003).

The women thus felt lower competence, and skills when it came to cycling all year round. Even Marcia, the only woman who reported to cycle during winter and who learnt how to cycle through the cycling organisation, mentioned that she would fear slipping on ice in photo 8. Many women talked about photo 8 (Amy, Ulrika, Natasha, Amanda, Maryam, Linda, Josefin, Mary, and Emma),

and said that it could be slippery due to the ice and gravel. As an overwhelming majority of the women mentioned the fear associated with ice and gravel, it is seemingly about confidence and competence rather than a specific sociodemographic, such as being Swedish native or of foreign background. There has been research covering seasonality and cycling in a Swedish context, which found that summer cyclists, both male and females, would be more willing to cycle during winter if the maintenance was improved (Bergström & Magnusson, 2003).

Photos 7, 11 and 13 are also discussed, with negative connotations of the gravel. The material object of gravel and ice are thus linked to the fear of injury, the meaning as well as the competence and confidence these women feel regarding these cycling environments. The maintenance of the roads was also discussed, specifically in photos 7 and 13, as not being sufficient to cycle there. Johanna delved deeper into photo 7, saying she would cycle here more for enjoyment than to commute to work or an errand, due to the amount of gravel, as it would force her to slow down her pace. Once more relating the material, the gravel, to the competence, the skills of slowing down and the meaning; the enjoyment and leisure rather than a rushed commute to work. Johanna thus has practice-based experience of cycling in different contexts and has thus built up her competence and skills to understand where she feels comfortable to cycle for different purposes (Stove et al., 2012).

5.3.3. Difficulties associated with hills

In relation to elevation, or hilliness, two findings were noted. The first one was that a few of the women, namely Johanna and Amy, both having young children, said that it would be a struggle to cycle uphill with their children when describing photo 8. This can be thought of as a competence, ‘know-how’ skills that these women struggle to adapt to. Amy, for instance, shared how her 3-year-old son would “*freak out*” if he had to cycle uphill on his own balance bike. Johanna also discussed this as she has three young children who sometimes cycle with her, and she said it would be a challenge to take charge and control a cycling path such as photo 8 with her children cycling around, not knowing if another person might come from the other side of the hill. These challenges the women experience corresponds to ‘mobility biographies’, which describe how female caregivers deal with barriers associated with cycling (Basaran et al., 2021; Xie & Spinney, 2018). One of them is the complexity to have a child cycle alone rather than as a ‘passenger’, which has been found to make a cycling journey more uncomfortable for female caregiving cyclists (Sersli

et al., 2020). In this specific instance, it seems that the physical elevation in combination of having a child cycling on a bicycle next to the female adds an extra dimension of complexity.

Photo 8 was the only cycling environment with a distinct elevation, which was mentioned by Natasha and Emma as decreasing the overall visibility. Natasha mentioned that the decreased visibility due to the topography and lighting would fear her personal safety, whilst Emma and Natasha, mentioned that the elevation in combination with ice and gravel makes the path more susceptible to the risk of falling. Natasha also discussed that the hill blocks visibility, which would make her feel less comfortable cycling on this path alone. This relates back to the finding of greenery in which Natasha said that the trees block what could be hidden behind a steep cycling path.

Previous research from Norway, looked at the association of being a commuter cyclist with personal characteristics, and found that when cycling during summer, as most of this study's participants reported, more women compared to men strongly corresponded with perceived road safety while men were more associated with self-reported health status (Nordengen, Ruther, Riiser, Andersen & Solbraa, 2019). However, as many of the women who reported fears, both from a socially vulnerable and from an injury perception, were not regular commuter cyclists, the literature is not inherently linked to this finding.

Johanna briefly mentioned it being hard with a slope such as in photo 8 while Aminah said she would be scared to lose control. This relates to her competence, having to cycle downhill from the other side, which she does not feel comfortable doing. Salma and Maryam said it is "*too hilly*".

Further, Amy, Salma, and Natasha, all said that they would probably get off their bikes and walk as it is too steep in photo 8. Additionally, Salma and Aminah talked about not liking to bike uphill at all, Linda saying that she struggles to cycle uphill as well as Julija saying that she can sometimes try to seek out an alternative route just to avoid cycling in elevated environments.

Although not gender specific, previous studies have shown that being regarded as a physically active person was correlated with being a cyclist (Nordengen et al., 2019). It could mean that several of the women who reported a struggle to cycle uphill were not used to that amount of physical activity. Besides Johanna and Linda, both Swedish natives, mentioning that it is hard with a slope and is struggling to cycle uphill, it seems that the majority of women highlight the dislike and discomfort but also the practice of stepping off the bike altogether as well as seeking an

alternative route. Topography, more specially a hillier terrain has been negatively correlated with cycling, with a US study finding that female cyclists were more negative compared to male cyclists when faced with steeper cycling slopes (Hood et al., 2011). In addition to this, Stockholm has a varying elevation (Stockholm stad, 2023) which could impact the emphasis the women put into the struggle. It could be that due to not having grown up here they face an additional battle to cycling in elevated terrain, as besides the gender component that has been shown to relate to a disfavour of these type of cycling routes, also faces the challenge of not being very accustomed to the natural elevation in Stockholm.

5.4 Summary

Several findings were presented in this results chapter, namely related to social safety that being cycling in the dark, which was found to negatively impact the females, especially so in isolated areas. Other social safety findings were fear of crime or shootings while cycling, as well as being unaware or uncertain of car drivers' behaviour. Findings related to traffic safety with positive affiliation were wide and coloured roads and being separated from other motorised traffic. Cycling next to parked vehicles was associated with fear of getting injured from car doors or not getting enough space. Seasonality, that is winter, ice, snow, and gravel as well as elevated roads were found to be barriers. The fear of slipping or not having the physical capacity to cycle uphill were noted. Greenery was both positively and negatively associated with bicycling, depending on the context. Overall, it was positive, as it was affiliated with childhood, flowers, or relaxation. However, many of the women would due fear of crime and avoid cycling in greenery in isolated or dark or very dense green environments.

6. Discussion

The following chapter will provide the reader with a discussion, to deepen the understanding of what the different perceptions the female cyclists had of physical, traffic and social safety in different cycling environments and how they impact their behaviours and decisions when cycling. Moreover, cultural, and socio-demographic barriers will be discussed. The theoretical framework of SPT with the three elements: *materials, competence and meanings* will be summarised and discussed. Additionally a short section covering the limitations of the method will be discussed in terms of the implications of the results. Finally, future research will be presented, in terms of how racial and religious studies relating to female bicycling could be conducted, as well as which policies and practical outcomings, mainly relating to physical and traffic safety, could be inspired by this study.

6.1. Understanding female bicycling perceptions through social practice theory

To understand how female bicyclists perceive different factors relating to social and traffic safety, as well as to the physical environment and how socio-demographics and culture could impact their perceptions and decisions when cycling, the factors have been summarised in relation to the theoretical elements of *materials, meanings, and competence* in SPT (see Figure 2).

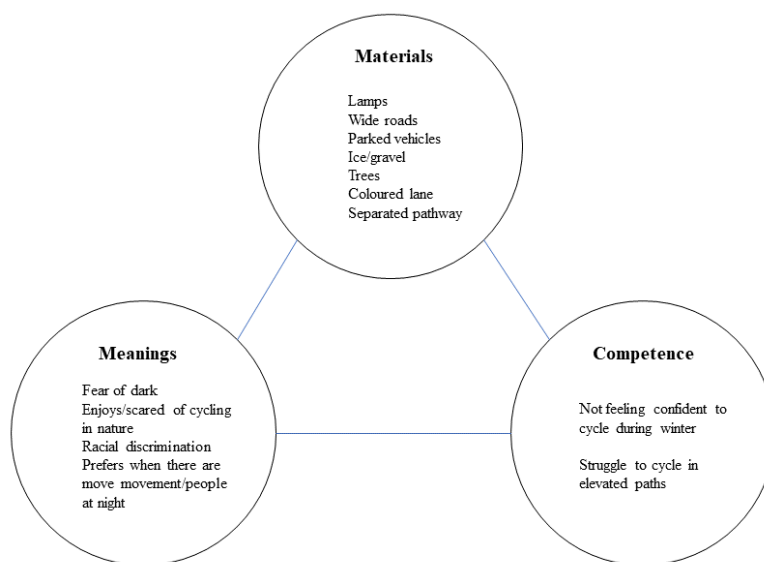


Figure 2. The findings categorised according to SPT's three elements.

Figur 2. Resultaten indelade i SPT's tre olika element.

Although the most mentioned perceptions have been categorised into the three respective elements, they are often more easily analysed as interrelated elements (Shove et al., 2012), such as mentioned in the theory chapter, section 3.5.

This interrelation was exemplified on several occasions during the interviews. The ‘struggle to cycle in elevated paths’, a factor relating to the physical environment, was brought up by several of the women. The topography is an example of a material structure, but the actual struggle relates to both discomfort and difficulty in physically getting past the elevation, which connects to the element of competence, the skills required to pass this type of terrain (Cass & Faulconbridge, 2016; Larsen, 2017; Shove et al., 2012). Previous studies analysing SPT in relation to the practice of cycling found that the fitness required for commuter cycling was perceived as unattainable, as their own energy levels did not meet their perception of cycling (Spotswood et al., 2015). Although this study did not explicitly investigate elevated paths, it did show that female cyclists can perceive certain paths as more difficult and thus act as a barrier.

Further, the notion of topography was related to cycling uphill with their children on bicycles, as found in two of the women’s reasonings. This relates to meaning, as cycling with children on different types of paths can be regarded as unsafe or safe (Ravensbergen et al., 2020), in this case as a stressful and daunting experience. Previous research demonstrated that while raising their children, mothers took a pause from cycling due to the complex nature of combining the practice of cycling with children (Sersli et al, 2020), which again links to the element of competence and skills (Ravensbergen et al., 2020).

Other factors relating to the physical environment were found to be ‘ice/gravel’ and ‘not feeling confident to cycling during winter’, the former categorised as a materialistic feature and the latter as competence in Figure 2. Although ice and gravel are initially thought of as attributes relating to weather and as such to the element of material (Cass & Faulconbridge, 2016; Larsen, 2017), they were found to connect to the other factor categorised in competence, not feeling confident to cycling all year around. The fear of slipping and getting hurt, was a barrier found among several of the women, relating the practice of cycling in winter as an unsafe mode of transportation (Larsen, 2017). This was mentioned about cycling in icy conditions and on poorly maintained roads. One woman even mentioned that she would cycle on roads with gravel, but she would most

likely decide to use those types of roads for leisure trips rather than commuting to work, as the speed could risk having to break and thus slip and get hurt.

Furthermore, greenery was analysed, i.e., 'trees' and 'enjoys/scared of cycling in nature', the former categorised as a material element and the latter as meaning. Several of the women saw trees and nature, material features, as something that had a positive impact on the practice of cycling. They associated trees with a positive meaning, thus a motivational factor and appreciation of nature (Gravenstine et al., 2012). However, as soon as the greenery came to associate with darkness, isolation or cycling alone, often mentioned in terms of cycling in nature reserves, feelings of fear of harassment were noted. Greenery in dark or isolated environments was viewed with different meanings, having a negative impact on their decision to cycle there, and posing as a strong barrier (Shove et al., 2012).

Associating unsafety with cycling in isolated environments has been found in previous studies, as well as female cyclists not liking dense greenery as it limits visibility (Russell et al., 2021; Schneider et al., 2022; Xie & Spinney, 2018). This finding brings these two notions together, finding that female cyclists do appreciate cycling in green, lush environments, as also found in previous research, but not in conditions they do not appreciate such as the temporality, i.e., the darkness and the isolation (Nawrath et al., 2019).

This brings us to the other statements in Figure 2, namely, 'fear of dark', 'preference of people at night' and 'lamps'. These findings almost go hand in hand with those of greenery but also imply that good lighting and lamps, a material element, could go a long way in encouraging the women in their decision to practice cycling, as they would feel safer going through places that they do not associate with positive emotions. A few of the women mentioned preference for routes with more movement and people at night. They thus associate less light and less movement or people to fear, another negative emotional association the females felt in regard to cycling. In previous studies, research into fear of crime or violence has been carried out, which showed that being a female cyclist was more associated with those feelings compared to being a male cyclist (Fowler et al., 2017). In addition to this, Bergström and Magnusson (2003) found that female commuter cyclists rated darkness less favourable compared to male commuter cyclists, something that cannot be concluded as this study did not target commuter cyclists. In this study female cyclists that practice different types of cycling, such as for leisure or commuting, referred to darkness as intimidating.

Lastly, traffic safety was related to several material structures, i.e., ‘wide road’, ‘parked vehicles’, ‘coloured lane’ and ‘separated pathway’. Width, colour, and separation all gave the women the feeling of safety, thus a positive meaning as has been proved by previous studies (see ‘Traffic safety’, section 2.3). The material feature of a parked car was instead affiliated with fear and negative emotions as the women said they had less space and feared that car doors could injure them. The fear of parked vehicles and car doors posing a risk has been found in a study by Sanders (2015), which also found that daily cyclists rated the risk higher compared to cyclists who cycle very irregularly, which did not correspond to this study’s finding as some women cycled more regularly during certain seasons while some a lot less.

6.2. Future research and practical implications

During the analysis of the results, a few components were found that could be further researched. Although practical policy implementation is limited, especially in terms of cultural and social factors, it could still benefit from further acknowledgement and findings. These are presented below, with the first section relating to racial discrimination and the bias of ‘white male cyclists’, as well as female Muslim scarves not always being suitable when cycling, and how knowledge of how to ease this problem could be addressed. Further, the physical environmental factor of greenery is discussed in terms of how it could be further researched to better understand which infrastructural designs could work well in combination with greenery, to accommodate for female cyclists’ safety.

6.2.1. Social-cultural factors

In terms of future research, one interviewee associated her cycling behaviour to the fear of being harassed by white male cyclists. Raha said that white male cyclists scare her and have a huge impact on her practice of cycling. Racial discrimination is a social-cultural factor that could impact how women of foreign background or women of different ethnicities feel when they cycle in certain environments. She expressed anxiousness cycling when white male cyclists try to show how they ‘own’ the path. This meaning of cycling thus surpasses being a less experienced cyclist, as Raha learnt to cycle as an adult to also incorporate her foreign and ethnic background. This experience and fear of racial discrimination while cycling relates to the term ‘cycle blindness’, which can be used to describe the vulnerability of experiencing racism on roads, something that is often overlooked as the population, in this study female cyclists, is considered to be homogenised.

Cyclists easily get put into the same category regarding which roads and cycling contexts feel pleasant and safe (Lam, 2018).

People of other ethnicities than white expressed concern about racial microaggressions in public in a cycling study in the US. These cyclists expressed how motorists and cyclists behaved aggressively towards them, which they interpreted as being caused by their ethical or racial background. An African American woman explained how other bicyclists “*did not want to share the road*” (Lubitow, Tompkins & Feldman, 2019, p.1193). These findings concluded that racial aggressiveness from other cyclists and drivers acted as a barrier to practising regular cycling habits (Lubitow et al., 2019). Even though it might be difficult and complex to practically change racial cycling discrimination, the term ‘cycle blindness’ could be further investigated in a Swedish or Scandinavian geographical context. This would allow more women from different ethical or foreign backgrounds to come forward with their narratives of practising cycling and hopefully help to raise awareness of this barrier. Such a study could be of significance to Stockholm as the highest percentual increase of residents being foreign-born, from 2021 to 2022, was in seven municipalities, all located in the region of Stockholm (Statistics Sweden, 2023).

Another social-cultural factor that is suggested for future research is the topic of gender and religious attire. Salma said she struggled to practice cycling in Egypt as a young woman before moving to Sweden as she could not find appropriate clothing that she could cycle in as it would get stuck in the bicycle chain. She goes on to explain that she did not know that a possible solution, plastic protection for the chain, was available. Once she moved to Sweden and got a more traditional ‘female bicycle’ with the protection for the bike chain, she was able to cycle with her hijab without it getting stuck. These attributes, the bike chain protection, and the ‘female’ bicycle, alongside the lack of knowledge of the different options to deal with cycling with religious attire, caused Salma to negatively associate bicycling with unsafety and problems. This impacted her behaviour as she decided to quit cycling before she understood what the barriers were, and thus solved them.

The literature on this topic is not extensive, particularly not in a Scandinavian context, however a master’s thesis research carried out in London, that focused on which barriers Muslim women experienced, found that clothing influenced their choice to cycle (Chaudhry & Urban, 2020). Muslim women, with different cycling habits, commented on the difficulty of combing the right

attire when riding a bike. Wearing clothing in a modest way, as well as not getting too warm while cycling were examples brought up by Muslim women (Chaudhry & Urban, 2020). To better accommodate those that practice cycling from all religious backgrounds, it would be interesting to delve deeper into how Muslim women in Sweden find it to cycle with religious attire as there seems to be a research gap.

6.2.2. Physical factors

Findings about greenery and temporality, for instance, cycling in nature or green pathways at different times of the day are quite problematic from a practical point of view. What is perceived as an attractive cycling environment by many women during a summer or spring day, becomes an area of fear at dark. For policy makers, this is a balance, to keep planning for cycling paths to go through green environments that are enjoyable for recreation whilst also accommodating the fear of crime and harassment that female cyclists perceive. To better understand which type of green environments, in combination with lighting, are understood as safer for female cyclists' future research could be adopted with other strategies.

Studies with focus on females, but instead relating to running or walking (Roper, 2016; Wesely & Gaarder, 2004) have been conducted but not with a focal point on cycling. Bike-along interviews are one suggestion, which has been used in other geographical and demographic contexts, e.g., investigating environmental influences on older adults' transportation cycling experiences or how children, aged 10-12 viewed cycling in their residential areas, both using bike-along interviews (Ghekiere et al., 2014; Van Cauwenberg et al., 2018). Further, an ethnographic field study could better and deepen the knowledge, for example by following women that are participating in cycling courses. Lastly, a photo-elicitation method that would incorporate cycling environments and elements such as tunnels (photo 5) or bridges (photo 10) but during different times of the day, with or without greenery, as well as in more residential areas or with different cycling infrastructure, to improve the perception of more cycling environments, i.e., tunnels, bridges, and roundabouts (in photo 2, but not clearly depicted). As these infrastructural elements, e.g., a green roundabout, could be practically implemented, it would be of value to examine this, as the currently opposed meanings of greenery create issues for female cyclists' safety.

Some socio-cultural and physical factors were explored in this study, but due to uncertainty, for instance as greenery was affiliated with greenery in some circumstances but also with fear in

others, it could be further researched with focus on different infrastructure. Socio-cultural factors, relating to racial discrimination when bicycling and how to better combine religious attire while cycling are both important as the foreign background community in Stockholm continues to grow.

6.3. Limitations of the study

This study could have been improved in several ways, including which photographs were used when interviewing the women, how well the target population was defined and the sampling method(s). In this study, the theoretical understanding, thus the perception that female cyclists have, has been understood by examining previous literature, regarding factors that seem to have had a particular impact on women. The method used, photo-elicitation, thus incorporated different photographs, some with many factors (elevation, greenery, ice, separated from motor traffic, e.g., photo 8) while some with fewer factors (greenery, separated from motor traffic, e.g., photo 11). This was a way to operationalise the research questions and aim, as it allowed the participants to discuss different topics and factors in relation to different photos, by including different contexts and how strongly they felt about them (Esaiaasson et al., 2007). One issue could have been the fact that some photos, such as photo 2 included several attributes, such as a dashed bicycling lane, tram, car traffic, signal lights as well as a roundabout. Cycling in a roundabout and a dashed bicycle lane has been shown in previous research to impact, especially female cyclists (Manton et al 2016; Rivera Olsson & Elldér, 2023). However, when coding and analysing the transcriptions, the roundabout and to some extent, the dashed bicycle lane, were not very noticeable, as the attention was directed to the tram and the public transport.

Moreover, the sampling can also have had an impact on the results. As only three out of 18 women were aged 50 or older, it could have meant that the results are slightly skewed towards younger female cyclists. This phenomenon, the so-called 'sampling bias', is often more common when the sample group is quite small, usually below 50 people, in relation to the target population (Flowerdew & Martin, 2013). As such, the variation of socio-demographic could have had an impact on the results, as only a total of 18 women were considered. This was most likely caused by the non-random sampling through local neighbourhood groups on Facebook, as it was difficult to sample non-daily and non-all year around female cyclists, and thus, the females that choose to volunteer happened to not be evenly distributed by age (Esaiaasson et al., 2007). This brings us to the limitation of the target population not being well defined. The initial target population was

focused on less experienced female cyclists that had taken part of a cycling course via a Cycling organisation. However, due to sampling difficulties, as well as religious festivities such as the month of Ramadam, I had to rethink and reach out to other female cyclists through local Facebook neighbourhood groups. As the females recruited via Facebook had different experiences and purposes of cycling, although all were either not daily or all year around cyclists, the initial target population of 'less experienced female cyclists' had to be altered to 'less frequent female cyclists'.

7. Conclusion

The aim of this study was to investigate the so-called ‘gender-cycling gap’ that is prevalent in Sweden. Although ranking high in gender equality, Sweden has a relatively lower number of female cyclists compared to its neighbouring countries. Therefore, this study explored less frequent (non-daily or non-year around) female cyclists’ perceptions of different cycling environments and how they impact upon their decision making around cycling as a practice.

When a cycle path was poorly lit or isolated it was found to impact the women’s social safety, as this made them fear being a victim of crime. Further, shootings or areas that have been badly spoken about (referred to ‘socially vulnerable’) were discussed as decreasing their social safety, which is of specific interest in Sweden, due to the politicised nature of ‘vulnerable’ areas, particularly around race and migration.

Coloured, wide, and separated from motor traffic were three attributes found to positively influence women when choosing to cycle, all corresponding to previous studies. Whilst the impact of cycling next to parked vehicles has previously been researched, this study found that women of different backgrounds and cycling experiences reflected differently on cycling next to parked vehicles as unsafe.

Greenery, seasonality, and elevation were all mentioned by the women as having an impact on their decisions to cycle. Greenery was both positively and negatively affiliated, positive in the way of enjoyment and recreation but negative when associated with isolation and darkness, which, linking back to social safety, invoked fears of violence and harassment. Moreover, the women not liking to cycle during winter, was due to ice and poorly maintained roads, as they feared injuring themselves. Elevated paths not only posed a physical safety issue but were also described as difficult due to levels of physical fitness, and especially difficult for mothers cycling with children.

Two novel findings from the study related to social and cultural impacts, namely the fear of being harassed by white male bicyclists by a woman of non-western foreign background, and the difficulty knowing how to safely wear hijabs and religious attire when cycling. These findings are relevant as they contribute to the growing literature on female cyclists, in a Scandinavian context, especially so as females of different socio-demographic backgrounds and experiences were given the chance to share their perceptions and feelings about cycling. As the Region of Stockholm is

targeting all types of cyclists, explicitly highlighting those of foreign background, this research is significant to further facilitate cycling and urban planning policies. The findings of fear of white male bicyclists and hijabs could be used in future Scandinavian cycling research, to develop and enlarge ways to aid female cyclists of all ethical and religious backgrounds.

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Appendix

1. Photographs used in the photo-elicitation interviews





2. Table presenting the respondents socio-demographic characteristics

Table 1. Details of participants and methods of sampling. Tabell 1: Detaljer av deltagare och hur de rekryterades.

| | <u>What age they learn to cycle</u> | <u>Seasons of cycling</u> | <u>Purpose of cycling and how often</u> | <u>Age</u> | <u>Children</u> | <u>Background</u> | <u>Occupation</u> | <u>Family history of cycling</u> | <u>Sampling method</u> |
|----------------|-------------------------------------|---------------------------|---|------------|------------------|-------------------------|-------------------|----------------------------------|--------------------------------|
| Raha | 40 + | Summer | For local errands, max. 5 km 2-3 /week | 60-69 | 2 adult children | Iran | Works full time | Not common, only brothers cycled | Cycling organisation, Whatsapp |
| Dorthe | 4-5 | Spring, summer, autumn | To work, 1/ week | 50-59 | 2 adult children | Denmark (countryside) | Works full time | Common | Facebook, Telephone |
| Natasha | 5-6 | Spring, Summer, Autumn | For local errands/to bring daughter to Kindergarten, 5/week | 30-39 | 2 young children | Russia (mid-sized town) | Unemployed | Fairy common | Facebook, Whatsapp |
| Linda | 5 | Spring, summer, autumn | To work, sometimes with family and for local errands 3/week | 40-49 | 2 young children | Stockholm, Sweden | Works full time | Common | Facebook, Telephone |
| Sandra | 6-7 | Summer | To work, 4-5/week | 40-49 | 2 young children | Stockholm, Sweden | Works full time | Common (during summer) | Facebook, Messenger |
| Amanda | 6 | Spring, summer, autumn | To uni, quite on and off in periods, 2-3/week | 20-29 | No children | Stockholm, Sweden | Student | Common | Facebook, Telephone |

| | | | | | | | | | |
|----------------|-----|--------------------------|--|-------|------------------|------------------------------------|-----------------------------|--|------------------------------------|
| Maryam | 20+ | Summer | To school or for local errands, 2-3/week | 20-29 | No children | Middle East | Student/Works part time | Not common, mostly men cycle | Cycling organisation, Whatsapp |
| Josefin | 6 | Summer | Currently not cycling, however sometimes 1/week | 30-39 | 1 young child | Lund/Malmö, Sweden | Works full time | Common | Facebook, Telephone |
| Mary | 5-6 | Summer | Local errands, to visit grandchildren or leisure trips with friends Daily | 60-69 | 2 adult children | US and Sweden (Stockholm) | Works part time | Not common | Facebook, Messenger |
| Emelie | 30+ | Spring, Summer, Autumn | To work, Every other week | 30-39 | No children | West coast Archipelago, Sweden | Works full time | Fairly common, mother knew but not father | Cykelfrämjandet, Telephone |
| Salma | 3-4 | Spring, Summer, (Autumn) | Leisure & health, Frequency varies | 30-39 | 1 young child | Egypt (Cairo) | Student | Common | Via Aminah, Whatsapp |
| Ulrika | 5-6 | Summer | Leisure and for local errands, 1-2/week | 40-49 | 1 adult child | Stockholm, Sweden | Works full time | Common | Via Facebook, Messenger |
| Aminah | 40+ | Summer | Leisure, mainly with children, irregularly | 40-49 | 4 young children | Egypt | Student and works part time | Not common | Via Cycling Organisation, Whatsapp |
| Johanna | 5-6 | Spring, Summer, (Autumn) | Local errands, to work 2-3/week | 30-39 | 3 young children | Stockholm, Southern suburb, Sweden | Works full time | Fairly common, besides sister who dislikes cycling | Via Facebook, Whatsapp |

| | | | | | | | | | |
|---------------|-----|----------------------------------|---|-------|------------------|-----------------------------------|---|------------|-------------------------------------|
| Emma | 5-6 | Spring, summer, autumn | Local errands, to visit friends and family, 2-3/week | 30-39 | 2 young children | Stockholm Southern suburb, Sweden | Maternity leave, but normally works full time | Common | Via Facebook, Whatsapp |
| Amy | 6-7 | (Winter), Spring, Summer, Autumn | Leisure with family, To take child to Kindergarden, irregularly | 40-49 | 1 young child | US (California) | Works part time | Not common | Via Cycling Organisation, Telephone |
| Márcia | 5 | Winter, Spring, Summer, Autumn | To work and for errands, regularly | 30-39 | No children | Brazil (large city) | Works part time | Not common | Via Emelie, Telephone |
| Julija | 5-7 | Spring, Summer, Autumn | To work and for local errands, 2-3/week | 30-39 | No children | Lithuania (small town) | Works full time | Not common | Via Facebook, Whatsapp |

3. Interview guide

Syftet med denna studie är att försöka identifiera och undersöka hur kvinnor, som inte är lika erfarna cyklister, uppfattar och tolkar olika slags cykelvägar och cykelmiljöer. För att undersöka detta kommer vi använda en metod där du som blir intervjuad får se olika bilder, ca 12 stycken, som vi diskuterar genom att jag ställer olika frågor till dig. Om du inte vill svara på en viss fråga eller diskutera en viss bild är det bara att säga det så går vi vidare till nästa fråga/bild. Om du tycker något annat känns oklart så är det bara att hojta till. Jag vill även säga att du kommer bli anonymiserad, med hjälp av ett falskt namn. Innan vi börjar vill jag också fråga dig om det är okej att jag spelar in vårt samtal., då jag lättare kommer kunna fokusera på vår dialog istället för att skriva ned allt mellan svaren och frågorna? Inspelningen kommer sparas på universitets lagringsprogramvara där den är säkrad. Jag vill poängtera att jag just vill intervjua kvinnor som annars kanske inte får sin röst hörd av olika skäl, då det oftast är mer erfarna (kvinnliga) cyklister, manliga cyklister eller olika representanter (tex myndighetsansvariga och tjänstemän) som uttrycker sina åsikter och upplevelser av att vara cyklist/hur cykelvägar kan förbättras. Jag är jättetacksam att du vill delta och du vill ge dina synpunkter.

Inledningsfrågor: Första frågorna kommer handla lite generellt om dina egna erfarenheter av att cykla och i vilket sammanhang du lärde dig cykla.

Så, berätta lite kort om hur du började cykla? Hur länge har du cyklat? Har du goda minnen? Var det vanligt att folk cyklade där du växte upp? *(So, tell me a bit about how you learnt how to cycle? For how long have you cycled? Do you have good memories? Was it common that people cycled where you grew up?)*

Vad var anledningen till att du började cykla? Något som kom naturligt? Något du kände dig tvungen att lära dig? *(What was the reason that you started cycling? Was it something that came natural? Or was it something you felt forced to learn?)*

I dagsläget, hur skulle du beskrivna t.ex. hur pass ofta du cyklar? T.ex. under olika perioder eller olika syften? Spelar årstiden roll? *(At present, how often would you describe that you cycle? Is it for example during certain periods or for certain purposes? Does that season of the year matter?)*

Tematiska frågor: Nu kommer vi diskutera olika bilder som visar upp olika slags cykelvägar och cykelmiljöer. Som du ser är vissa av bilderna tagna på kvällarna då det är mörkt medan de andra (flesta) är tagna under dagtid. Jag kommer ställa olika, ganska öppna, frågor relaterade till bilderna och då är du välkommen att ge exempel från en specifik bild eller flera av bilderna. Eftersom jag har numrerat bilderna i olika ordning får du gärna referera till dom när vi pratar, men det går också bra att beskriva bildens innehåll.

Vilken/vilka av dessa cykelvägar känner du är tryggast? Varför? Är det något i cykelinfrastrukturen eller miljön som lockar dig att cykla just där? *(Which of these cycling roads do you feel safest? Why? Is there something related to the cycling infrastructure or the environment that attracts you to cycle there?)*

Vilken av dessa vägar skulle du känna dig mindre trygg att cykla ensam och varför? Kan du ge ett exempel på...? Skulle du kunna dig mer trygg att cykla på vissa av dessa vägar om du cyklade

tillsammans i en grupp med andra? (*Which one of these roads would you feel less safe to cycle on alone and why? Could you give an example of...? Would you feel more safe to cycle on some of these roads if you would cycle together with others?*)

Är det någon av cykelvägarna som är tagna under dagtid när det är ljus ute, som du skulle känna dig otrygg att cykla på ifall det var kvällstid? Hur kommer det sig? Är det något speciellt i miljön som får dig att känna så? (*Is there any of the roads that are taken during day time, where you would feel less safe to cycle if it was night time? How come? Is there anything particular in the environment that evokes those feelings?*)

Skulle du kunna dig bekväm att cykla på cykelvägarna som syns på bild 3, 10 och 12 som är tagna på kvällstid? Hur kommer det sig? (*Would you feel comfortable to cycle on the cycling roads you see on photos 3, 10 and 12 that are taken during the evening? How come?*)

Förutom belysning, skulle du uppleva denna (specifika) väg annorlunda ifall det fanns mer bostadshus och t.ex centrum och aktiviteter som var närliggande? (*Besides lighting, would you perceive this (specific) road any different if there were residential houses or for example activities nearby?*)

Hur upplever du miljön runt omkring cykelvägarna? T.ex grönska och träd (och buskar). Försök föreställa dig mer grönska då dessa är tagna innan våren kommit igång. (*How do you perceive the environment surrounding the cycling roads? For example the greenery and the trees (and bushes). Try to imagine more greenery as these photos were taken before spring*)

Hade du upplevt cykelvägarna annorlunda att cykla på ifall det hade varit parkerade bilar längs vägen? Ta bild 13 till exempel (förklara hur bilarna hade kunnat vara parkerade) (*Would you have perceived the cycling roads different to cycle on in case there would have been parked cars along the road? Take a look at photo 13 for instance (explain how the cars would be parked).*)

Socio-demografiska frågor: Tack så mycket, nu har vi gått igenom bilderna.

Jag undrar om det skulle vara okej för dig om jag ställer lite korta demografiska frågor, vilket innebär frågor om ålder, sysselsättning och bakgrund.

Vilken av följande ålderskategorier är du i? (20-29, 30-39, 40-49, 50-59,60-69) (*Which of the following age categories do you belong to?*)

Har du barn? Om ja, är de fortfarande i grundskolan (till och med årskurs 9)? (*Do you have children? If yes, are they still in elementary school, i.e., up and until year 9?*)

Arbetar du? Om ja, heltid eller deltid? Om inte, är du utan arbete, studerar eller hemmafru? (*Do you work? If yes, fulltime or parttime? If not, are you unemployed, studying or a housewife?*)

Var är du uppvuxen? Är det vanligt att cykla i din familj? (*Where are you raised? Is it common to cycle in your family?*)

Tack så mycket för din medverkan. Om du råkar veta någon annan i din närhet som är kvinna och inte erfaren cyklist så får du gärna meddela mig om de skulle kunna tänka sig medverka, så kan du skicka iväg ett meddelande till mig.