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SPACE FOR PERSPECTIVE; **FAST CYCLE ROUTES**

A qualitative grounded theory study to the perception of fast cycle routes by low socioeconomic status residents in the Netherlands

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PREFACE

With the completion of this thesis, I may close a tremendous chapter of my life, and I am eager to see what the future holds for me!

During the bachelor's degree in Geography, Spatial Planning, and Environment at the Radboud University in Nijmegen, I was offered the incredible opportunity to study a semester at the University of Exeter in the UK, I have had the opportunity to broaden my skills by following the minor in education, and I was able to live a great student life where I have made friends for life!

In September 2019, after a backpacking adventure to New Zealand and Australia, I started the Master's programme in 'Environment and Society Studies' with the specialisation track 'Local Environmental Change and Sustainable Cities'. During this instructive master's, I was able to specialise in local sustainability and society concerning mobility and infrastructure.

During this thesis writing process, I have received great support and assistance. I would like to thank my supervisor, Henk-Jan Kooij, whose knowledge was very useful for conducting and writing this thesis. Your feedback pushed me to improve my thinking and brought my work to a higher level. You provided me with the information I needed to choose the right direction to complete my thesis successfully.

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Marieke Pijnappels

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SUMMARY

This constructivist qualitative grounded theory (GT) research aims to study the perception of fast cycle routes (FCRs) by low socioeconomic status (SES) residents in the Netherlands. It explores the fundament of their perception of FCRs, representing their needs and interests in the environment and society.

Active mobility as a form of sustainable mobility is becoming increasingly important for sustainable, healthy, and inclusive future cities. Consequently, considerable investments are being made in cycling infrastructure, including the implementation of fast cycle routes. A challenge and opportunity arise from the fact that low SES residents are less likely to be physically active than people with high SES. With this in mind, insights into their perspective towards FCRs is helpful for future city planning, ease in participation, and stimulation of active mobility.

By means of a grounded theory study (GT), this research aimed to explore the depth of the perception of FCRs by low SES residents. By constructing a theoretical model grounded from data, opportunities for novelty and surprise behind the perception of FCRs were explored. This provided understanding in the perspective of low SES residents on FCRs, as well as cycling, infrastructure and their social- and physical environment. Infrastructure measures, such as FCRs, are commonly designed and implemented by higher SES groups. That being the case, these insights are valuable for inclusive future cities.

The research question in this study was formulated as follows: 'how do low SES residents perceive fast cycle routes, and how is this perception grounded?'

This research is societally relevant as it serves as a theoretical foundation for decisions by planners and policy-makers on two levels. First, it supports the implementation of environmental policy and design for inclusive future cities by providing insights into low SES residents' needs and interests in the environment and society. Second, it helps form strategies for promoting active mobility for sustainable and healthy future cities, by providing insights into behavioural patterns of low SES residents. Furthermore, this research is scientifically relevant as it contributes to different research needs, concerning research in cycling and its benefits, cycling experiences and motives, FCR experience from various user types, motivations and attitudes of transport mode choices, the influence of spatial differences in cycling levels, and finally, relations between the objective and perceived neighbourhood influences. This research could guide future quantitative and qualitative research, acting as a theory to shape the research methods for small and larger-scale studies.

Using the trialectics of space by Soja (1999), a distinction between different 'spaces' was made. This offered a format to consider different dimensions of perspective in this research. It provided the basis to investigate the 'fully lived space', where perception and use of FCRs come together. The 'first space' represents the 'conceived FCR' which is empirically measurable and mappable or the 'real' space. The 'second space' represents the subjective 'imagined FCR'. The 'third space' represents the 'fully lived FCR' where real and imagined space interact. This research focused on these interpretations of space as a basis for researching the perception of FCRs by low SES residents.

Based on the constructivist paradigm, a qualitative grounded theory was carried out. As a method, unstructured interviews were conducted with residents from the Kolping Neighbourhood in Nijmegen. With a relatively high share of social housing, this neighbourhood is located between the two FCRs,

Batavierenpad Zuid (F173b) and the Wijchen-Nijmegen route. The data was collected and analysed with literature on perception and environmental perception in mind. A theoretical model grounded from the retrieved data was created by open, axial, and selective coding.

The grounded theory, named 'space for perspective; the fundament of the perception of FCRs by low SES residents', provides answers to the research question. A two-way division is made between a positive and a negative perception of FCRs. The message of this research is that different elements influence these positive and negative perceptions. The elements that influence the shaping of a positive and a negative perception are highlighted on the grounds of three categories formed: (1) knowledge & awareness, (2) habits & attitude, and (3) abilities.

In existing literature, these three categories are often used as combined drivers behind behaviour and perception in the physical environment or mobility modes. These literary justified elements strengthen the arguments made in this study. Additionally, 'attractiveness', 'safety' and 'comfort' appeared to be the essential requirements for FCRs, according to low SES residents.

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LIST OF ABBREVIATIONS

GT	Grounded theory
FCR(s)	Fast cycle route(s)
SES	Socioeconomic status
PA	Physical activity
WHO	World Health Organisation
CROW	Centrum voor Regelgeving en Onderzoek in de Grond-, Water- en Wegenbouw en de Verkeerstechniek (*a Dutch non profit agency advising Directorate-General for Public Works and Water Management formerly Ministry of Transport and Water Management).*
PT	Public transport

1. INTRODUCTION

This chapter introduces the motivation behind the research (1.1), the research aims and associated research questions (1.2), and the scientific and societal relevance (1.3).

1.1 RESEARCH MOTIVATION

This section discusses the importance of the challenge of accessibility and mobility in creating sustainable, healthy, and inclusive future cities (1.1.1). Subsequently, it explains the importance of mobility for the health of society and the inequalities involved (1.1.2).

1.1.1 CHALLENGE OF ACCESSIBILITY AND MOBILITY FOR SUSTAINABLE, HEALTHY, AND INCLUSIVE FUTURE CITIES

Accessibility and mobility in relation to cities have been a debate for citizens and policy makers for decades. Mobility, *"the potential for movement, the ability to get from one place to another"* (Handy 1994; Hansen 1959 in Handy, 2002, p.3), and accessibility, *"the potential for interaction"* where choice is an important element (Hansen 1959 in Handy, 2002, p.4), are essential components for sustainable, healthy and inclusive future cities (Ettema, 2018). Due to recent trends in urban development, technological development and societal discussions on sustainability, health and inequality, the topic of accessibility and mobility remains high on the agenda (Ettema, 2018).

The growth of cities creates additional activities and trips and raises the question of how cities can remain accessible in the future. In addition, new transportation modes are emerging due to technological innovation, such as electric cars and bicycles, shared car and shared bike systems, autonomous vehicles, and Mobility as a Service (MaaS). Next to this, the debate on climate change highlights the need to reduce global CO2 emissions. Since the transport sector in the Netherlands accounts for 21% of CO2 emissions, the transport sector is highly relevant for the sustainability issue (Ettema, 2018). Also, active mobility can positively impact healthy cities, which is increasingly relevant due to overweight, obesity, and other movement-related diseases (Götschi et al., 2016; Oja et al., 1998 in Ettema, 2018). Finally, the challenge of urban accessibility and mobility is related to the discussion of inequality and exclusion. Bijl et al., 2017 in Ettema (2018) show that inequality in the Netherlands has grown over the past 25 years, with the group with the lowest income and education level finding increasing social and financial difficulties.

With this growing awareness in accessibility and mobility for sustainable, healthy and, inclusive cities, cities worldwide increasingly invest in policies to encourage 'active mobility', including walking and cycling (Rayaprolu, Llorca, & Moeckel, 2018). Active mobility could be seen as *"the potential for movement, the ability to get from one place to another"* in a physically active way (Handy 1994; Hansen 1959 in Handy, 2002, p. 3; Hess et al., 2017; World Health Organisation, 2017). Gerike et al. (2016) define active mobility as *"Walking and cycling for transport, solely or in combination with public transport* (p. 2). In the Netherlands, active mobility is becoming increasingly important. Different developments regarding this move to more sustainability, health and equality have been highlighted in the past few years (Ministerie van Infrastructuur en Milieu, 2012; Rutte et al., 2017). Looking at the province of Gelderland in the Netherlands, in its Environmental Vision (Omgevingsvisie), Gelderland describes working towards a 'clean', 'healthy', 'safe' and 'prosperous' Gelderland, where good accessibility is essential but under pressure. Forecasts show that an increase in movements can be

expected over the long term with the growing cities. That is why the province of Gelderland is committed to ensure that people can travel safely, quickly, affordably, and climate-neutrally. The province of Gelderland defines accessibility as a precondition for housing, the establishment of businesses, the energy transition, and further goals from the environmental vision such as biodiversity, circular economy, and climate adaptation (Provincie Gelderland, 2020). When zooming into the Municipality of Nijmegen, the municipality launched an integrated mobility approach, contributing to the four challenges of an ' attractive', 'sustainable', 'economically resilient', and 'social and healthy' city (Gemeente Nijmegen, 2019). This approach aims to contribute to better health for Nijmegen inhabitants by encouraging them to exercise more, and indirectly, by reducing car use leading to cleaner air and contributing to a healthier environment. To facilitate the city's growth, the most sustainable and space-efficient means of transport reserves the most prominent focus, with active mobility having the highest priority.

One development that facilitates mobility and accessibility sustainably and healthily is the development of fast cycle routes (FCRs) (van Esch et al., 2013; Rayaprolu et al., 2018). Although there is no official definition for FCRs, CROW (2014), a Dutch foundation that acts as a knowledge institute for infrastructure, public space, traffic and transport, and work and safety, defines it as follows: *"A fast cycle route – also known as cycle highway – is a regional main cycle route that is designed for cycling over longer distances (5 to approx. 30 kilometres). Fast cycle routes have a higher quality and a different appearance than the connecting routes in the regional network"* (CROW, 2014). The European cyclist' Federation defines it as *"a high-standard bicycle path reserved for cyclists for fast and direct commuting over long distance"* (European Cyclists' Federation, 2014). The focus in this research will be on FCRs as a form of infrastructure to facilitate active mobility to contribute to a sustainable, healthy, and inclusive future city. Section 2.2 discusses FCRs in more detail.

1.1.2 INEQUALITY IN HEALTH AND PHYSICAL ACTIVITY

Health problems caused by a lack of physical activity (PA) are a global problem (Bauman, et al., 2012). It is considered a prominent risk factor for diabetes, cancer, and fractures (Lippi & Sanchis-Gomar, 2020). Given these points, the role of PA in the prevention and treatment of non-communicable diseases is well established (Koszowski, et al., 2019; Mielke et al., 2018). Policymakers are advised by the World Health Organisation (WHO) (2010) to develop strategies for recommending more active mobility in people's daily life (Gao, Helbich, Dijst, & Kamphuis, 2017). Efficient means of increasing people's daily PA are walking and cycling (Gao et al., 2017). Although the Netherlands is well known for walking and cycling for transportations, there is still room for improvement (Gao et al, 2017). According to the RIVM, in 2018, less than half of the Dutch population in the 18 to 64 age group complied with the exercise standard drawn up by the Health Council. One-third of over-65s, and 28% of youths meet this PA standard (RIVM, 2018 in van Muijden et al., 2019; RIVM, 2020). According to the Health Council of the Netherlands' advice, the most significant health gain will be achieved if inactive people exercise more daily. To this end, the Health Council of the Netherlands and the Council for the Environment and Infrastructure (RLI) recommend promoting daily exercise behaviour, such as active mobility (Radboud University, Radboud UMC & UUM, 2019). One way of encouraging PA is by influencing people's choice to favour an active mode of transport (Scheepers, et al., 2013).

A way of encouraging PA is by the physical environment (Sallis, et al., 2016). However, most infrastructure design, modifications and studies of accessibility, mobility and infrastructure assume the

average traveller (Ettema, 2018). Research by Martens (2012) shows that no average traveller exists. Transportation and inclusion work differently for vulnerable groups with low socioeconomic status. Having a low socio-economic position could, in this way, lead to social exclusion (Ettema, 2018). Cities' physical and social environment cannot be separated from each other when aiming to understand and improve urban health imbalances as it frequently interacts with each other (Barton et al., 2015). *"The urban social environment includes the institutions that shape the structure and characteristics of relationships and opportunities among people and different population groups within a given community* (Healey, 1999 in Barton, et al., 2015, p. 41). The influence of economic status or class on health is a well-researched aspect of the social environment. It is known that poverty increases the probability of health risks in life. Various studies show that higher socioeconomic groups are more prone to be physically active and more prone to use active forms of mobility than lower socioeconomic groups (Fischman, Böcker & Helbich et al., 2015; Gao et al., 2017; Kamphuis et al., 2009; Kitchen et al., 2011; van Muijden et al., 2019; RIVM, 2020; Scheepers et al., 2013). This means that the use of active forms of mobility differs between different population groups. Specifically, adults aged 55-75 years from low socioeconomic status (SES) groups are, compared to higher SES groups, less likely to walk or cycle (Kamphuis, et al., 2009).

SES can be defined and understood differently. Mueller & Parcel (1981) define socioeconomic status as "*the relative position of a family or individual on a hierarchical social structure, based on their access to or control over wealth, prestige and power"* (Mueller & Parcel, 1981, p. 19). According to Mich & Hauser (2001), SES is *"a broad concept that refers to the placement of persons, families, households, census tracts, or other aggregates with respect to the capacity to create or consume goods that are valued in our society"* (Miech & Hauser, 2001, p. 75). SES is being used to incorporate processes of participation in social, cultural, or political life. It could be measured by looking at income, education, and occupation (Shavers, 2007). Education is a commonly used indicator of SES because of the capacity to illustrate the educational achievement level of individuals. This indicator also influences future occupational opportunities and earning potential (Shavers, 2007). In this research, education will therefore be used as an indicator of SES in combination with the social housing situation.

1.2 RESEARCH AIM AND RESEARCH QUESTIONS

Overall, active mobility as a form of sustainable mobility is becoming increasingly crucial for sustainable, healthy, and inclusive future cities. Therefore, considerable investments are being made in cycling infrastructure, including implementing fast cycle routes. Next to that, low SES residents are less likely to be physically active compared to people with high SES. With this in mind, insights into their perspective towards FCRs is helpful for future city planning, ease in participation, and stimulation of active mobility.

By means of a Grounded Theory study (GT), this research aims to explore the depth of the perception of FCRs by low SES residents. By forming a theory, opportunities for novelty and surprise behind the perception of FCRs are researched (Wagenaar, 2011, p. 261). This provides understanding in the perspective of low SES residents on FCRs, cycling and, infrastructure. Infrastructure measures, such as FCRs, are commonly designed and implemented by higher SES groups. In that case, these insights are valuable in ensuring equality in future city planning.

Using the trialectics of space by Soja (1999), a distinction between different 'spaces' was made. This trialectics offered a format to consider different dimensions of perspective in this research. It provided the basis to investigate the 'fully lived space', where perception and use of FCRs come together. The 'first space' represents the 'conceived FCR' which is empirically measurable and mappable or the 'real' space. The 'second space' represents the subjective 'imagined FCR'. The 'third space' represents the 'fully lived FCR' where real and imagined space interact. This research focused on these interpretations of space as a basis for researching the perception of FCRs by low SES residents.

This Grounded Theory (GT) research aims to study the perception of FCRs by low SES residents in the Netherlands. It researches insights into the fundament of their perception and use of FCRs, representing their needs and interests in environment and society. The research question in this study can be formulated as follows: **'**how do low SES residents perceive fast cycle routes and how is this perception grounded?' with the following sub-questions: 'How do low SES residents perceive fast cycle routes?', and 'How is the perception of fast cycle routes by residents with low SES grounded?'

1.3 SOCIETAL AND SCIENTIFIC RELEVANCE

This section argues why this research is relevant on a social (1.3.1) and a scientific (1.3.2) level.

1.3.1 SOCIAL RELEVANCE

This research is societal relevant as it contributes to informing planners and policy-makers to implement (1) environmental policy and design for inclusive future cities, by providing insights into low SES residents' needs and interests in environment and society, and (2) strategies for promoting active mobility for sustainable and healthy future cities, by providing insights into behavioural patterns of low SES residents.

Patricios (1976) and Zube (1999) argue that information about people's perception of FCRs informs environmental policymakers, planners, and designers about values, concerns, and responses to this infrastructure. Their views and attitudes towards the physical environment help environmental planners to give them a basis for Planning. Additionally, Patricios (1976) states that people's perceptions of the environment need to be included in the policymaking process: "*Insight into this specific man-environment relationship would greatly assist planners and decision-makers in making better choices in environmental issues"* (Patricios, 1976, p. 200). Additionally, according to Lui et al. (2019), prescribed design standards are no guarantee for good cycling experiences. He, therefore, states that experiential elements should be considered concerning physical design.

Furthermore, according to Orellana, Hermide and Osorio (2016), for planners and policy-makers it is needed to improve the understanding of active mobility and their relationship with socio-demographic and cultural facets. Patricios (1976) remarks that issues relating to individuals and populations' spatial behaviour regarding their geographical environment and the motivations and perceptions that shape this behaviour need to be explored. The results of this research show the existence of spatial behaviours and how perceptual characteristics influence mobility. This argument is in line with the CROW guidelines, which state that "*What may seem logical at the design table or in the eyes of an engineer may appear completely different with the logic of the actual user*" (CROW, 2014). For example, FCR's are commonly designed by people with higher SES. However, these FCR's are being

used by many different road users. Their logic ultimately determines whether something works the way it was conceived (CROW, 2014). Besides, numerous cities globally are applying policies to promote cycling, using the Dutch cycling infrastructure as an example. However, it remains helpful to gather evidence to guide investment in cycling infrastructure, by not only focussing on questions of engineering and safety but also a broader range of questions is essential, even for places that have already made a solid commitment to cycling (Handy, Van Wee, & Kroesen, 2014). As Handy et al. (2014) put it: *"many different approaches have a role to play in improving our understanding of the potential effectiveness of strategies for supporting and promoting increased cycling"* (p.16).

Also, previous research has shown that travel behaviour is connected to the spatial and social environment (Van Acker, Van Wee & Witlox, 2010; Harms, Bertolini & Brömmelstoet, 2014). Therefore, spatial planning has a vital role in promoting a healthy lifestyle (Wang et al., 2016; van Wijk et al., 2017). Scheepers (2016) argues in her study that there is no 'one-size-fits-all' solution for the various groups in society. She indicates that a customised approach is needed, and she argues that if one wants to stimulate active transport, one should not only focus on the physical characteristics of the built environment but also on the individual perception of this environment. As Fernández-Heredia, Monzón and Jara-Díaz (2014) argue: *"Information on (subjective) physical-social factors that play a role in cycling is helpful to gain a better understanding of users' behaviour towards cycling and to determine the appropriate actions to encourage bicycle use"* (p. 2).

Besides, in the Netherlands, the position on the socioeconomic ladder has consequences for someone's health. It appears that people with a low socioeconomic status live on average six to seven years shorter than people with a higher socioeconomic status. Therefore, reducing this difference in health is of high importance (Stronks et al., 2019). Additionally, *"promoting pedestrian and bicycle mobility is a cost-effective way to dramatically reduce environmental and socioeconomic impacts derived from the car-based transportation model and improve the population's wellbeing"* (Orellana et al., 2016, p. 527). Because the bicycle is a relatively inexpensive means of transport, this research can reduce socioeconomic differences regarding mobility. Barton et al. (2015) say that planners and policy-makers must get 'inside' the urban neighbourhood to understand physical and social forces that influence human health. Inclusionary procedures need to be added to the 'expert' analysis of health issues in cities. "*As the world continues to urbanise, planners must take a leading role in offering new models for understanding and improving the place-based characteristics that influence health equity"* (Barton et al., 2015, p. 45). According to Pol (2014), it is relevant to know the underlying values and motivations of the behaviour of a group to undermine positively motivated behaviour.

By combining knowledge from research, practitioners and society, an expanded vision can be formed with new explanatory theory (Lawrence, 2010 in Barton et al., 2015). By involving different stakeholders during a project, the gap between scientists, professionals and the public can be bridged to generate recommendations and guidelines for architecture, public space management, urban planning and health promotion. As human planning always occurs in a human context, it is necessary to challenge the standard interpretations of design. By creating insight into the perception low SES residents have of FCR, this research broadens planners' and policy-makers' perspectives. These insights can be used to engage, influence, and coordinate a broader range of stakeholders around the coherent vision of FCRs. Furthermore, it contributes to, what Ettema (2018) believes to be necessary, insights into how the spatial organisation of cities, the transport system and the travel and activity patterns of

city residents influence each other and what consequences this has for outcomes such as accessibility, inclusion, health, and sustainability.

1.3.2 SCIENTIFIC RELEVANCE

This research is scientifically relevant as it contributes to (1) the need for research on cycling and the benefits that would accumulate. Next to that, it provides information for the research need on (2) cyclists' experience and individual motives, and (3) FCR experience from the perspective of various user types. Additionally, it provides information for the research need on (4) qualitative research to be able to clarify personal motivations and attitudes of choosing a specific transport mode, and (5) spatial differences in cycling levels and how these affect people. Finally, it provides information for the research need on (6) people not using active mobility as a form of transport, and (7) relations between the objective and perceived neighbourhood.

This research is scientifically relevant as Handy et al. (2014) point to the importance of investments in cycling research. They argue that this is needed for providing strategies for increasing cycling and the benefits that would accumulate (Handy et al. 2014). Additionally, this research is relevant as Sargentini and Valenta (2015) point to the theory that cycling infrastructure should not be developed with the same background knowledge as planners do for highways for cars. They argue that research on cyclists' experiences and individual motives should be considered (Liu et al., 2019). Furthermore, this research aligns with the research gap considered by Liu et al. (2019). Liu et al. (2019) study the planners and policy-makers' perspective on user experience and the design of cycle highways'. They argue that future research should be done in investigating FCR experiences from the perspective of various user types. Where Liu et al. (2019) explored FCRs from the planners and policy-makers' perspective, *"cycle highways have not been researched in relation to the perspective of cyclists themselves. It is clear that practitioners draw extensively from their personal experiences of cycling, but the exact meaning of experiences should be properly explored and defined from the perspective of various user groups in the context of cycle highways"* (Liu et al., 2019, p. 7). Knowledge of experiences must be retrieved from the users (Liu et al., 2019). Gaining a definition of what a fast cycle route means to people and what it should be according to them makes it easier to assess FCRs (Liu, Brommelstroet, Krishnamurthy, & van Wesemael, 2019). Besides, Scheepers et al. (2013) expressed the relevance of this research, who argue that more qualitative research is needed to clarify personal motivations and attitudes of choosing means of transport. Previous research has shown that attitudes, motivations, and social support systems play a role in the choice of transport mode. This research contributes insights into these personal motivations and attitudes. Also, Fischman et al. (2015) argue that a crucial section of future research concerns people not using active mobility as a form of transport, as these people may be at more threat of growing diseases of an inactive lifestyle. Because this research focuses on low SES residents who, according to previous research, are less likely to use active forms of mobility than higher SES groups, it is in this way relevant. Likewise, as this research focuses on one neighbourhood and FCRs surrounding this neighbourhood, this research is relevant according to Gao et al. (2017), who argue that it would be interesting to explore local spatial differences in cycling levels, and how these affect people. This study on the local level provides insights in-depth on spatial differences in cycling levels in this neighbourhood and reflects how the residents are affected. As well, Kamphuis et al. (2009) point to the need of more exploration into the relations between neighbourhood pressures and individual perceptions for better understanding how socioeconomic disadvantages can affect physical inactivity.

As this research explores these individual cognitions and neighbourhood influences of low SES residents concerning FCRs, it helps to understand these relations between neighbourhood pressures and individual perceptions. Finally, Shavers (2007) argues that a current research challenge is to examine different ways in which low SES influences a person's health situation for reducing health inequalities. By exploring further and looking at the mobility and transport mode choices of this group and their perspective, this research provides an understanding of approaches to improving this group's health.

1.4 RESEARCH STRUCTURE

Following this introduction (1), the overall structure of this research takes the form of eight chapters.

The research begins by introducing the theme of this research (2), where cycling as a form of active mobility (2.1), FCRs (2.2), and the studied case (2.3) will be introduced. It will then go on to the contextualisation (3), where literature on perception (3.1) and environmental perception (3.2) are being reviewed, enabling placing the research in its literary context. The fourth chapter is concerned with the methodology used for this study. The first section of this chapter will examine the constructivist paradigm assumed in this study (4.1), followed by the strategy and research design (4.2), and the data collection and analysis (4.3), where the qualitative grounded theory study is discussed. The fifth chapter presents the research findings, focusing on unravelling perception and creating space for perspective. By first elaborating on the positive and negative perceptions found (5.1), followed by the fundament of FCR perception (5.2), the underlying thoughts and practices are then addressed (5.3). This chapter ends by presenting the complete GT model (5.4). Chapter six concludes the research by answering the research question through the formed GT model (6). The seventh chapter deals with placing the research results into context by discussing the research (7). In the final chapter of this research, recommendations (8.1), a reflection, and limitations (8.2) will be provided to finalise this research.

2 THEME

This chapter further elaborates on the theme of interest in this research. First, cycling as a form of active mobility with its benefits is discussed (2.1), followed by the introduction of FCRs (2.2), and finally, the case study used in this research is presented (2.3).

2.1 CYCLING AS A FORM OF ACTIVE MOBILITY

As is well-known among people, cycling is a healthy and sustainable mode of transport. As Pucher & Buehler (2008) phrase it, *"it is hard to beat cycling when it comes to environmental, social and economic sustainability"* (Pucher & Buehler, 2008, p. 296). As a form of active mobility, cycling provides opportunities for designing more attractive, inclusive, and liveable cities. Increasing active mobility has environmental, social, and economic benefits, contributing to cities' functioning and supporting sustainable development (Koszowski, et al., 2019). It is a clean and quiet way of transport in which the only energy required is that of the cyclist self. It has practically no impact on the environment and takes up very little space, energy, and infrastructure requirements, compared to other transport modes (CROW, 2014; ECF, 2018; Rayaprolu et al., 2018). Additionally, cycling as a form of active mobility connects well to transport planning ambitions. It is space-efficient, flexible, it causes low costs, and together with walking and public transport, it can cover almost all demands for mobility (CROW, 2014; Koszowski et al., 2019). Furthermore, cycling allows people to exercise outdoors, which is good for mental and physical health. Cycling is an excellent way to fit regular exercise into daily routines and reduce obesity, diabetes, cancer, cardiovascular disease, and depression. The effects of cycling on weight are minor, but these diseases' effects are both preventive and curative (CROW, 2014; ECF, 2018). Although cyclists run a higher risk than motorists of being seriously injured in a traffic accident, the positive effects of the extra exercise on health more than outweigh this (CROW, 2014; Pucher & Buehler, 2008; Rayaprolu et al., 2018).

Promotion of the cycling network is seen as an effective solution to accessibility problems and health problems, and more cycling contributes substantially to achieving sustainability targets. The bicycle is therefore popular with policymakers in the Netherlands and abroad. The growth in bicycle use and the high level of bicycle sales show that many users increasingly see the bicycle as a sustainable, healthy, and reliable means of transport (CROW, 2014). However, to sustain this, careful planning of bicycle networks and a good design of facilities is essential. The cycling infrastructure in the Netherlands is considered the safest in the world. The Dutch Central Government offered 60 million euros a year for bicycle projects between 1990 and 2006 (Pucher & Buehler, 2008). The bicycle is essential for mobility, quality of life and health in the Netherlands (CROW, 2014). Thanks to this high bicycle use, the average life expectancy is more than half a year longer, and absenteeism due to illness is lower than in European countries where cycling is less common (TNO, 2009 in CROW, 2014). Since physical inactivity is a global public health problem, active mobility in plans such as the Environmental Vision could help work towards a healthy and sustainable future (Provincie Gelderland, 2018; World Health Organisation, 2017).

2.2 FAST CYCLE ROUTES

The genesis of FCRs in the Netherlands is as follows. In the 1960s, the car was seen as the future transport (van der Zee, 2015). In the mid-1970s, due to a massive reversal in transportation and urban planning policies, cycling was brought back to its original successful form (Pucher & Buehler, 2008). Since then, cities in the Netherlands have undertaken enormous cycling infrastructure developments (Pucher & Buehler, 2008). To gain more experience with the construction of high-traffic urban cycle routes, the Minister of Transport, Public Works and Water Management granted subsidies to the municipalities of The Hague and Tilburg for the first time in 1975 to realise two mainly red coloured demonstrations of cycle routes in urban areas (van Tilburg & Stoovelaar, 1977). Later, by means of the programme 'Met de fiets minder file' and later 'Fiets filevrij', work was carried out from 2006 to 2013 on improving cycle routes along traffic-prone highways throughout the Netherlands. The aim was to offer motorists an alternative to the car with a starting point to enhance existing cycle routes that run along traffic junctions, removing barriers, increasing quality, and actively communicating about the routes (van Esch et al., 2013). In Gelderland and Noord-Brabant, the regional cycle network was ahead of the rest (Geise & Jonkman, 2020). At the time of 'Fiets filevrij', five FCRs were constructed throughout the Netherlands, including the Nijmegen - Beuningen FCR. In 2015, Tour de Force was set up, a consultative body in which policymakers exchange knowledge and experiences. Whereas many developments have already been achieved in the bicycle infrastructure domain, the current bicycle infrastructure network in the Netherlands is still in full development.

To provide an understanding of FCRs, the characteristics and requirements that planners and policy-makers believe FCRs should meet are briefly discussed. Fast cycle routes function in a network in conjunction with both the existing cycling infrastructure and other modes of transport such as public transport (CROW, 2014). Within this existing cycle infrastructure, the FCR functions in the whole of a hierarchically structured cycle network in which the FCR is at the top. FCRs form a link between important origins and destinations in an area, whereby business parks, educational facilities, hospitals, city centres and residential areas are directly or indirectly accessed (CROW, 2014).

Planners and policy-makers designed several specific characteristics a FCR should meet (European Cyclists' Federation, 2014, p. 1). These are the following:

- *"At least 5km long;*
- *≥3.0m wide if one-directional, and ≥4.0m if bi-directional;*
- *Separated from motorized traffic and pedestrians;*
- *Avoid steep climbs and prioritize mild gradients;*
- *Avoid frequent stops, e.g. by giving priority at a crossing to enable an average speed of ≥20km/h;*
- *Provide regular maintenance, winter service, public lighting, service stations, etc.".*

Besides these characteristics, this hight quality cycling infrastructure, conceived by planners and policy-makers, has five main requirements, according to the CROW (2014):

1. *"Coherence: fast cycle routes form the backbone of the regional cycle network.*

2. *Directness: fast cycle routes provide a direct connection between the main origins and destinations on a regional scale.*
3. *Attractiveness: fast cycle routes are attractively integrated into their surroundings, so that both users and the surrounding area experience the added value and experience the route in a positive way.*
4. *Safety: fast cycle routes offer the opportunity to travel largely unhindered.*
5. *Comfort: fast cycle routes are sufficiently wide for safe and smooth overtaking and meet the highest quality requirements in terms of flatness and roughness of the pavement".*

2.3 CASE

This section describes the case study used in this research (2.3.1) and subsequently argues why this case study was chosen (2.3.2).

2.3.1 CASE DESCRIPTION: THE KOLPING NEIGHBOURHOOD

Data for this research was collected in the Kolping neighbourhood in Nijmegen (figures 1 and 2). The Kolping neighbourhood is a neighbourhood with social housing, located northwest of the Goffertpark in Nijmegen Goffert. The Nijmegen-Den Bosch railway borders the neighbourhood on the north side, the Muntweg on the south side and the Muntmeesterlaan on the west side. Along the Muntmeesterlaan and the Muntweg, privately owned houses are located. The Kolping neighbourhood lies behind these houses and consists mainly of terraced houses (figures 1 and 2). Thus, the neighbourhood's primary function is housing and has a snack bar on the Leo XIII square and a community centre in a former school building in the northeastern tip of the neighbourhood (Gemeente Nijmegen, 2015).

The working-class neighbourhood, built in the 1950s, has a traditional character. The neighbourhood was built aiming to house as many residents as possible. As the pressure to build was high, the housing association agreed with little space for numerous houses (Gemeente Nijmegen, 2015). For years, the Kolping neighbourhood was considered a neighbourhood of care and attention. With high crime rates and poor living conditions, the neighbourhood no longer met today's requirements. Houses were small, outdated and in need of maintenance. More green spaces and various types of housing were needed (Talis, n.d.).

In 2018 a reconstruction took place in the neighbourhood, where 127 houses have been renovated. Houses conform more living comfort and better energy efficiency upgraded the neighbourhood. 115 houses have been demolished, and 99 newly built social housing units returned. Today's neighbourhood has a varied supply of houses, providing housing for families, singles, and people with disabilities (Talis, 2020). Additionally, six new squares, new paving and more greenery were implemented, and the neighbourhood centre was improved by better accessibility (Talis, n.d.). Despite the upgrading, the working-class character of the neighbourhood was preserved.

Figure 2. The Kolping neighbourhood, Nijmegen (Emergo, 2019).

Figure 1. The Kolping neighbourhood, Nijmegen (Cyclomedia, 2020).

2.3.2 CASE SELECTION

The Kolping neighbourhood in Nijmegen was chosen as a case study for this research on several grounds. First, the Space2Move project, in which the researcher was involved, initially introduced the researcher to the Kolping neighbourhood. This project, which Radboud University carried out in cooperation with RadboudUMC and housing cooperative Talis, aims to increase opportunities for active mobility in the living environment and was carried out in de Kolping Neighbourhood (van Muijden et al., 2019). By collaborating in this project, the researcher found an entrance in the neighbourhood. By contributing to the survey for this Space2Move project, the researcher approached residents in the neighbourhood for the first time. Especially during the covid-19 pandemic, this was an efficient way to get in touch with low SES residents as a first attempt.

Moreover, as mentioned earlier, the Kolping Neighbourhood is a neighbourhood with social housing, where in general, high numbers of people with low SES live. More importantly, the Kolping is located between two FCRs (figures 3 and 4). The Batavierenpad Zuid (F173b) (figure 5), and the Wijchen – Nijmegen route (figure 6) (Snelfietsroutes Gelderland, 2020). The Batavierenpad Zuid is part of the FCR Nijmegen – Beuningen and was opened in 2017. The route runs from Beuningen to Nijmegen and has a length of 7,6 kilometres. The Batavierenpad Zuid crosses the Wijchen – Nijmegen FCR right next to the Kolping at the Muntmeesterlaan. The route from Wijchen to Nijmegen was opened in 2007, has a length of 10,3 kilometres and connects to the FCR the Rijnwaalpad at the central station of Nijmegen. All in all, the neighbourhood is surrounded by high-quality cycling infrastructure.

Figure 3. FCR along the Kolping neighbourhood, Nijmegen (Cyclomedia, 2020)

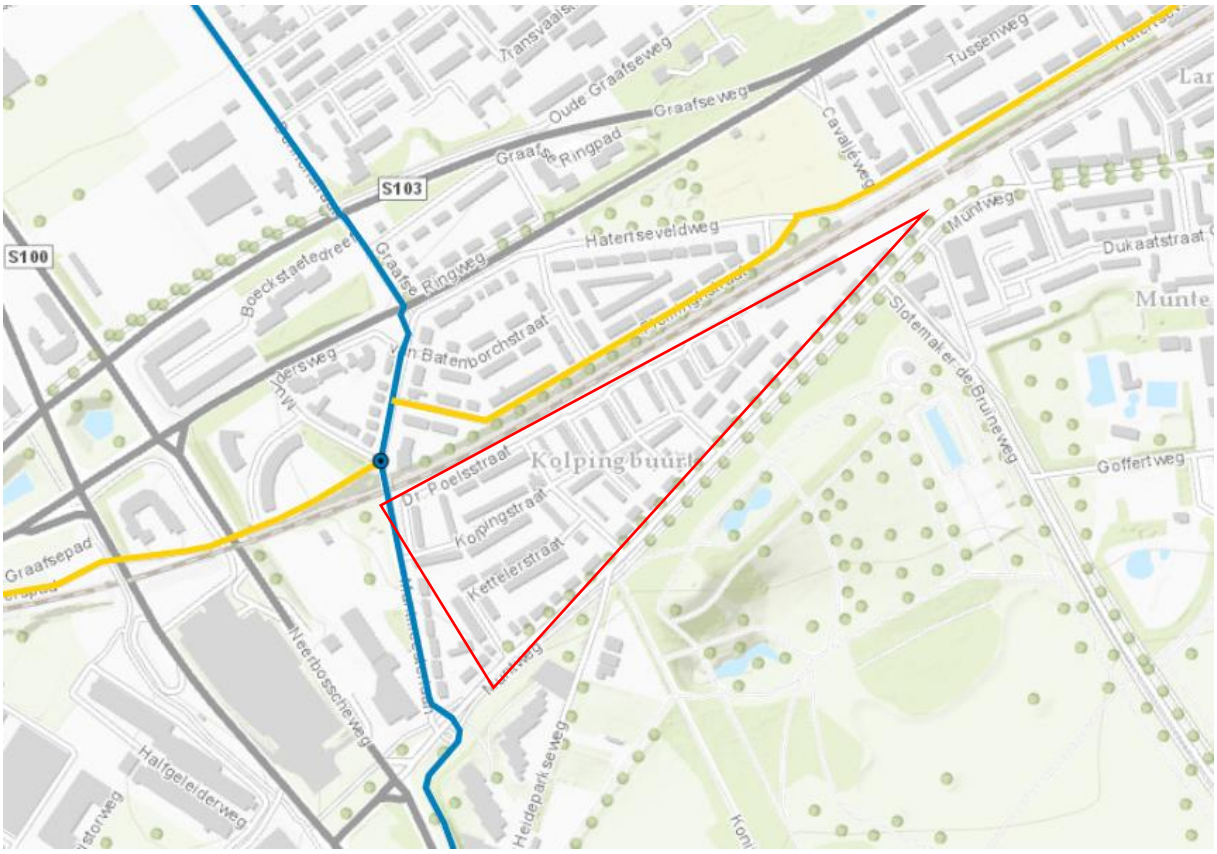


Figure 4. FCRs along the Kolping neighbourhood, Nijmegen (Snelle fietsroutes Gelderland, 2020).

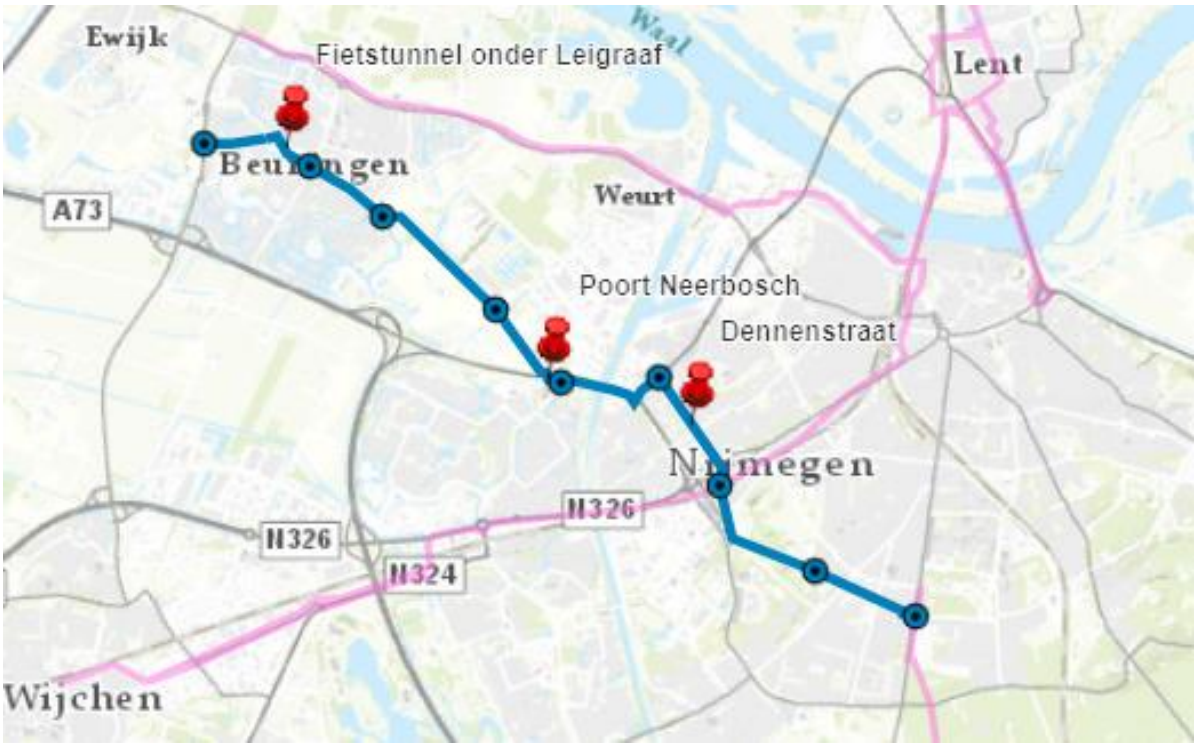


Figure 5. FCR Batavierenpad Zuid in blue, F173b (Snelfietsroutes Gelderland, 2020).

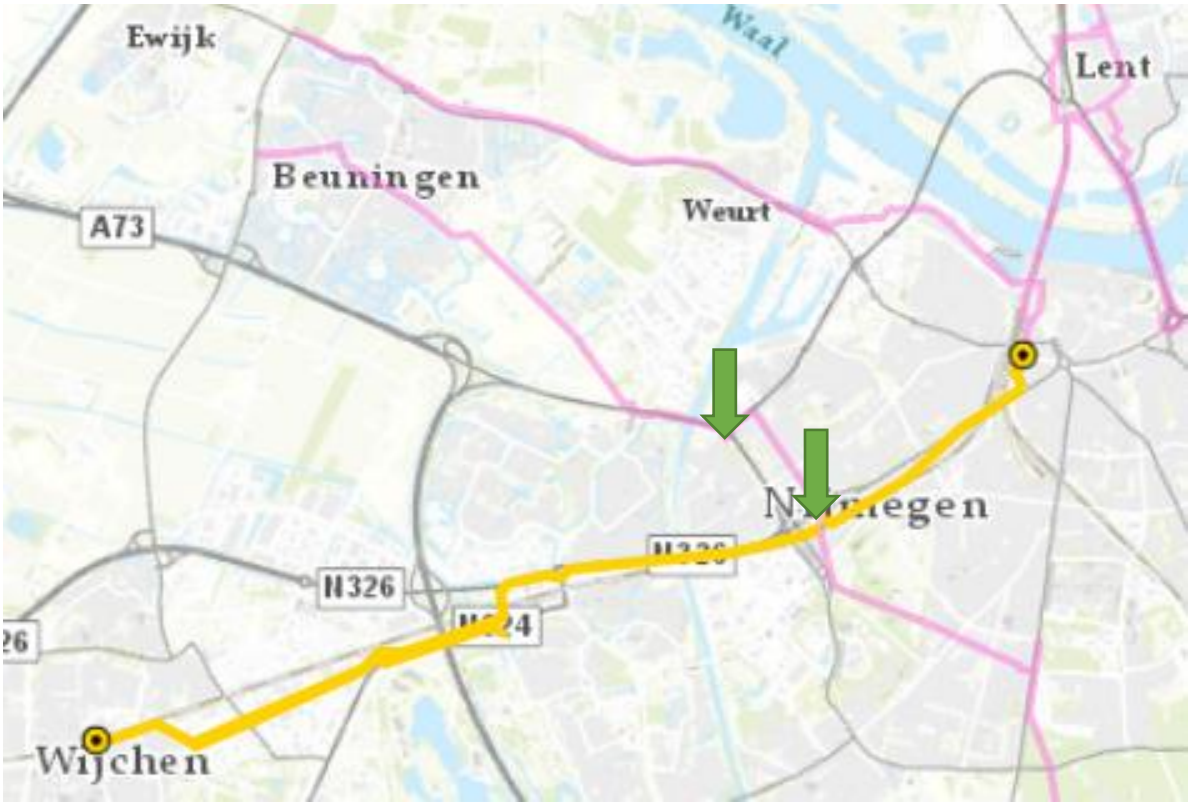


Figure 6. FCR Wijchen – Nijmegen in yellow (Snelle fietsroutes Gelderland, 2020).

To sum up, the Kolping Neighbourhood, a social housing neighbourhood surrounded by two fast cycle routes, proved to be a well-fitted case for this research (appendix A for more pictures of the Kolping neighbourhood).

3 CONTEXTUALISATION

To be aware of when and how to use literature in this research, to enhance instead of being distracted from the analysis, this chapter discusses the existing literature on environmental perception and presents the theoretical background for this research. This is of interest for the performance of the GT research. Assuming that knowledge is created through interaction with others, the literature we read or the people we talk to, this literature review is based on the researcher's knowledge. In this chapter, the concepts relevant to this research are explored and highlighted in terms of "*the difference between an open mind and an empty head"* (Dey, 1999, p. 251 in Charmaz, 2014, p. 117).

First, the general concept of 'perception' will be discussed (3.1), followed by the concept of 'environmental perception' (3.2).

3.1 PERCEPTION

I am starting with an example. What do you see in the following picture?

Figure 7. My Wife and My Mother-In-Law, by the cartoonist W.E. Hill (1915)

Whether you see a young or an elderly woman (they are both in the picture) depends on your perception. This example is a typically known cartoon created by Hill (1915), implying that what a person sees depends on the individual's perception (Nicholls, Churches, & Loetscher, 2018).

Various authors define 'perception' differently. Perception is the central concept in this research. Colker (2008) explains the concept of perception as followed: *"the concept assumes that an individual sees the world through his or her own screen (Adler, 1958; Ansbacher & Ansbacher, 1956; Charmaz, 2006; Leibniz, 2003) and makes interpretations based on what he or she needs (Lewis, 2003). In this view, perceptions are a construction of the individual"* (Colker, 2008, p. 16). Patricios (1976) defines it as *"an interaction between the individual and the environment in which information from the external world is in some way modified by experience and behaviour".* Robbin & Judge (2013) see perception as "*a process by which individuals organize and interpret their sensory impressions in order to give meaning to their environment. However, what we perceive can be substantially different from objective*

reality" (Robbins & Judge, 2013, p. 166). For example, by associating a car with sportiness, social status, and successful life, this product is made attractive to certain groups, while the car's primary function is barely addressed. The brain interprets what the senses perceive. The way someone perceives the environment determines the meaning of this environment for this person (Robbins & Judge, 2013).

Perception is shaped and sometimes biased by various factors (figure 8). This explains why different people 'see' the same things differently. Perception is strongly influenced by 'personal characteristics' of the observer self, such as 'attitude', 'motivations', 'interests', 'experiences', and 'beliefs'. In addition, the physical characteristics of the 'perceived object' are essential, such as 'novelty', 'movement', 'sound', 'size', 'background' or 'proximity'. Furthermore, the observation context must be taken into account. Objects are perceived in their environment, and thus influenced by the 'context' in which the perception is made. 'Time', 'location', 'temperature', and 'other situational factors' all play a role (Robbins & Judge, 2013).

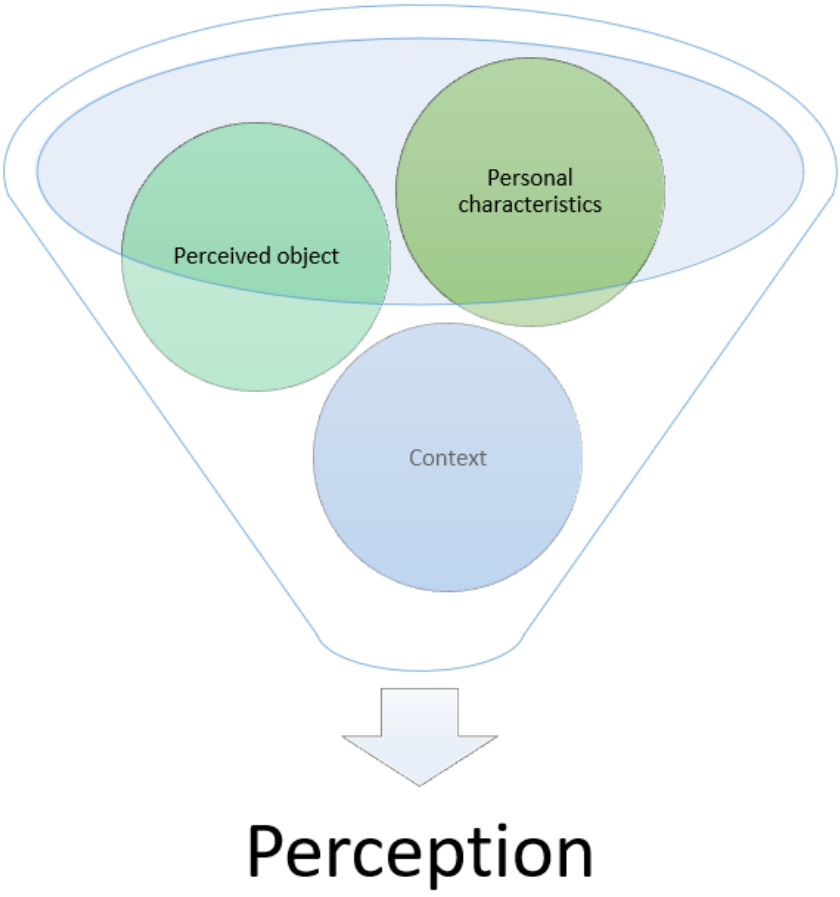


Figure 8. Factors influencing perception (own figure, based on Robbins & Judge, 2013)

Perception is important in environmental planning, because "*people's behaviour is based on their perception of what reality is, not reality itself*". "*The world as it is perceived is the world that is behaviourally important"* (Robbins & Judge, 2013, p. 166). Since this study aims to investigate the perception of FCRs by low SES residents, the environment is the fundament in forming this perception. Therefore, environmental perception is addressed next.

3.2 ENVIRONMENTAL PERCEPTION

To give the chosen focus group a voice and gain insight into this group's perceptions regarding FCRs, it is valuable to address previous literature on environmental perception to broaden the mind.

3.2.1 STUDYING HUMANS SPACE

Since the 1970s, geographers, planners, architects, and others began to intensify research on human perceptions and spatial behaviour to the physical environment. The change of emphasis from quantitative to the behavioural approach in urban planning took place. Criticisms points to an increasing awareness *"to view man's behaviour as dependant on individual evaluation and relative assessment of the environment"* (Patricios, 1976, p. 200).

Allan Pred argued that place was often considered in terms of static obvious and quantifiable attributes. He thought that human geographers *"conceive of place as an inert, experienced scene"* (Pred, 1984, p297 in Cresswell, 2014, p. 65). He argued that places are always 'becoming' and never finished. Pred tried to portray the relationship between the influences in people's lives and people's own capacity to practice agency. *"Human agency is not so easily structured, and structures themselves are made though repetition of practices by agents"* (Cresswell, 2014, p. 67). Therefore, places need to be explored by considering the relation between structure and agency. Or as Nigel Thrift puts it, "*if we focus on the way we do things, we get a primal relationship with the world that is more embodied and less abstract*" (Cresswell, 2014, p. 69). This is in line with Tuan (1974), who argued that "*through human perception and experience, we get to know the world though places*" (Cresswell, 2014, p. 35). In addition, Pred, Thrift and Certeau demonstrate that place is created by recurring social practices. *"Place provides a template for practice – an unstable stage for performance"* (Cresswell, 2014, p. 70). According to geographers such as Tuan (1974a, 1977), Buttimer and Seamon (1980), and Relph (1976), place is a concept that *"expressed an attitude to the world that emphasized subjectivity and experience rather than the cool, hard, logic of spatial science"* (Cresswell, 2014, p. 35).

In this research, the environment is seen as the 'open arena of action and movement'. These 'spaces' where people move in, create 'places' where people become involved, and where people develop values and feelings (Tuan, 1977 in Cresswell, 2014, p. 35). Environmental perception is thus densely connected to one's behaviour. In today's mobile and globalised world, there is a relationship between place and mobility (Creswell, 2014). According to David Seamon, bodily mobility is the key component to the understanding of place. He suggests that *"places are performed on a daily basis through people living their everyday life"* (Cresswell, 2014, p. 64).

3.2.2 ENVIRONMENTAL PERCEPTION AND BEHAVIOUR

A thinker on environmental perception and behaviour is American geographer Joseph Sonnefeld (1968), a pioneer of environmental perception. He explains the concept of environment, where he argues that on the one hand, the environment exists in the real world, and on the other hand, it exists in the mind of the individual. According to Sonnefeld, the environment is studied by numerous observers through their separate techniques of analysis. Sonnefeld (1968) states that *"not all of environment is significant for the behaving organism. Not all of that behavior which is directed towards environment has its origins in environmental stimulation. Not all in environment that stimulates one individual or a group or culture is equally stimulating for other individuals or groups or cultures. In its objective dimensions the behavioural environment exists as a complex subset of the broader geographical environment, but in its subjective perceived dimensions it also exists as the individual's psychological environment, a mental projection of a kind which, conditioned as it is by personality and culture, may only in part be congruent with the real world"* (p. 245).

He defines the behavioural environment as an element of the broader geographical environment (figure 9). He defines the geographical environment at the broadest level, *"being the constitution of both proximal and distal elements of man's universe*". Subsequently, he defines the operating environment as *"the environment impinging on man with which in some way or another he is likely to be directly involved".* After which he defines the perceptual environment as *"the environment of which man is aware*", to end in the behavioural environment, which he defines as *"the environment which elicits a behavioural response from the individual"*.

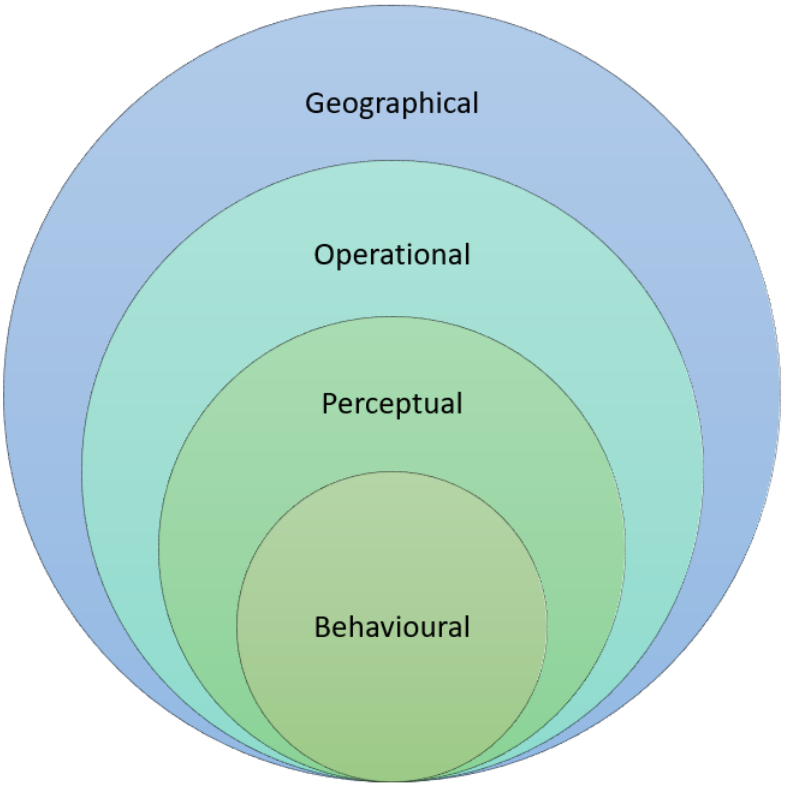


Figure 9. The Human Environment (Sonnefeld, 1968)

The environment consisting, on the one hand of the 'real world' and, on the other, of the individual's 'mind' is something that geography and planning must consider, according to Sonnefeld. No environment can be objectively studied without separate analysis techniques. As Sonnefeld argues: *"we cannot ignore the fact that the behaving organism – man – is reacting only in part to what could be considered objective elements of the environment, whether these involve landscape, or resource, or spatial arrangement".*

What is important in Sonnefeld's theories is that each individual only perceives certain parts of the environment, consciously interprets them and only partially does something with them. This can have a different focus for each individual. He states *"we all live in a geographical environment, but not all of this is operational; and only part a part of that which is operational are we aware of; and only part of that which we are aware of do we consciously adjust for or react to, or in some way accommodate for, manipulate, or attempt to control"* (Sonnefeld, 1968, pp. 249-250).

One more author who also thought about environmental perception and behaviour was Patricios (1976). Patricios (1976) defined environment as "*a term covering all phenomena which act from without upon the organism"* (p.201). He argues that *"environment surrounds"* (Patricios, 1976, p. 201). He uses perception as *"the term to embrace the several ways in which one individual is aware of the world around him"* and defines it as *"an understanding awareness, a 'meaning' or 'recognition' of phenomena as things can and do look differently from the way they 'are'"* (Patricios, 1976). He defines environmental perception as *"the image – the mental or cognitive space – with which man operates and, it is postulated, strongly influences his behaviour"* (Patricios, 1976, p. 199). Patricios emphasises the relation between environmental perception and behaviour by arguing that the "*behavioural environment are those parts of the phenomenal environment which are in some way modified by the process of perception and transformed into mental images"* (Patricios, 1976). This corresponds to Colker (2008), who argues that *"perception and behaviour are inextricably intertwined such that people automatically behave as they perceive.*

Several other authors examined the concept of environmental perception, such as psychologist William Ittelson (1973), who states that the social, cultural, and physical environment cannot be separated. Ittelson defines environmental perception as "*experienced significance of the person-environment system*" (Ittelson, 1973, px.). He argues that environmental perception depends upon the physical, interpersonal, and cultural aspects of the environment, combined with the needs, actions, motives, and cognitive processes, and states that "*the environment is an artifact created in man's own image" (Ittelson, 1973 in Patricios, 1976).* Ittelson suggested that the environment surrounds people and provides opportunities for exploration. In addition, he states that it provides information that is received through all senses but provides more information than people can absorb. Furthermore, he indicates that perception of the environment is affected by an individual's experiences and current values. Also, Gifford, Steg & Reser (2011) argue that environmental perception is about *"how people 'read' their world"* (Gifford et al., 2011, p. 442) and that the environment filters men's behaviour (Gibson, 1976; Berlyne, 1974; Seamon, 1982). To conclude, Zube (1999) defines environmental perception as *"awareness of, or feeling about, the environment, and the act of apprehending the environment by the senses".* He argues that the perception of the environment is influenced by an individual's past and current values.

TRIALECTICS OF SPATIALITY

Two thinkers who guide this complex relationship of environment, perception and behaviour are French sociologist Henri Lefebvre and American geographer Ed Soja, who analysed everyday practices and perceptions in space (Lefebrvre, 1991; Soja, 1999; Edirisinghe et. al., 2011). Lefebvre (1991) argued in his work 'The production of space' that *"space has a complex character and enters social relations at all levels".* He states that *"social relations also are spatial relations; we cannot talk about the one without the other"* (Gottdiener, 1993). The physical, the mental, and the social come together in his theory of space. Soja (1999) developed his notion of the 'trialectics of spatiality' (figure 10) based on Henri Lefebvre's description of three kinds of space (Cresswell, 2014). Soja distinguishes between 'Firstspace', 'Secondspace', and 'Thirdspace' (Soja, 1999; Cresswell, 2014).

According to Soja, Thirdplace is *"lived space and it interrupts a distinction between Firstplace and Secondplace"* (Cresswell, 2014, p. 69). He describes Firstplace as *"empirically measurable and mappable phenomena"* or the *'real'* space. Secondspace is described as *"perceived space – space which is subjective and imagined – the domain of imagination, representation, and image"* (Cresswell, 2014, p. 69). *"Thirdplace is practiced and lived rather than simply being material (conceived) or mental (perceived)* (Cresswell, 2014, p. 69).

This trialectics of space is valuable for this research to focus on gaining data on the perception and use of fast cycle routes for this specific group. Using the trialectics of space by Soja (1999), a distinction between different 'spaces' is made. It offers a format to consider different dimensions of perspective. It provides the fundament to investigate the 'fully lived space', where perception and use of FCRs come together. By considering these three 'spaces', a distinction is made between the ideas of fast cycle routes designed by the planners and the perception and the use of the fast cycle routes by the users. The 'first space' represents the 'conceived FCR' which is empirically measurable and mappable, or the 'real' space. The 'second space' represents the subjective 'imagined FCR'. The 'third space' represents the 'fully lived FCR' where real and imagined space interact. This research focuses on these interpretations of space as a basis for researching the perception of FCRs by low SES residents.

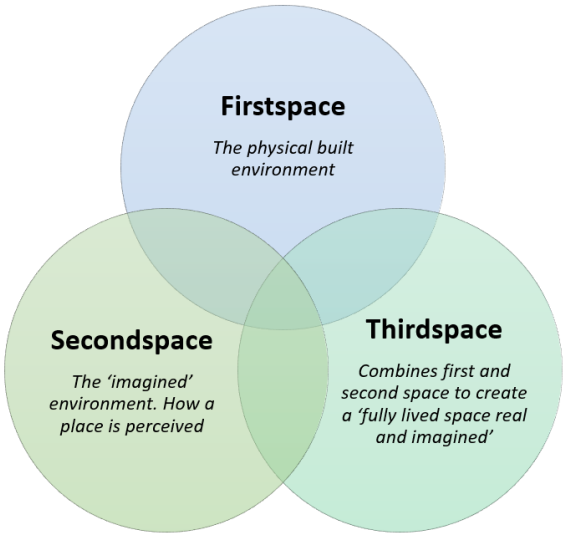


Figure 10. Trialectics of spatiality (Soja, 1999)

Given these points, if one wishes to examine the environmental perception of individuals, various factors need to be considered. Especially behaviour needs to be taken into account, as environmental perception and behaviour are densely related. This literature on environmental perception formed the base of this study and was kept in mind by the researcher throughout the process.

4 METHODOLOGY

In this chapter, the methodological choices of this research are discussed. First, the research paradigm used in this study is discussed (4.1). Then the research strategy and design are introduced (4.2), where the choices for qualitative (4.2.1) grounded theory (4.2.2) are justified. Later it explains how the data collection (4.3.1) and analysis (4.3.2) took place (4.3).

4.1 RESEARCH PARADIGM

The research paradigm outlines how the researcher formulates the problem and research question, and it offers guidance to seek information to answer the questions (Creswell, 2014).

According to Guba & Lincoln (1994, p107), paradigms are defined as "*basic belief systems based on ontological, epistemological and methodological assumptions".* According to Guba & Lincoln (1994), four paradigms of qualitative inquiry are 'positivism', 'postpositivism', 'critical theory' and related ideological positions, and 'constructivism'. Answers to three fundamental questions together serve as the significant foci around these four paradigms. The first being the ontological question, "*what is the form and nature of reality, and therefore, what is there that can be known about it?".* The second being the epistemological question, "*What is the nature of the relationship between the knower or would-be knower and what can be known?"*. The third question is the methodological question "*How can the inquirer (would-be knower) go about finding out whatever he or she believes can be known?"* (Guba & Lincoln, 1994, p. 108). The answers to these three questions are constrained to the answer already given to the previous question.

The Positivist paradigm is based on the ontology that there is one fixed reality that can be inquired through quantitative methods (Guba & Lincoln, 1994). Since it does not include subjective aspects, this research paradigm is inadequate for understanding human perceptions. Next to that, as the researcher and the researched 'object' are believed to be autonomous individuals, and the researcher is able of studying the object without influencing it or being influenced by it, this paradigm is not usable for this research (Guba & Lincoln, 1994).

Contrary to the Positivist paradigm is the Constructivist paradigm. This paradigm is based on the ontological belief that reality is based on subjective constructions defined by individual interpretations (Guba & Lincoln, 1994). This research paradigm could adequately be used in this research on human perception. In social constructivism, "*Individuals seek understanding of the world in which they live and work. "They develop subjective meanings of their experiences – meanings directed toward certain objects of things"* (Creswell, 2014, p. 24). The aim is to rely on the participants' view of the case. Therefore, subjective meanings are *"formed through interaction with other and through historical and cultural norms that operate in individuals' lives"* (Creswell, 2014, p. 25). Interaction between the researcher and the participants is essential within constructivist research (Creswell, 2014). Concentrating on the specific living situation of people is needed to interpret the historical and cultural settings of the participant (Creswell, 2014). Also, researchers need to 'position themselves' in the research as their own experiences form their interpretations (Creswell, 2014). In the end, the researcher aims to 'interpret' the meanings others have.

4.2 STRATEGY AND RESEARCH DESIGN

In this section, the choice for qualitative research methods is discussed (4.2.1), followed by the choices for a grounded theory approach (4.2.2).

4.2.1 QUALITATIVE RESEARCH METHODS

In this research, a qualitative grounded theory has been used as a research methodology to study data from a single case study. In short, the aim of this research is seeking to generate a theory grounded in the data retrieved from the case study.

Traditionally, the focus in science has been on quantification, where science concentrates on verifying (positivism) or falsifying (post-positivism) often quantitatively constructed hypotheses (Guba & Lincoln, 1994). However, according to Guba and Lincoln (1994), there are some critiques on quantification. One of those critiques is that quantification generates exclusion of meaning and purpose, where human behaviour gives meaning to their action and thus need to be included (Guba & Lincoln, 1994). By using qualitative research, these meanings and purposes were included. Denzin and Lincoln (2000) in Vennix (2011) define qualitative research as follows: *"qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them"* (2000, p.3). Given these points, a qualitative research approach is most suited to answer the research question where the interpretation of the data is essential to understand the perception of fast cycle routes by low SES residents.

Additionally, according to Minzberg (1979) in Eisenhardt (1989), qualitative data is essential for theory building; as Minzberg argues: "*Theory building seems to require rich description, the richness that comes from anecdote. We uncover all kinds of relationships in our hard data, but it is only through the use of this soft data that we are able to explain them"* (Minzberg, 1979 in Eisenhardt, 1989, p. 538). Qualitative methods and this research form a good match since this research is based on the grounded theory approach. The GT approach will be addressed in more detail in the next section.

4.2.2 GROUNDED THEORY APPROACH

Grounded theory (GT) is a strategy to develop theoretical insights from empirical data where initial ideas are being confronted with the empirical world (Wagenaar, 2011). This empirical world consists of, for example, interviews, observations, written texts, or material objects. With GT, close attention to the data and process or statement interpretation is necessary (Charmaz, 1990 in Wagenaar, 2011).

GT is a practical design for this research project. There is no theory available to clarify the perception of FCRs by low SES residents. The literature only has models and theories available that were created for different sorts of research (Creswell, 2014). In addition, existing theories are incomplete because they do not focus on categories and variables of interest for this research (Creswell, 2014). The goal of this research was to generate a theory. According to Abbot (2004) in Wagenaar (2011, p. 260), GT is a 'method of discovery'. "*Grounded theory presents a strategy of engaging in a dialogue of theory and the world; a strategy that admonishes us over and over again to respect what the world has to tell us*". It "*creates the condition for novelty and surprise*" (Wagenaar, 2011, p. 261).

Two critical approaches to GT are the procedures of Strauss and Corbin (1990, 1998) and the approach of Charmaz' (2005, 2006 in Creswell, 2014). *"In the more systematic, analytic procedures of Strauss and Corbin (1990, 1998), the investigator seeks to systematically develop a theory that explains process, action, or interaction on a topic"* (Creswell, 2014, p. 86). The "*constructivist grounded theory, according to Charmaz (2006), lies squarely within the interpretive approach to qualitative research with flexible guidelines, a focus on theory developed that depends on the researcher's view, learning about the experience within embedded, hidden networks, situations, and relationships, and making visible hierarchies of power, communication, and opportunity*" (Creswell, 2014, p. 87).

According to Charmaz (2006), the original GT methods are founded on the concept of positivism. She argues that positivist theory aims to explain and predict. In Charmaz's constructivist approach, the focus lies on the concepts of interpretation. This focus entails that "*the representations of the facts and the conclusions about them are interpretations of both respondents and researchers"* (Colker, 2008, p. 55). Furthermore, the constructivist approach is based on multiple realities instead of explaining reality (Colker, 2008). Grounded theory Glaser and Strauss (1967) and Charmaz (2006) form a solid foundation for approaching this research.

The grounded theory approach can be referred to as the method of constant comparison. *"A method of analysis that generates successively more abstract concepts and theories through inductive processes"* (Charmaz, 2006, p. 187). During the research, the researcher is always busy comparing what she finds with what has previously been observed and interpreted or what others have described (Verschuren & Doorewaard, 2015). This iterative process, where the researcher moves back and forth between different components of the research process, gains more details and insights for theory generation (Verschuren & Doorewaard, 2015). In qualitative data analysis, 'empirical precision' and 'heuristic flexibility' go hand in hand, and understanding the particulars of the empirical data is constantly being adjusted (Wagenaar, 2011). This iterative process allows the researcher to extend, refine, change, or reject early insights or sometimes make the researcher 'see' something in the data representing valuable insights (Wagenaar, 2011, p. 259).

In this research, a case study was used to collect the data. According to Mills et al. (2017), "*the fundamental goal of case study research is to conduct an in-depth analysis of an issue, within its context with a view to understand the issue from the perspective of participants*" (p. 8). The researcher aims to "*explore, understand and present the participants' perspectives and get close to them in their natural setting*" (Creswell, 2013 in Mills et al., 2017, p. 8). Therefore, the interaction between researcher and participants is vital to achieving data. These principles correspond to the GT approach. However, the GT approach developed by Glaser and Strauss (1967) differs in its approach from the case study approach proposed by Yin (1994). In contrast to the inductive theory developing approach of GT, the case study approach has a more deductive or testing approach. This research was based on the GT approach aiming to collect data from a single case. Therefore, Glaser and Strauss' (1967) and Charmaz' (2006) strategy takes the lead in this research.

Eisenhardt (1989) provides an approach lying somewhere between the Grounded Theory approach and Yin's approach. Most of it relates to the Grounded Theory approach as the approach is inductive. Nevertheless, she used the more planned elements of the case study approach wherein the case is selected in an early stage of the research. This approach fits this research where a theory was created from data grounded in a single case study.

USE OF THEORY

According to the GT approach, research can be characterised to develop new theoretical insights by consciously renouncing the researcher's knowledge of the object and constantly confronting phenomena with each other (Verschuren & Doorewaard, 2015). The researcher ought to have an open attitude to the impressions that come with researching data. Strauss and Corbin (1990) refer to this open attitude as 'theoretical sensitivity': "*The attribute of having insight, the ability to give meaning to data, the capacity to understand, and the capability to separate the pertinent from that which isn't"* (Strauss & Corbin, 1990 in Verschuren & Doorewaard, 2015). This 'hermeneutic attitude' allows the researcher not to be strongly guided by what the researcher already knows about the object of study and existing theoretical insights (Verschuren & Doorewaard, 2015). Following Glaser and Strauss' (1967) ideas about grounded theory, the literature review must be written after the data analysis. This literature review must be written in this specific order to not fill the researcher's mind with concepts or ideas from other data and guarantee the research from being done with no preconceived ideas.

However, this is impossible as much research has been done on related topics (Eisenhardt, 1989). This early thinking on grounded theory has brought some criticism with it. Corbin and Strauss (2014) acknowledge in their later work that every person brings their preconceived ideas, expertise, or knowledge from previous research. Additionally, by performing a literature review after the analysis, a whole field of knowledge is potentially ignored until after the analysis. It also brings the risk of rehashing the same concepts repeatedly by not diving into the literature beforehand.

Corbin and Straus (2014) argue that it is impossible to discount all the researcher's knowledge when planning a research project. Knowing how to engage with the literature is essential for enhancing, instead of being distracted from, the analysis (Corbin & Strauss, 2014). Charmaz (2014) agrees with earlier grounded theory rules that conducting initial coding needs to be done without having preconceived concepts in mind. However, she acknowledges that researchers hold prior skills and ideas. "*There is a difference between an open mind and an empty head"* (Dey, 1999, p. 251 in Charmaz, 2014, p. 117).

Following this criticism and taking into account designing this grounded theory research in the most suitable way, this research was based on an Informed Grounded Theory, where "*the researcher takes the advantage of pre-existing theories and research findings in the substantive field in a sensitive, creative, and flexible way"* (Thornberg, 2012, p. 255). "*Instead of running the risk of reinventing the wheel, missing well-known aspects, and coming up with trivial products or repeating others' mistakes", the researcher should take advantage of the pre-existing body of related literature to see further"* (Thornberg, 2012, p. 245). The literature study helped the researcher to gain attention, and to investigate further to details in the data and the analysis (Thornberg, 2012). What might appear to be new for the researcher could reflect the researchers own ignorance of the literature. By ignoring previous research, the researcher creates a loss of knowledge (Thornberg, 2012). Wagenaar (2011) argues that it is important to do some preparation to select what elements are relevant in the data collection and analysis process. The literature helped the researcher be aware of her theoretical knowledge and ideas, and it helped improve her theoretical sensitivity. In addition, it helped the researcher to foster data sensitivity, and it helped to leave irrelevant assumptions out of the data analysis. "*By being informed, the researcher not only situates his or her study and its product in the current knowledge base of the field but will also contribute to it by extending, challenging, refining, or*

revising it" (Thornberg, 2012, p. 255). Becker (1986) argued, "*Use the literature, don't let it use you" (Becker, 1986 in Corbin & Straus, 2014, p. 49).* Alternatively, as Burton (2007) and Stern (2007) argue, *"A dwarf standing on the shoulders of a giant may see further than the giant himself" (*Burton, 2007, p. 27; Stern, 2007 in Thornberg, 2012, p. 246).

Moreover, it was impossible to know beforehand which concepts were most significant to the theory since the concepts are derived from data analysis (Corbin & Strauss, 2014). Thus, the researcher required some knowledge of the literature before analysing the data, which enabled her to go beyond the literature in the analysis. As long as the literature did not block the researcher's creativity, literature was helpful to be used actively (Thornberg, 2012). Ramalho et al. (2015) would say, *"In a constructivist GT Method, the researcher's influence—and through him/her that of the reviewed literature—is neither avoidable nor undesirable, but rather recognized and included in the analytic process. In this approach, it is not a 'researcher's free' quality that ensures the roundedness of a theory, but rather the researcher's active, ongoing, and deliberate commitment to prioritize the data over any other input"* (Ramalho et al., 2015, p. 9).

Within this approach, a literature review before the data collection process was used to filter what is important to consider in the research without being steered to certain conclusions. (Ramalho et al., 2015; Thornberg, 2012)). However, as the purpose of doing a grounded theory is to develop a theoretical framework, it was unnecessary to use a theoretical framework at the beginning of the research.

4.3 DATA COLLECTION AND ANALYSIS

This section discusses how data collection was carried out in this study (4.3.1). Following this, the data analysis process will be explained (4.3.2).

4.3.1 DATA COLLECTION

Interviews and observations are the most often used types of data for grounded theory studies. For this research, unstructured interviews and observations were preferred, allowing the researcher to go into depth (Corbin & Strauss, 2014). However, the covid-19 pandemic changed this initial plan. For a few weeks, it seemed impossible to visit the neighbourhood and interact with the residents physically. As a consequence of the measures concerning Covid-19, which were effective in summer 2020, the methods for data collection needed revision.

The first step in the data collection process was taken by distributing a flyer with the question to participate in an online or telephone survey. In cooperation with student Mejdan Gashi, who researched 'the effect of a neighbourhood revitalization intervention targeting the built environment on leisure-time PA levels' for his internship at UMCN, a questionnaire was prepared, and a flyer distributed in the Kolping neighbourhood. The last question in the survey questioned whether the resident was willing to participate in a follow-up interview by telephone or video call. The follow-up question was seen as a way of contacting the residents for this research. This way, data could be collected in a 'safe' way. Nevertheless, this did not bring in enough respondents. Nine respondents appeared to be suitable for this study, considering the level of education. Of these nine respondents, four indicated that they were willing to participate in an interview, from which three interviews were

conducted. Although the researcher intended to conduct the interviews by telephone or skype, the residents preferred a physical interview at a safe distance. After it turned out to be possible to conduct interviews physically from a safe distance, the researcher decided to approach residents on the street in the Kolping neighbourhood and ask them to participate in this research. Another method to connect with respondents was through the Facebook page of the Kolping neighbourhood. Sharing the question for participants on this page resulted in one respondent but ensured that the residents of the Kolping neighbourhood had an idea of who the researcher would be in case they were approached on the street.

In short, the respondents in this study were approached in three ways. The first is the flyer with the questionnaire, the second being via Facebook, and the third through physically approaching residents in the neighbourhood. Addressing the residents on the street worked best. By proceeding in this way, six interviews were planned with a total of 18 respondents. More information about the respondents can be found in appendix B.

Given these points, the primary method used in this research to collect data was through unstructured interviews. Broad and general questions were essential during the interviews so that the participants could *"construct the meaning of a situation, a meaning typically forged in discussion or interactions with other persons"* (Creswell, 2014, p. 25). "*The more open-ended the questioning, the better, as the researcher listens carefully to what people say or do in their life setting"* (Creswell, 2014, p. 25). The Dutch topic list the researcher used for these interviews can be found in appendix C. In total, the researcher talked to 23 respondents in 10 interviews. Four interviews were conducted one-on-one, and the remaining six interviews had multiple respondents present, ranging from two to five people. The researcher emphasised that everyone was welcome to participate in the conversation, regardless of someone's knowledge of transport or cycling. When the researcher indicated that she aimed to discuss transport, cycling, or choice of transport, residents were sometimes hesitant to participate. They indicated that they did not know much or that they were not engaged in this subject.

Next to the interviews, the researcher carried out observations in the neighbourhood. Every time she visited the neighbourhood, she observed the people, streets, cars, bicycles, children playing, etcetera. The researcher created feelings and thoughts with the neighbourhood, each influencing the researcher's interpretation. These observations affected different stages in the research process. It influences the questions she asks during the interviews and the way the researcher analyses the data. During each phase of the research process, the researcher needed to maintain self-awareness. Especially during data collection and analysis, the researcher needed to bear in mind that "*assumptions, values, perspectives, experiences, and professional background enter into the decisions that a researcher makes…"* (Corbin & Strauss, 2014, p. 54). During the data collection, the researcher kept a notebook to note thoughts, ideas, observations, reflections, questions, responses, and everything else the researcher considered important at that particular time, what is a critical thing to do during GT data collection according to (Corbin & Strauss, 2014). By constantly comparing the data collected, the researcher maintained control over biases or negative assumptions and used these insights in the following interview. This analytical strategy helped the researcher open data and enabled the researcher to check and recheck the meanings of data (Corbin & Strauss, 2014).

The data collection process overlapped with the data analysis process. An advantage of overlapping data analysis with data collection is that it allows the researcher to collect data flexibly with the freedom of making adjustments during the data collection process. As in theory-building research, the

researcher tries to understand the case in as much depth as possible, it is legitimate to alter ways of data collection during the process (Eisenhardt, 1989). If a fresh way of thinking appears during the research, it makes sense to modify the data collection to better base the theory or provide new theoretical insights (Eisenhardt, 1989). "*This flexibility is controlled opportunism in which researchers take advantage of the uniqueness of a specific case and the emergence of new themes to improve resultant theory"* (Eisenhardt, 1989, p. 539). However, since the covid-19 pandemic worsened at the end of the summer of 2020, a slight pressure occurred to complete the interviews before it was no longer possible to speak to people physically. As a result, it was impossible to transcribe fully and code an interview before conducting the following interview. However, each interview was critically evaluated to make sure that questions could be asked more clearly during the following interview, or people could be spoken to in a slightly different way to gain as much information as possible.

This iterative research project has undergone several changes during the process. During this research, some adaptations were made while writing the theoretical background, methods of data collection, approaching the respondents and executing the interviews. The interview questions used in the first few interviews slightly differed from the last few interviews. After conducting several interviews, the researcher found out how the respondents responded to specific questions. The researcher reviewed the questions and answers in-depth, which showed that she needed to focus more on asking open questions, listening to the answers, and responding to these answers to search even better for surprising data. The same applies to the way of approaching respondents. During contacting the respondents in the neighbourhood, the researcher found that the way they were approached could influence whether the resident wished to participate. In the beginning, the researcher was willing to inform the people in the neighbourhood as extensive as possible to make them participate in the project. However, this amount of information about the project appeared to discourage them from time to time. At a later stage of contacting participants, the researcher considered using language appropriate to the target group. An example of this is that instead of introducing herself as a student at Radboud University researching the perception of fast cycle routes, the researcher turned to whether the residents could help her with an assignment for school about transport. The residents seemed to respond better to this as they were appeared to be better able to place themselves in the situation.

Therefore, the researcher mastered various skills during the process to work more effectively with the respondents. It appeared that it was not simply a matter of asking the right questions, but as Wagenaar (2011) puts it, a matter of working together with the respondent properly: *"Interviewing is not about asking questions, but about working with the respondent to produce useful data. To obtain that goal, asking questions is secondary to monitoring the quality of the interview material"* (Wagenaar, 2011, p. 251).

The end of the data collecting process was reached when data saturation took place. When the researcher noticed phenomena already heard before, no new phenomena were noticed (Eisenhardt, 1989).

4.3.4 DATA ANALYSIS

Data analysis has two general aims in an interpretive study: (1) moving from empirical materials to generalisations and (2) moving from empirical materials to model building. Generalisation could be seen as "*a description of the data in more general, theoretical terms that put the data to a wider context, that explain data, or both*", where a theoretical model tells the researcher "*how the phenomenon studied works*" (Wagenaar, 2011, p. 262).

In the GT approach, it is essential to follow different procedures and techniques while analysing the data to clarify the research process step by step and prevent it from being inimitable (Verschuren & Doorewaard, 2015). Coding is considered the most effective tool for analysing data, where the researcher distinguishes themes or categories in the research data and names them with codes (Boeije, 2014). Coding can be seen as a way to organise data, and it tells the researcher something about the data that connects separate data elements. "*It creates conceptual connections of which the researcher was until then unaware*" (Wagenaar, 2011, p. 262).

"*Coding is the pivotal link between collecting data and developing an emergent theory to explain these data. Through coding, you define what is happening in the data and begin the grapple with what it means"* (Charmaz, 2014, p. 113). While coding, it was important not to lose touch with the data while moving beyond the data to understand the data as part of more extensive processes (Wagenaar, 2011). In this research, the researcher chose to use the Atlas.ti 8 software to execute the coding process. The following procedures and techniques were used: 1) 'open coding', 2) 'axial coding', and 3) 'selective coding' (Glaser & Strauss, 1967; Charmaz, 2006; Boeije, 2014; Verschuren & Doorewaard, 2015).

OPEN CODING

After fully transcribing all the interviews, the data analysis proceeded in stages, the first being 'open coding'. "*In open coding, the researcher forms categories of information about the phenomenon being studied by segmenting information"* (Creswell, 2014, p. 89). Open coding is described by Strauss and Corbin (2007, p. 61) as the process of "*breaking down, examining, comparing, conceptualizing and categorizing data"* (Boeije, 2014, n.d.). The researcher carefully studied the collected data and classified them into codes. Then, the researcher compared the relevant codes with each other and labelled them. In this stage, selecting based on relevance was not yet necessary because this coding phase aimed to explore the field and not yet discover what is important (Boeije, 2014). "*Codes are a summary notation for a fragment of the research data in which the meaning of that fragment is expressed*" (Boeije, 2014, n.d.). This open coding resulted in a code system that helps to make the data manageable.

Open coding was the beginning of the process of theorising or conceptualising the research field. (Boeije, 2014). In open coding, codes needed to be simple, active and analytic. The codes needed to fit the data rather than forcing them to fit them (Charmaz, 2014). "*Grounded theorists aim to code for possibilities suggested by the data rather than ensuring complete accuracy of the data. This approach helps you to define the range of variations of your studied process or phenomenon and provides leads for conceptualizing it further and checking your ideas with other data"* (Charmaz, 2014, p. 120).

In order to stick closely to the data, the researcher attempted to code with words that reflect actions rather than applying pre-existing categories to the data (Charmaz, 2006).

An example of how the researcher proceeded in the phase of open coding in Atlas ti. 8 can be found in appendix D. One can see that the researcher stayed close to the interview and related numerous different codes to the interviews. By working this way, 859 codes were created, providing specific insights into the collected data, aiming to find all sorts of information.

AXIAL CODING

The next step was 'axial coding', where the researcher collected the data in new ways. "*In this structured approach, the researcher presents a coding paradigm or logic diagram in which the researcher identifies a central phenomenon, explores causal conditions, specifies strategies, identifies the context and intervening conditions, and delineates the consequences for this phenomenon*" (Creswell, 2014, p. 89). Axial coding refers to *"a set of procedures whereby data are put back together in new ways after open coding, by making connections between categories"* (Strauss & Corbin, 2007, p. 96 in Boeije, 2014, n.d.). It is a way of arranging the codes from the first phase and making subdivisions of leading codes and sub-codes, and it enables the researcher to decide whether or not to deepen specific themes. Axial coding served in this research to determine which categories are important and integrate codes around the main categories. During this phase, relations between categories were examined, and these categories' meanings described (Boeije, 2014). The number of codes and the data size is being reduced, and the essential and less essential themes in the research are determined. This process of specifying the data enables the researcher to start thinking about the order or structure of the categories (Boeije, 2014). When synonyms were used during the open coding process, the researcher chose which codes to use or rename the category during the axial coding process. At this stage, it became clear which categories were crucial in the research (Boeije, 2014).

Appendix D shows how the researcher worked in Atlat ti.8 during this phase of the analysis. Here, some example code groups are shown with their corresponding codes. In this way, the researcher classified the codes formed during the open coding process into groups.

SELECTIVE CODING

These stages of collecting and analysing the data finally result in a 'substantive-level theory' (Creswell, 2014). Strauss and Corbin (2007, p. 116) define this as "*selecting the core category, systematically relating it to other categories, and filling in categories that need further refinement and development*" (Boeije, 2014). The main focus in this phase was on the integration of the findings. This integration of the findings was done by creating connections between the categories described in the axial coding phase (Boeije, 2014). This is called the stage of selective coding, where the researcher "*may write the 'story line' that connects the categories*" (Creswell, 2014, p. 89). The problem definition, literature and theory, research data, fascination and topicality, must be considered (Boeije, 2014). In this final phase of the analysis, the final results were obtained, and answers to the research question could be formed.

Several tools helped to explore links between categories. One of these techniques was memo writing. In this data analysing process, the process of 'memoing' helped the researcher saturating the theory. 'Memoing' includes writing notes of ideas and assumptions the researcher keeps in mind of during the coding process (Creswell, 2014). Writing memo's enabled the researcher to keep track of the development history of each of the concepts and makes the researcher work intensively on their research data, and allowed her to discover the meanings expressed in de data (Boeije, 2014). It *"…helps the researcher to make a conceptual leap from raw data to abstractions that explain the phenomena*

in the context in which they are studied" (Birks et al., 2008 in Boeije, 2014, n.d.). The researcher made observations of her changes in perspective in the memos. Memo writing "*helps the researcher to make sense of the connections and explanatory suggestions that begin to emerge from the data*" (Wagenaar, 2011, p. 262). It helped to integrate categories and properties that emerged from the data into a broader explanatory theory.

The result of this phase of the analysis can be found in the results (chapter 5). Here, the formed theory is presented, and its emergence is written out. During the selective coding process, the researcher analysed the codes several times with each other and with the groups in order to form the storyline that correctly substantiates the theory.

After having used the procedures and techniques mentioned above, the earlier reviewed literature was taken into account to strengthen the emerging theory. "*An essential feature of theory building is comparison of the emergent concepts, theory, or hypotheses with the extant literature. This involves asking what is this similar to, what does it contradict, and why. A key to this process is to consider a broad range of literature"* (Eisenhardt, 1989, p. 544). By examining literature conflicting with the emergent theory, faith in the findings are strengthened. In addition, conflicting literature offers a window of opportunity. The results can create a deeper understanding of both the developing theory and the conflicting literature. "*Literature discussing similar findings is important as well because it ties together underlying similarities in phenomena normally not associated with each other. The result is often a theory with stronger internal validity, wider generalizability, and higher conceptual level"* (Eisenhardt, 1989, p. 544). By using literature discussing similar findings, the conceptual level of the study is being enhanced.

All in all, linking existing literature to the developed theory enhanced the internal validity, generalizability, and the theoretical level (Eisenhardt, 1989). Especially as the results in this research grounded from a precise but limited number of data, any further confirmation of internal validity or generalisability was valuable. This step, where the formed theory is compared with existing literature, is discussed in Chapter 7.

5 RESULTS

This chapter presents the results of the data analysis, represented in a grounded theory framework. The fundament of the perception of FCRs by residents with low SES is represented by the key categories: (1) knowledge & awareness, (2) habits & attitudes, (3) and abilities. These three key categories are grounded from the data collected in this study and form the fundament for shaping perception of FCRs by low SES residents.

To start with, a two-way division of a positive and a negative perception of FCRs is presented (5.1). Subsequently, the three key categories and their elements are highlighted to reflect the perception of FCRs by low SES residents (5.2). Each category consists of different elements, which reflect the perception and character of the focus group. Eventually, the full model is presented in section 5.3, including the elements discussed in the results.

For this secure small-scale study, the researcher tried to stay close to the interviews, using quotes and actively coded data in this results chapter. By doing this, the researcher aimed to create space for the respondents' voices and prevented compartmentalising the respondents and their answers.

Furthermore, throughout the chapter, quotations are used to support and illustrate the presented results. All interviews were conducted in Dutch. Therefore, the quotes used in this chapter were translated into English. In some cases, quotes were shortened to enhance readability, indicated by: (…).

5.1 POSITIVE AND NEGATIVE PERCEPTION

This research points out that a two-way division can be made between a positive and a negative perception of FCRs (Appendix E). Figure 11 represents the respondents' positive perceptions of FCRs, according to the interviews, and figure 12 represents the negative perceptions respondents have of FCRs.

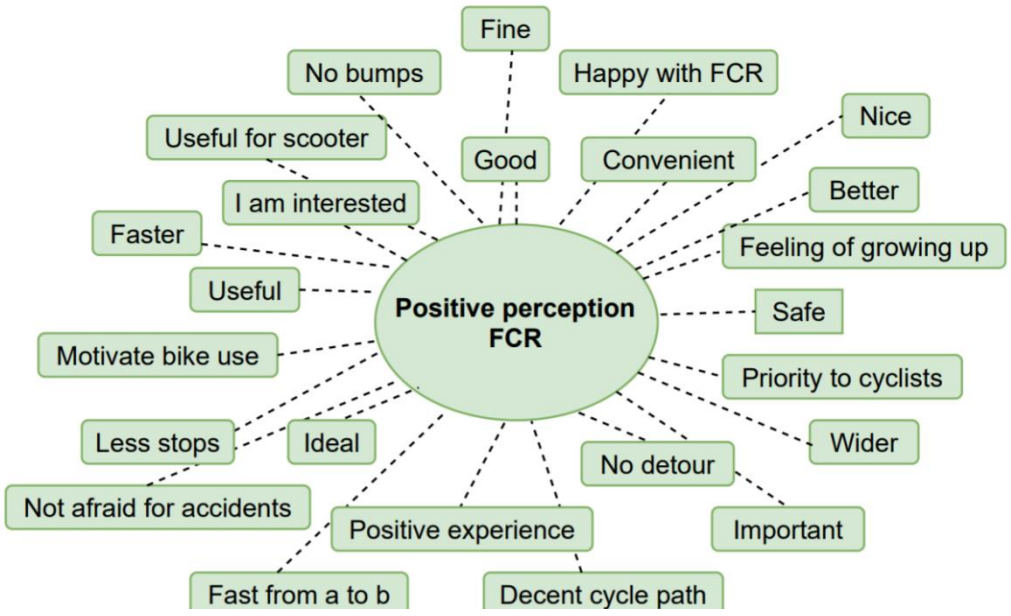


Figure 11. Positive perception FCR (own figure, based on interviews)

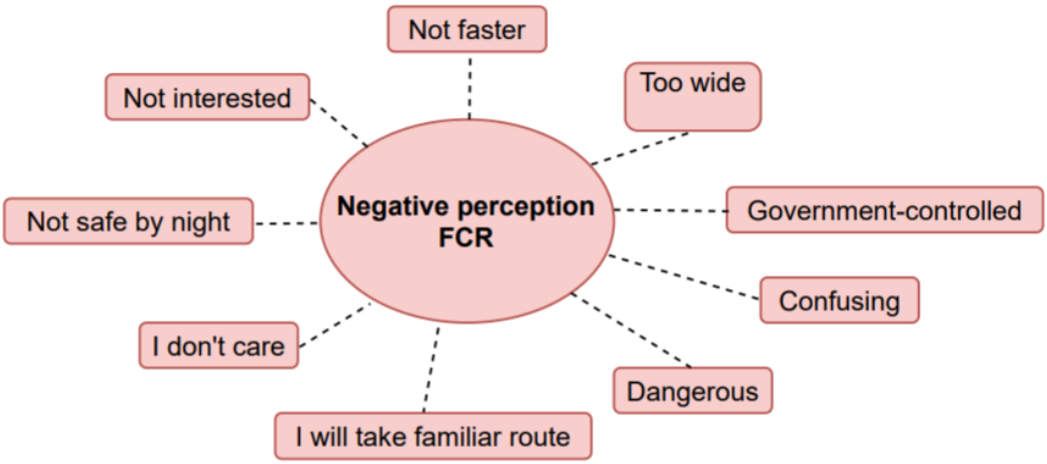


Figure 12. Negative perception FCR (own figure, based on interviews)

The message of this research is that different factors influence these positive and negative perceptions. In the next paragraph of this chapter, the elements that influence the shaping of a positive and a negative perception are highlighted on the grounds of three categories formed.

5.2 FUNDAMENT OF FCR PERCEPTION

To better understand these positive and negative perceptions, a model has been developed that helps to understand the fundament of the perception of FCRs by low SES residents (figure 13). This is represented by the key categories, (1) knowledge & awareness, (2) habits & attitudes, and (3) abilities. These three key categories are grounded from the data collected in this study and together form the fundament of the perception and use of FCRs by low SES residents.

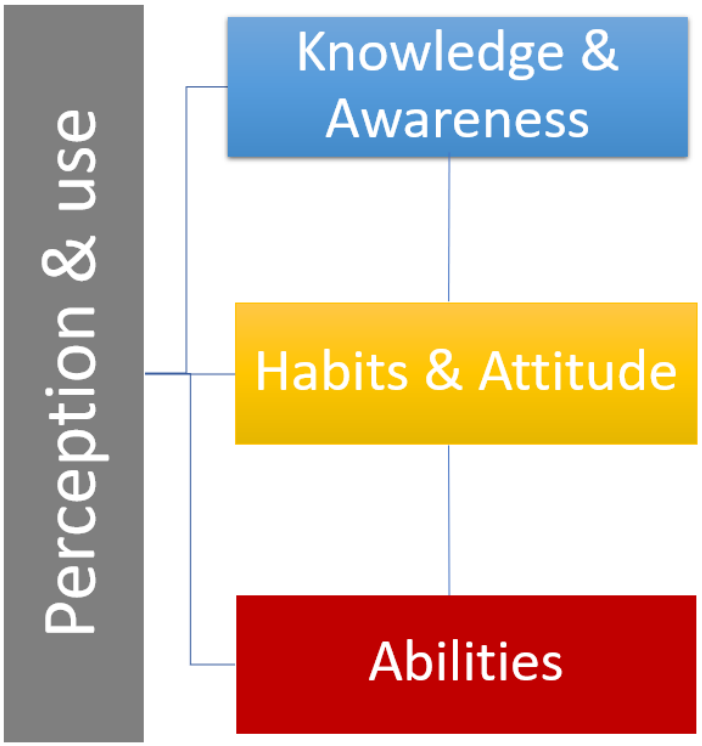


Figure 13. The fundament of the perception of FCRs by low SES residents (own figure)

In the following paragraph, the fundament of the perception of FCRs by low SES residents will be further unravelled by discussing the various elements that together form the GT model in more detail.

5.3 UNRAVELING PERCEPTION: CREATING SPACE FOR PERSPECTIVE

In the following section, the elements that influence the formation of a positive or negative perception of FCRs are discussed based on the main categories of (1) knowledge & awareness, (2) habits & attitude, and (3) abilities. First, the category 'knowledge & awareness', shown in blue in the model (5.3.1), is discussed. Next, the 'habits & attitude' category is discussed, represented in yellow in the model (5.3.2). Finally, the 'abilities' category is discussed, which is represented in red (5.3.3). The colours in the model are used in the results as a clear guideline. This way, an overview is maintained of to which key categories the discussed element belongs.

5.3.1 KNOWLEDGE & AWARENESS

In this section, the category 'knowledge & awareness' is unravelled. This category, influencing the fundament of a positive or negative perception of FCRs, covers the elements shown below. The results of the research are presented in these elements. The blue coloured elements affect the fundament of *positive* perception, and the white elements affect the fundament of *negative* perception. These elements provide a perspective into the world of the respondents and determine how perceptions of FCRs are formed.

Knowledge & Awareness

A) + Health conscious

B) + Knowledge and awareness about cycling and cycling infrastructure

C) - Limited knowledge and unawareness about cycling and cycling infrastructure

A) HEALTH-CONSCIOUSNESS LEADS TO A POSITIVE PERCEPTION OF FCR: *"YOU MUST BE CYCLING, YOU'RE SKINNY!"*

The results showed that the respondents (R) are health-conscious and are aware of the effects of using a bicycle from a health point of view. Some respondents use the bicycle to stay active and busy. Such as R10:

> *I: But you are happy that you switched to cycling?*
>
> *I:R10: Yes, it is better for me!*
>
> *I: Yes. ... Why then?*
>
> *R10: Yes, so I can keep myself from being lazy. And if I sit on the scooter all day, I become lazy, if I sit in the car all day I become lazy. Look, that's my son. He has become lazy.*

It became clear that all respondents know that cycling is a healthy way of travelling. Sometimes the doctor advises them to cycle more to become fitter, and sometimes they decide to do this independently.

> R6: *"Then I cycle along that route to Dukenburg, and then once along that shopping centre, and then hop on my bike back home. Yes, I must keep an eye on that with narrowing blood vessels. I do cycle back and forth every now and then".*
>
> *R7: "Cycling takes a long time, actually. But it keeps you fit!"*
>
> *R11: ... "...then I am more physically active. Also with walking".*

On the other hand, some respondents do specifically not cycle to save energy. They find cycling tiring. For instance, R23 indicated that he did not have any energy left to cycle for another quarter of an hour home at the end of his working day.

> *R23: That is why I bought the scooter.*
>
> *I: And not the bicycle...*
>
> *R23: No.*
>
> *I: And uh... Why not?*
>
> *R23: ... Yes, why not? ... It makes me tired... ...And I don't want to get tired anymore haha. No... Bicycle... No, I don't.*

In the case of R7, he simply did not have the energy to cycle. He liked going by car better. In addition, R16 said that he often went to work by car out of convenience and energy savings.

Similarly, respondent 6, who suffers from health problems, indicated that he no longer cycles because of his health. He does not want to cycle on a 'special' bicycle. That is why he takes the car. He does,

however, ride his electric bicycle for short distances occasionally to get some fresh air and get some exercise. He mentions: *"As long as I can walk, I should also be able to ride a bike".*

Cycling to stay fit or intentionally not cycling to avoid getting too tired thus plays a clear role in the respondents' lives and forming a perception about FCRs.

B) KNOWLEDGE & AWARENESS LEAD TO POSITIVE PERCEPTIONS OF FCRS: *"YOU SEE A LOT OF THOSE THESE DAYS, THOSE RED CYCLE LANES!"*

Although respondents first told that they did not know anything about FCRs, they later formulated descriptions of FCRs. Figure 14 shows how the respondents describe FCRs. In part, this corresponds to the feelings that respondents have about FCRs.

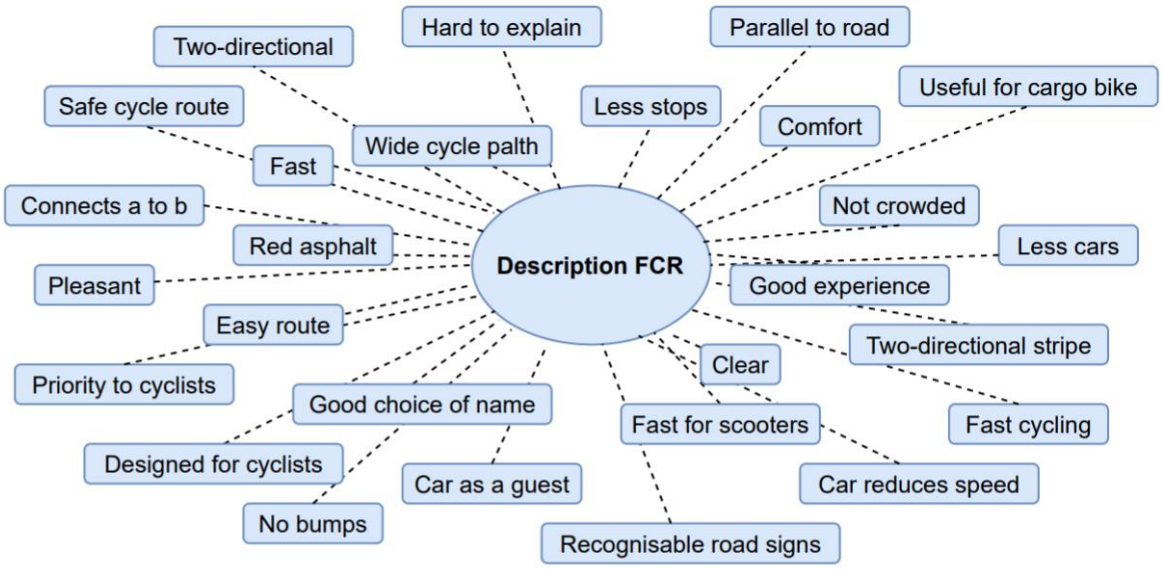


Figure 14. Description FCR (own figure, based on interviews)

The fact that the respondents were able to describe FCRs shows that they have an impression and thoughts about the cycling infrastructure. In addition, this shows that they must have been confronted with FCRs in some way. It is remarkable that when respondents describe FCRs, they use what they see, feel, and experience interchangeably. The 'firtstplace', 'secondplace' and 'thirdplace' come together here. It was noticeable that respondents who use bicycles or FCRs more often had more positive perceptions than respondents who did not have much experience or knowledge about cycling or cycling infrastructure.

C) LIMITED KNOWLEDGE AND AWARENESS LEAD TO NEGATIVE PERCEPTIONS OF FCRS: *"IF YOU KNOW IT, YOU CAN USE IT"*

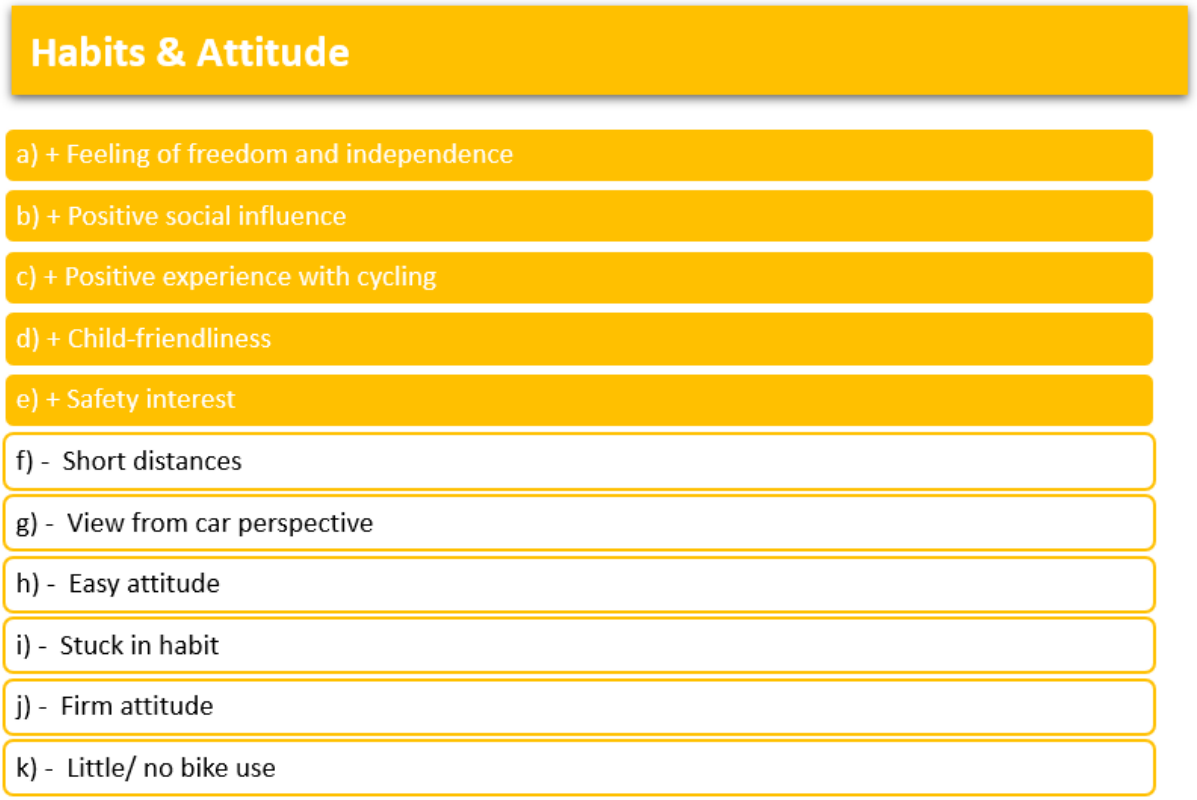
For many respondents, FCRs appear to be relatively unknown territory. They are not very familiar with them in daily life and use them rarely. The interviews reveal that many respondents indicate that they do not know what a FCR is or where they could be found, and on the other hand, respondents have heard of it, and in some cases, they referred to 'those red paths'. When the conversation continued, it turned out that they sometimes do use FCRs occasionally and that they often know more about them than they initially indicated. In example, by describing or locating them; it appears they do know something about FCRs.

R20 is a postman and is familiar with cycling infrastructure in the area. He indicated that he thinks many people in the neighbourhood do not know about the existence of the excellent cycling infrastructure. He says he knows about it through his work as a postman. He thinks that if more people knew about the existence of the FCRs, more people would use them. Furthermore, R1 indicates that she would like more information about FCR.

Thus, there appears to be some knowledge about FCRs, but this is very limited in many cases. It can be concluded from the respondents' answers that in some cases, there is a need or scope for more knowledge or awareness of cycling infrastructure.

5.3.2 HABITS & ATTITUDE

In this section, the category 'habits & attitude' is unravelled. This category, influencing the fundament of a positive or negative perception of FCRs, covers the elements shown below. The results of the research are presented in these elements. The coloured elements affect the fundament of *positive* perception, and the white elements affect the fundament of *negative* perception. These elements provide a perspective into the world of the respondents and determine how perceptions of FCRs are formed.



A. FEELINGS OF FREEDOM AND INDEPENDENCE LEAD TO POSITIVE PERCEPTIONS OF FCRS: *"CYCLING BRINGS FREEDOM AND INDEPENDENCE"*

Respondents 9 and 10 say they use the bicycle because it brings freedom:

> R9: *"It's your own transport. You don't depend on uh.... That's the difference".*
>
> R10: *"Yes, but just what I say! You take the bike, you can go! You can go whenever you want, and you don't depend on anyone. I just have the bicycle. Then I don't get fines and so on".*

Respondent 12 indicates that she is often faster because the bicycle allows her to decide for herself when to leave. She finds this more critical than other advantages the bus brings, such as sitting in a dry and warm place.

> R12: *"When I want to go to my grandmother, or something like that, or to the gym. Then I don't want to wait for the bus. And then... You know, the bus is like that, it's easier... you're dry when it rains for example, but the disadvantage of the bus is that you have to check at what time it comes. And the disadvantage is that sometimes you arrive too late..." "…And then you have to wait again. Because if I want to go to the gym, I prefer to go by bike. Otherwise, you have to wait for the bus again. And then you have to get off and then you have to wait again. Because then you don't want to work out any more and then eventually, you think, yes, but the bus won't be here for another half hour, for example, in the evening".*

They pointed out that you make yourself dependent on the locations and times of buses by using public transport. During the Covid-19 pandemic, many respondents said they avoided public transport for safety reasons and because they did not want to wear a face mask. For example, respondent 15 also indicated that certainly in times of Covid-19, cycling still offered freedom, which in many other areas is being taken away:

> R15: *"And cycling is always possible, and cycling is always allowed, of course".*

Even though not all respondents have freedom of choice when it comes to transport, the bicycle does bring freedom and independence to move, and the respondents are aware of that.

B. POSITIVE SOCIAL INFLUENCES LEAD TO POSITIVE PERCEPTION OF FCRS: *"MY NEIGHBOURS CYCLE EVERY DAY"*

The surrounding people in the neighbourhood do not influence the use of bicycles and cycling infrastructure or the perception of it, on a conscious level. All of them state firmly that they do not allow themselves to be influenced by others. Yet, the answers they give show that their environment unconsciously influences them. For instance, when respondents say that they see more and more people in their neighbourhood with an e-bike and that they are now thinking about buying one themselves.

C. POSITIVE EXPERIENCES WITH CYCLING LEAD TO POSITIVE PERCEPTIONS OF FCRS: *"CYCLING FEELS GOOD"*

On the other hand, many respondents have positive feelings when talking about cycling. The following experiences about cycling appear among the respondents (figure 15):

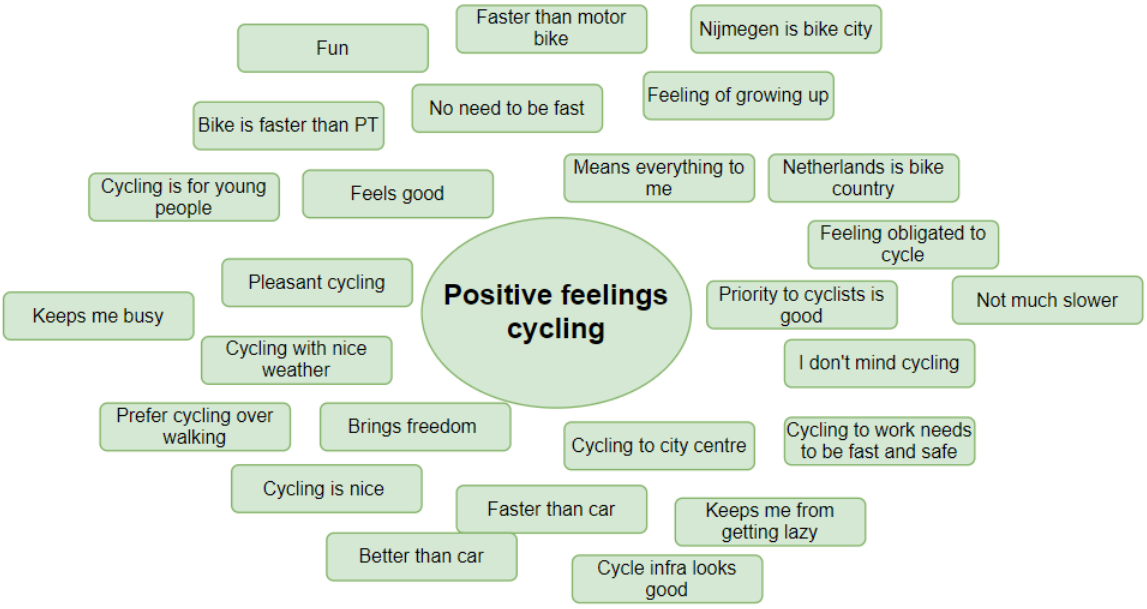


Figure 15. Positive feelings cycling (own figure, based on interviews)

D. CHILD-FRIENDLINESS LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"I CAN DO THIS! I AM SUPER-FAST!"*

Respondents indicated that bicycles make children independent. For instance, one respondent said that the fast cycle route along Dukenburg gave her child a feeling of independence and of growing up:

> R1: *"Our eldest is almost ten, and my sister-in-law lives in Zwanenveld, and you can cycle all the way to Dukenburg along the railway and he'll be there in no time! And since we said, 'oh you want to go there, but we can't, you go alone!'. He feels grown-up, because he can cycle there all by himself. We turn on the tracker on his phone so that we can see exactly where he is. But he does feel like 'oh yes! I can do it! I am super-fast".*

For many respondents, the bicycle is part of parenting and education, and it is essential when children are growing up. R1, for instance, states that she finds it necessary that her children learn to be independent and not always have to be picked up and brought to school. FCRs offer a solution, according to her.

Besides raising their children, all respondents used to cycle when they were young themselves. Cycling has therefore been an important part of their own childhood. They cycled to school or to friends. It was the norm. They often say that they have continuously cycled everywhere. When they got older, they often bought a motorbike or a car, and since then they have been cycling less.

Thus, FCRs and cycling are, according to the respondents, necessary in the lives of children. Noticeable was that children are very important in the lives of the respondents. Their own (grand)children, or the children in the neighbourhood. This makes FCR and bicycles valuable to respondents.

E. SAFETY INTEREST LEADS TO POSITIVE PERCEPTIONS OF FCRS: "*THE MUNTWEG IS LIFE-THREATENING CYCLING*"

The interviews show that road safety is essential to the respondents. Various elements play a role in this. Respondents do not like cycling in the dark or take a different route than during the day, where there is better lighting or more people. The FCR towards the city is experienced as unsafe at night. R2 and R15 indicated they did not consider it safe to cycle in the dark. They would instead take the car.

On the other hand, overall, FCRs are considered safe by the respondents. For example, R1 indicates finding the FCR safer when using a cargo bicycle than other routes.

> R1: *Anyway, I do like that part. The last time I wanted to go to the city via my parent, I had to go up the Wolfkuilseweg and then along the old Graafseweg, and that is a lot more dangerous with a cargo bike than taking the shortcut, because it is a FCR. So it is, I notice that it is much safer and much nicer to cycle there. I'm not so afraid of something happening there, whereas I'm more afraid of something happening on the ordinary road. So that does make a difference.*

Respondent 11 indicates that she likes FCRs because there is no other traffic there. When there is no cycle path, some respondents cycle on the sidewalk for safety reasons.

The respondents indicated that they would like to see infrastructural changes at specific points around their neighbourhood. Almost every respondent said that the Muntweg is dangerous. Both at the intersection and on the road a bit further down. The intersection proves to be dangerous for cyclists because cars do not always prioritise them, and a bit further down the Muntweg, the cycle path ends so that cyclists and scooters must use the main road. According to many respondents, there is room for improvement here. This shows that respondents benefit from bicycle infrastructure and prefer (separate) cycle paths rather than cyclists or scooters having to share the road with cars.

It is also mentioned that speed barriers should be placed in the neighbourhood itself. Respondents argue that the Kolpingstraat has become a more through-street after the renovation, where people drive too fast. When the Muntweg is congested, people use the Kolpingstraat. In addition, respondents would like to see a cycle lane in the Kolpingstraat.

At locations where traffic is confusing or where it is busy, respondents consider this to be unpleasant. According to them, this is particularly dangerous for cyclists and scooters.

It can be concluded from this that respondents consider traffic safety very important. They are indeed concerned about it. Remarkably, even though the Muntweg is considered busy and dangerous for cyclists and scooters, many respondents continue using it.

Overall, road safety comes first for every respondent. Good lighting on the roads, social supervision, safe roads without loose tiles and tree roots, clear roads where it is not too busy and clear who has priority, were all mentioned. Respondents also thought it is vital for the elderly to be able to travel safely across the road. For instance, R6 said: *"As long as I can walk, I should also be able to cycle".*

The safety interest shown by the respondents contributes to an influence on a positive perception of FCRs, as FCRs are generally perceived as safe by the respondents.

F. SHORT DISTANCES LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"…TO THE SUPERMARKTET AND BACK…"*

The Muntweg comes up very often during the interviews. This road is located next to the Kolping neighbourhood and leads towards the city centre. Respondents use this route a lot to get to their destinations. During these conversations, the following becomes clear.

The interviews indicated that the respondents mainly travel short distances. They go to the supermarket, the city centre, work, school, visit family and friends, and so on. They do this by bicycle, e-bike, scooter, car and on foot. When respondents go to work or school, it is mostly not many kilometres away from their homes. The following destinations were mentioned during the interviews:

> Beek, Beerendonk, Berg en Dal, Beuningen, Brakkenstein, city centre, Canisius Hospital, Mook, Plasmolen, Cuijk, Arnhem, cemetery, doctor, family and friends, Groenestraat, Hatert, Lent, Londenholt, Malden, Meijerhorst, Ooij, sports club, Waterkwartier, Weurt, Wijchen, MC Donald's, Goffert, Grave, Groesbeek, Hatertse Ven, Het Walt, Heumen, Honig, Millingen aan de Rijn, Molenhoek, Neerbosch, shopping centre Dukenburg, Staddijk, and the supermarket.

So, for day-to-day destinations, respondents generally do not go very far from home. They indicated that they have all the daily necessities and destinations close by.

When the respondents go cycling, it is usually a relatively short distance. This varies between five and twenty minutes. Furthermore, some respondents go cycling recreationally. On those occasions, they often cycle more kilometres than when the bicycle is used as a means of transport. Also, respondents say that they often take the bike when the distance to be covered is too far to walk. Respondents also indicated that they walk a lot because they travel a lot of short distances. Some respondents prefer cycling over walking, and some walking over cycling. There are different preferences in this respect. Respondent 13, for instance, indicates that she prefers cycling over walking because her leg is sore. When respondents do walk, they have a variety of reasons for doing so. Such as walking with children; they walk to be active, to be walking with the dog, to stroll around, etcetera. Furthermore, they walk to various places such as the neighbourhood, Dukenburg, the supermarket, and Goffert. When it is too far to walk or too hot, they travel by other means, such as bicycle, scooter, car, or public transport (PT).

G. VIEW FROM CAR PERSPECTIVE LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"CYCLISTS ARE PROTECTED SPECIES"*

It is notable that during the interviews, many respondents spoke from a car drivers' perspective. This was the case for respondents 1, 2, 4, 5, 6, 12, 13, 14, 21, 22 and 23. For instance, respondent 2 thought that cyclists prioritise the road and think they always have priority. R2 mentions the following about the cycle street Fleminghstraat:

> *R2: … So that um... And I'm just being very honest, look, cycle paths are another issue than cyclists, of course. How should I put it? I often think cyclists are inattentive. You know? They think that the cyclists always have the priority, and they just go! That's often the case with motorists and things. That's my opinion…*
>
> *R2: …That cyclists here think that they have priority, and they cycle all the way through and things...*
>
> *R4: Yes, but cyclists always press on, I think...*
>
> *R2: Yes, that's what I'm saying! That you must be careful as a motorist.*
>
> *R4: You must be careful anyway.*
>
> *R2: …But of course... cyclists always have... Cyclists just think that they... A motorist is of course always at fault when something happens. So, they just keep on pushing...*
>
> *R4: …But that's because you drive a car now...*
>
> *R2: Then you look at it differently...*
>
> *R4: Now you see all of that, you think. um... Oh well!...*

Respondent 14 said that he used to drive his car on cycle paths because he thinks it is not fair that only cyclists may benefit from these paths.

> *R14: Yes, I'm going to tell you very honestly. You have one of those bollards in between. I just drive past those things, haha. So, I just drive there. But I do find… what I find very annoying, and I say that very honestly. The fact that the government makes those red paths and cyclists literally benefit from them.*

Respondent 23 says that cyclists think they are protected species. He indicates that they do not take account of other road users and think they have priority everywhere.

Figure 16 illustrates which negative feelings about cycling emerged in the interviews:

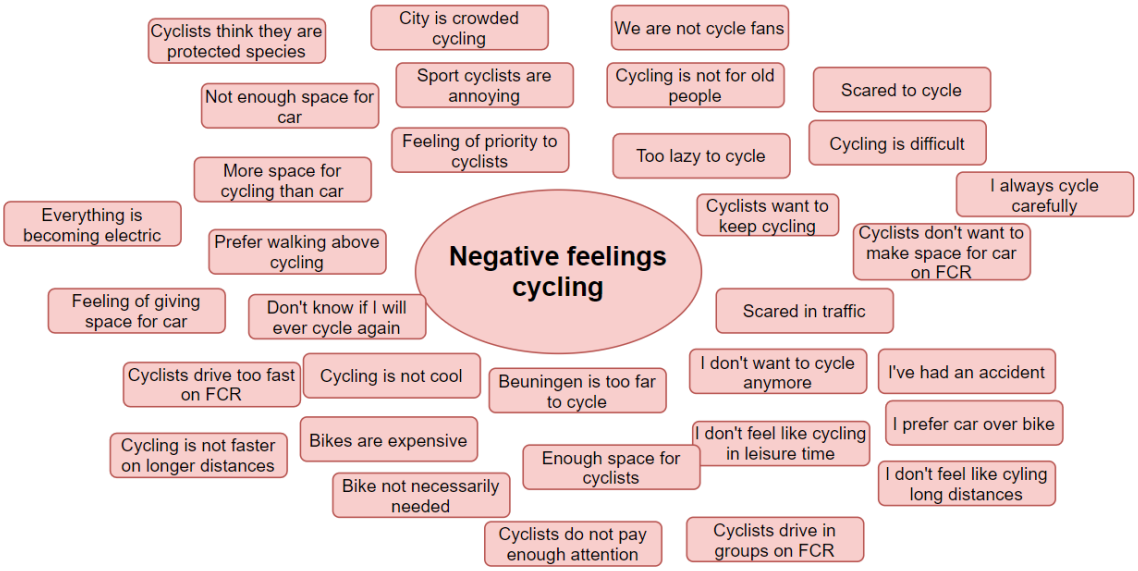


Figure 16. Negative feelings cycling (own figure, based on interviews)

However, some respondents mention some negative points of car use. R15 thinks that the car parking spaces in the city are too far away. This keeps her from taking the car. In addition, she indicates that cycling is faster because cars lead people around everything. R2 and R4 also felt that another disadvantage of the car is that people must wait at many traffic lights.

H. AN EASY ATTITUDE LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"WE'RE JUST LAZY!"*

Several respondents say that they would be 'liever lui dan moe', a common said sentence in the Netherlands, meaning rather being lazy than tired. They think a car offers luxury and convenience. Most respondents admitted not to cycle when the weather is terrible. Except for respondents who are dependent on their bicycle, they still take to the bicycle. Respondents themselves indicate a difference in the use of the bicycle between people who are dependent on the bicycle and those who are not. People who are bicycle dependent use the bicycle always and everywhere, with bad and with good weather. Respondents who have another mode of transport use the bicycle mainly when the weather is good or when they are not in a hurry. In addition, according to respondents 12, 13, 14 and 15, the free public transport card that students receive from the government ensures that they use public transport for all short trips. Respondents feel that this makes them lazy.

> *R12: Since I attended ROC, I never really take the bike anymore. ... I only take the bus.*
>
> *I: Why then?*
>
> *R14: Yes.*
>
> *R12: It is easier. Especially in the winter! Nice and warm!*

Respondent 12 uses the bus to go to college. She finds Beuningen too far to cycle, and she uses the bus to wake up. Besides, she does not want to arrive at school sweaty from cycling. She says she likes the bus, especially in winter.

Respondent 14 also felt that cycling was no longer cool. According to him, everything has to be done by motorbike or electric. He never cycles but always goes by car or scooter. He mentions that he would like to use an e-bike if the government gave him one for free. R7 and R9 say they will definitely go to the centre by car. They indicate this in a way it seems that the scooter is not good enough to go to the centre with. The scooter is not an option in this case.

So, respondents indicated that they are lazy and therefore do not use a bicycle, or do not consider the bicycle luxurious or convenient enough to use compared to other means of transport. The car is considered to be luxurious and convenient.

I. HABITS LEAD TO NEGATIVE PERCEPTION OF FCRS: "…VIA THE MUNTWEG"

What became obvious in the interviews is that many respondents show habitual behaviour. They are used to travelling by car or scooter or cycling the same route for years, like respondent 3. She has continuously cycled via Muntweg to the city centre. Her sister-in-law said that she is doing this because she is used to it and because she can meet people she knows on that road:

> *R2: Yes, but why? Because you are used to it!*
>
> *R3: Yes, you are used to that!*
>
> *R2: You are used to the Willemskwartier. You think, 'Oh, I'll cycle to the Willemskwartier or whatever. Then you see some familiar faces!*
>
> *R4: Yes, no. Then I take the familiar road again.*

She has no intention of taking any other road, even if it could be faster. R3 and R4 state:

> *R3: Yes, I don't believe that.*
>
> *R4: Yes, I don't believe that either.*
>
> *R3: No, I really don't believe that!*
>
> *R4: Whether you drive like this or like this, it has always been like this.*
>
> *R3: I don't think that makes a difference.*

It is particularly noteworthy that most of the respondents cycle or use a scooter to go to town via the Muntweg, have been doing so for years, and do not intend to use the FCR. This is also the case for respondent 17.

> *R17: Yes, I always go via the Muntweg because I am used to it".*

Many respondents are not in a hurry when cycling and look for the safe and familiar route rather than the fastest one. It is indicated that the preferred route for cycling is often the easy route, which is often the familiar route.

Lots of habits relate to scooter or car traveling or using the familiar route which mostly is not a FCRs. In this way, remaining stuck in habits has an influence on the formation of a negative perception of FCRs.

J. FIRM ATTITUDES LEAD TO NEGATIVE PERCEPTIONS OF FCRS: *"IF THAT CONTROLS YOUR LIFE…, THAT IT MATTERS WHAT ANOTHER PERSON DOES… NO, THAT DOESN'T BOTHER ME"*

It appears that the respondents are not easily influenced by their surroundings. All the residents state firmly that they do not allow themselves to be influenced by others. Additionally, most of the residents know very well how people in the neighbourhood travel. This shows that many people in the neighbourhood often travel the same way and have been doing so for a long time. Not being influenced by others and traveling the way one is doing for a long time relates to sticking to habits and influences the formation of a negative perception of FCRs.

K. LITTLE OR NO BIKE USE LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"EVERYONE CYCLES HERE. JUST LOOK AT ALL THOSE BIKES!"*

It was striking that there were quite some bicycles visible in the neighbourhood. Yet, according to one respondent, many people in the neighbourhood use bicycles, and according to another this is not the case. So, this remains somewhat divided. According to respondents, it is often the same people who get on a bicycle. All respondents agreed on, and what was also visible on the street, hat many children in the neighbourhood play together outside on bicycles. Respondents are proud of this, and they think it is nice to see.

For some respondents, it has been more than a few years since they last cycled.

> *R23: "The last time I cycled? Well, that's.... .... 26 years ago".*
>
> *R7: "...It's been a long time... The last time I cycled. I don't know exactly..." "Yes, a long time ago. A couple of years ago".*

On the contrary, some respondents cycle regularly.

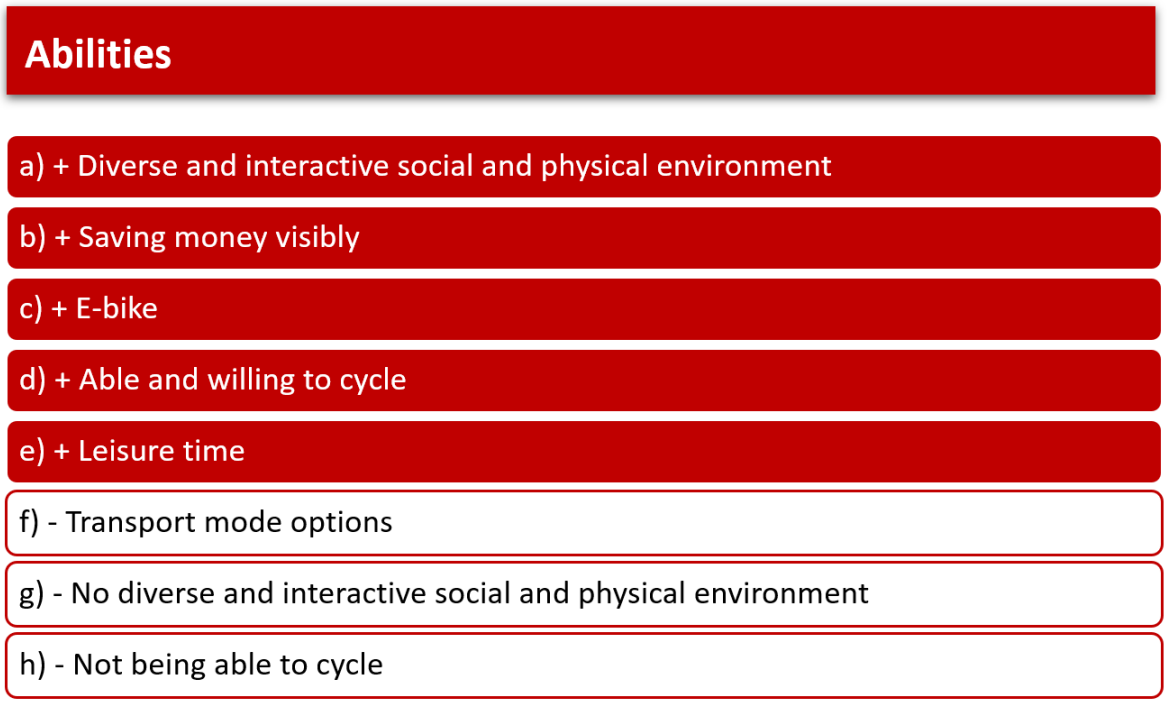
> *R3: "I did this morning."*

A distinction can be made between respondents who cycled during the week of the interview, respondents who cycled a few weeks ago and respondents who have not cycled for over a year. The majority either cycle regularly or not at all.

The (little or no) bicycle use contributes to an influence on a negative perception of FCRs, as they mostly look more from a car or scooter perspective and miss some recent bicycle experience (above mentioned). However (as mentioned earlier in C) the respondents positive social influence contributes to an influence on a positive perception of FCRs, whether they cycle or not.

5.3.3 ABILITIES

In this section, the category 'abilities' is unravelled. This category, influencing the fundament of a positive or negative perception of FCRs, covers the elements shown below. The results of the research are presented in these elements. The coloured elements affect the fundament of *positive* perception, and the white elements affect the fundament of *negative* perception. These elements provide a perspective into the world of the respondents and determine how perceptions of FCRs are formed.



A. A DIVERSE AND INTERACTIVE SOCIAL AND PHYSICAL ENVIRONMENT LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"YOU'LL HAVE A CHAT"*

When cycling, it is easier to have a chat with people you meet on the way. For instance, R2 and R4 indicated that there is a difference between driving a car and cycling.

> *R2: Because when you're in a car, you drive towards your goal and when you're on your bike, you often think, oh, I'll just cycle round the Goffert or I'll just know...*
>
> *R4: Or you meet someone.*
>
> *R2: Or you meet someone and you stop. Yes, exactly. That's right.*
>
> *R4: And you don't do that with a car.*

Greeting and meeting acquaintances appeared to be important to the respondents. This became clear from the interviews and observations made during and before, and after the interviews. People in the neighbourhood often greet each other and like to have a chat. Therefore, they base their route choice on this and often choose a route through neighbourhoods and along shops where there is a great change of running into people.

The fact that respondents like to be in a diverse and interactive social and physical environment does cause them to go outside and get on their bikes or scooters and thus use FCRs from time to time. By

using them more often and thus increasing their experience, this can have an influence on positive perceptions.

B. SAVING MONEY VISIBLY LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"BY BIKE, I WON'T GET A FINE"*

Respondents who use the bicycle indicate that bicycles are a cheap way of transport. R10 indicates that he thinks the bicycle is cheaper, as he cannot be fined with it for not having a driver's license or speeding.

> *R10: "I used to ride scooters. Got a few tickets, so now I don't want to do that anymore… …Then you won't get a ticket… …If I ride a scooter, I'll get a ticket without a licence and this and that. Do you understand?... …The last time I was with my nephews, the fine was... 300 euros... That's just a waste of money. I'd better take those boys with me on my bike. Then nothing happens! And that's not much slower".*

It appeared that the respondents are aware that not everyone can afford a car, scooter or public transport. Almost all of them say they know people who depend on a bicycle, or they say they depend on a bicycle because they cannot afford a more expensive means of transport. The bicycle is often an affordable solution, and respondents say they are grateful for this.

Respondent 2 says:

> *R2: "The bicycle is the cheapest means of transport, of course. And you can get everywhere you want to go. But yes, sometimes it takes a bit longer than a car".*

Further, one respondent indicated that she found the cost of car parking far too high and is happy with the free guarded bicycle parking facility in the city. She is careful with her bicycle. *R*15 also agrees with this, and she said to be surprised that many people from the neighbourhood still took the car, although it costs money:

> *R15: …"While you would think, also for the sake of saving money, just take the bike. That makes a difference. Gas is costly".*

Almost all respondents indicated that public transport is expensive. If the distance to be covered can also be done by bicycle, they prefer to do this because it does not cost money. Such as R2 and R3:

> *R3: Yes, I think the bus is very expensive!*
>
> *R2: Public transport is generally expensive anyway, so I think most of them take the bike... Look, it's like you say, if you can cycle to work a bit every day, you're not going to take the bus.*

Even though many respondents indicated that bicycles are relatively inexpensive, some respondents disagree. For instance, respondent 3 says that a bicycle is also costly, and respondent 14 says that an electric bicycle is just as expensive as a scooter. They argue that the bicycle also must go to the bicycle repair shop, and for instance, petrol for a scooter is not much. R13 and 14 compare an e-bike with a scooter and indicate that they do not find the e-bike much cheaper:

R14: "Yes, but if you... No fuel, but power. That also costs electricity.

R13: Fuel, yes. You have to recharge.

R14: You know! And you never know how much that battery will last. And when you go to refuel with scooter... 5 euros?

R13: 5 euros.

R14: 5 euros whole week!

R13: Yes, it is full".

Thus, the fact that many respondents consider the bike the be relatively cheap mode of transport compared to other transport modes, the influence of a positive perception of FCR is affected by this.

C. E-BIKE LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"... THOSE ARE HOT RIGHT NOW! YES, WE ALSO HAVE AN E-BIKE!"*

Respondents know many people in their neighbourhood who have an e-bike, or they have one themselves. R12 even says that she sees them everywhere and that more and more are being used. Most of the time, they use them because they can no longer use a standard bicycle for health reasons. The e-bike offers a solution in these cases. R3 indicates that cycling is better than walking because of leg problems and that she needs an electric bike because she also has asthma. In her case, the e-bike is very important to her. She wants to keep moving to stay healthy and get outdoors. Some respondents also bought e-bikes for the sake of convenience. They can cycle on an unsupported bicycle, but an e-bike makes it more accessible.

However, not all respondents were keen on an e-bike. R2 and 7, who both have a car and are therefore not dependent on bicycles, do not want an e-bike. They would instead take the car. Another factor is that e-bikes are considered very expensive. They would rather spend the money on a scooter or a car. In addition, R2, R3, R4 and R13 state that e-bikes make people lazy, and they consider e-bikes to be dangerous because they pass so quickly. According to them, they cause more accidents than standard bicycles.

In general, it appeared that the e-bike had a positive impact on cycling and the e-bike leads to a positive perception of FRCs.

D. ABLE AND WILLING TO CYCLE LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"I WILL START CYCLING AGAIN ONE DAY"*

Many respondents indicated that they would like to start cycling (again or more). They often give reasons why this is not possible, but that they would like to do this again one day. By saying that they would like to go cycling (again or more), they commonly argue why wherefore they mention different positive impact of cycling.

Therefore, the residents show their will to start cycling (again or more), having an influence on the formation of a positive perception of FCRs.

E. LEISURE TIME LEADS TO POSITIVE PERCEPTIONS OF FCRS: *"WE ARE NOT SUCH FANATICS "*

There is a clear difference between the respondents when it comes to recreational cycling. Some respondents like to go cycling for a while, while others would never do so. Such as R3 and R4:

> *I: And for you if you have a day off. Do you go cycling just for fun?*
>
> *R2/R3/R4: No!*
>
> *R2: What are we doing now?*
>
> *R3: Whoa!*
>
> *R4: Haha!*

R2 and R4 do not refer to themselves as 'fanatics who go cycling for a day'.

However, if respondents go cycling in their spare time, they often choose their route based on the natural surroundings. They indicate that they do not pay attention to the quality of the cycle path, but more to the location and what there is to see and do in the surroundings. A long road through the meadows is less popular than a road along the woods, water, or city.

R1 indicates this:

> *"Then you must go a very long stretch uhm, along the meadow. And the kids don't find that very interesting to bike".*

A bit of variety often seems to go down well, and places where one can stop and have a drink, are also found to be nice. According to R1, children sometimes do not even need a playground then.

> R1: *"So they often don't find that route that much.... I don't know. While there is no playground there, but still, they find that route then more fun to bike".*

Some respondents also mentioned that covid-19 made them cycle more, because there was nothing else to do.

In this case, leisure time influences the positive perception of FCRs because respondents often cycle more when they have time. This influences their experiences of cycling infrastructure, making them more likely to appreciate FCRs. On the other hand (as mentioned before), it is striking that respondents like to cycle in beautiful and varied surroundings in their spare time. Often a route other than an FCR is then chosen.

F. TRANSPORT MODE OPTIONS LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"AND THEN YOU JUST GO VROEM…!"*

> R13: "With this beautiful weather, it is nice to take the scooter, you know, "and then you just go vroemm….!"

Many residents of the Kolping neighbourhood use the scooter or motorbike. According to the users, the scooter has many advantages that also apply to the bicycle and the car. Therefore, the scooter is often seen as a good choice by the respondents. Scooters are used for many of the same reasons for which some people use bicycles, namely, relatively cheap, easily available, on the cycle path in beautiful surroundings, pleasant in nice weather, easy to take a shortcut, etcetera. On the other hand, scooters are also used for the same reasons as people use their cars: they do not make you tired, it's easy to go shopping, it's easy to find a parking space, a scooter is cool, etcetera. As R23 says:

> *R23: Because yes, I don't know, yes I'm fast everywhere, you don't have to look for a parking space, you can park it just about anywhere. That's just the advantage.*

For some respondents, the scooter is the only means of transport. Nevertheless, some respondents have switched from the scooter to other transport modes. R18, for example, hardly uses the scooter anymore because she now has an e-bike. Moreover, R11 bought a bicycle because the repairs to the scooter were too expensive. She said she had more trouble with the scooter than she travelled with it.

So, the scooter is seen by many respondents as a very convenient means of transport. It is noticeable, however, that there is a dichotomy between the e-bike and the scooter. Respondents often compare the two means of transport action, and a number of them say they have made the switch from scooter to an e-bike.

Nevertheless, more transport mode options available affects the shaping of a negative perception of FCRs. The respondents have more to choose from, making them use FCRs less as they do not rely on the bicycle this way.

G. NO DIVERSE AND INTERACTIVE SOCIAL AND PHYSICAL ENVIRONMENT LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"IF I WANT TO RIDE MY BIKE, I JUST RIDE MY BIKE"*

Most respondents were satisfied with the bicycle infrastructure in their neighbourhood. Respondent 18 even mentioned the Wijchen-Nijmegen fast cycle route:

> "R18: Yes, there's a path down towards Dukenburg... Yes, you have good cycle paths here!"

Next to this, many respondents consider good bicycle infrastructure necessary even though some do not use it. Safety is considered as attractive for the respondents.

> *"R2: "Well, I think in general it's very important. Otherwise, it's a mess with the traffic, of course. I think you need bicycle lanes, haha!"*
>
> *"R6: Yes because she was hit by a motorbike earlier. If that cycle path had been there at the time, this would not have happened.*
>
> *R6: Because that route has now been changed for the bicycle".*

> "*R17: Yes, important.*
>
> *R18: Very important.*
>
> *R17: We are old ones.*
>
> *R18: I just want to say. If we fall.*
>
> *R17: I mean, we are not old, but we are older. And I think I am more likely to break something now than I was 20 years ago.*
>
> *R18: And I am also more careful".*

Respondent 23:

> *R23: Good and safe cycle paths. Not only for me, but for everyone, I think. Important".*

Respondents like smooth asphalt cycle paths better than cycle paths with loose tiles, tree roots and potholes. Safety is critical to them, and uneven cycle paths are considered dangerous. Many respondents also indicated that they did not like cycling in the neighbourhood because of the clinkers.

They think that cycling is unpleasant there. In addition, lighting should be well regulated, and they prefer not much or no other traffic.

Even though almost all respondents consider good cycling infrastructure essential and prefer a pleasant environment, almost all respondents say the physical environment does not influence them.

> *R10: "Not specifically just because of the cycle routes. It is nice that they are there, though".*

R1 sees this differently:

> *"R1: Well, I think you take the bike more quickly then. I think so. Or at least, if I speak for myself, I take the bike faster or more often. Uhm, because then, you can cycle in any direction here. So then yes, you take the bike more often, I think".*

The majority said they would still cycle if the cycling infrastructure were worse. However, they think it is essential to have a pleasant environment to cycle, especially during leisure time.

> *"R23: Then the environment is important to me. If I just go for a drive, then it is the surroundings. And if I drive down, then I drive along the Waal, and then I drive along the centre, along the Waalkade, and then in the evening I look at the boats, have an ice cream. You know how it goes".*
>
> *R23: That is more the environment that I look at. And whether it is good cycle paths or not, the environment is what I want to enjoy. That is the only thing I find important".*

When it comes to scooters on cycle paths, respondents have clear wishes, as many scooter riders use cycle paths. R5 and R6 think scooters are dangerous because they go fast and are bigger. Both on the cycle track and the road. Scooter users indicate that they do not like narrow bike paths when riding a scooter. For instance, R23 thinks the bike path on Energieweg is too narrow. R12, R13 and R14 point out that they find electric scooters dangerous because you cannot hear them coming.

The majority say the physical environment does not influence them, but it appears from the interviews that this often happens unconsciously. Respondents prefer to cycle in an environment with good cycle paths, beautiful surroundings, not too many traffic lights and a social environment. In this respect, the surroundings are considered even more important than the cycle paths themselves. Many respondents argue that FCRs do not always meet their interest. If this diverse and interactive physical environment is not available good enough to match the respondents interest, this influences the shaping of a negative perception of FCRs.

H. NOT BEING ABLE TO CYCLE LEADS TO NEGATIVE PERCEPTIONS OF FCRS: *"IF I HAD A BIKE, I WOULD CYCLE"*

Respondents use different types of bicycles: standard bicycle, e-bike, cargo bicycle, BMX bicycle. However, not every respondent has a bicycle. Many respondents without a bicycle indicated that they would like to cycle if they had one. Respondent 4 indicated that she used to cycle, but now that she does not have a bicycle, she takes the car. However, she often mentions that she enjoys cycling and that if she had a bicycle, she would cycle. She also indicates to be aware of the fact that if she had a bicycle, she would be at work quickly. Yet, she continues to take the car.

> *R4: "If I had a bicycle here, I would cycle. I know I would. I like that...*
>
> *R4: But if I have a bicycle, I cycle to the city or work or whatever. Then I arrive earlier than when I would go by car.*
>
> *R4: No, but then I would go cycling. I don't have a bike here yet, but I would, I like that.*
>
> *R4: But I would cycle. I have always cycled.*
>
> *R4: But then, it is not here. Like this morning, I went to work by car. But if it had been here, I would have gone on my bike. Do you understand?*
>
> *R4: No, but if I had had a bicycle, then you would have the weather, yes I work at the HAN, then I would have cycled to work. I will do that then, I don't mind.*
>
> *R4: No, but if I had a bicycle, I was talking about it the other day, that is just great, ideal. I'll be there in a minute!"*

More respondents emphasise this. They do enjoy cycling once in a while, but they do not buy a bicycle, or they do not cycle. They indicate that they would cycle if they had a good bicycle, if the weather would be nice and if they would be less lazy. They also indicate that they would like to have an e-bike, but these are considered expensive.

Among the respondents who indicated that they did not cycle, all of them (except respondent 14) intend to cycle one day again. They mentioned all kinds of positive things about cycling. They also give reasons why they do not want to cycle now. Respondents 2 and 4 would cycle if they had a bicycle or could park it in their garden. They both indicate that they like cycling and that they work and visit shops within cycling distance. If they had a bicycle, they said they would cycle to town, shop, or work in good weather. They also mentioned that they would like to use their bicycles again one day. Respondent 17 would also like to cycle if she had a better bike. Some respondents already cycle but would like to cycle more, for instance, in their spare time. For example, respondent 18 would like to cycle with her neighbour.

So, there is much intention among the respondents to start cycling (more). However, there are always certain factors that make this problematic. Not being able to cycle leads to the shaping of a negative perception of FCRs as no good experience with cycling can be created.

5.4 GROUNDED THEORY

The abovementioned results are presented in the GT model; 'Space for Perspective' (figure 17). This model presents the theory formed grounded in the data, forming a 'space for perspective'. The model provides space for the perspective from which low SES residents look at the world. Insights into this perspective offer planners and policy-makers a perspective to consider and to critically evaluate future studies and projects. The fact that this model offers space for a perspective that planners and policy-makers can consider is why it has been named as such. This model reflects what shapes the perception and use of FCRs by people with low SES. It is a space where perspective is portrayed.

The fundament of the perception of FCRs by residents with low SES is represented by the key categories: (1) knowledge & awareness, (2) habits & attitudes, and (3) abilities. These key categories are grounded in the data collected in this study and form the fundament of the perception and use of FCRs by low SES residents. Each category consists of different elements, which reflect the perception and characteristics of the focus group. The elements influence the respondents' perception of FCRs positively or negatively.

The elements that underpin the perception and use of FCRs by people with low SES are represented on the model's right. The elements reflect the perspective and character of the focus group. It shows from which point of view the respondents are perceiving FCRs. In this way, it reveals the characteristics of the group and makes this focus group distinctive. The white blocks present the elements that influence the shaping of a negative perception and use of the FCRs. The coloured blocks on the right present the elements that influence the shaping of a positive perception or use of FCRs. They together form the three interrelated key categories, representing the fundament of the perception and use of FCRs by low SES residents.

The model is presented for a better understanding of the perceptions and uses of FCRs by the respondents. Doing so addresses the 'thirdspace', the combination of the 'firstspace' and the 'secondspace', to understand the 'fully lived space'. The firstspace is the environment as conceived by planners and policy-makers, and the secondspace is the environment as perceived by the public. This interaction makes space for insights into shaping the use and perception of FCRs by people with low SES.

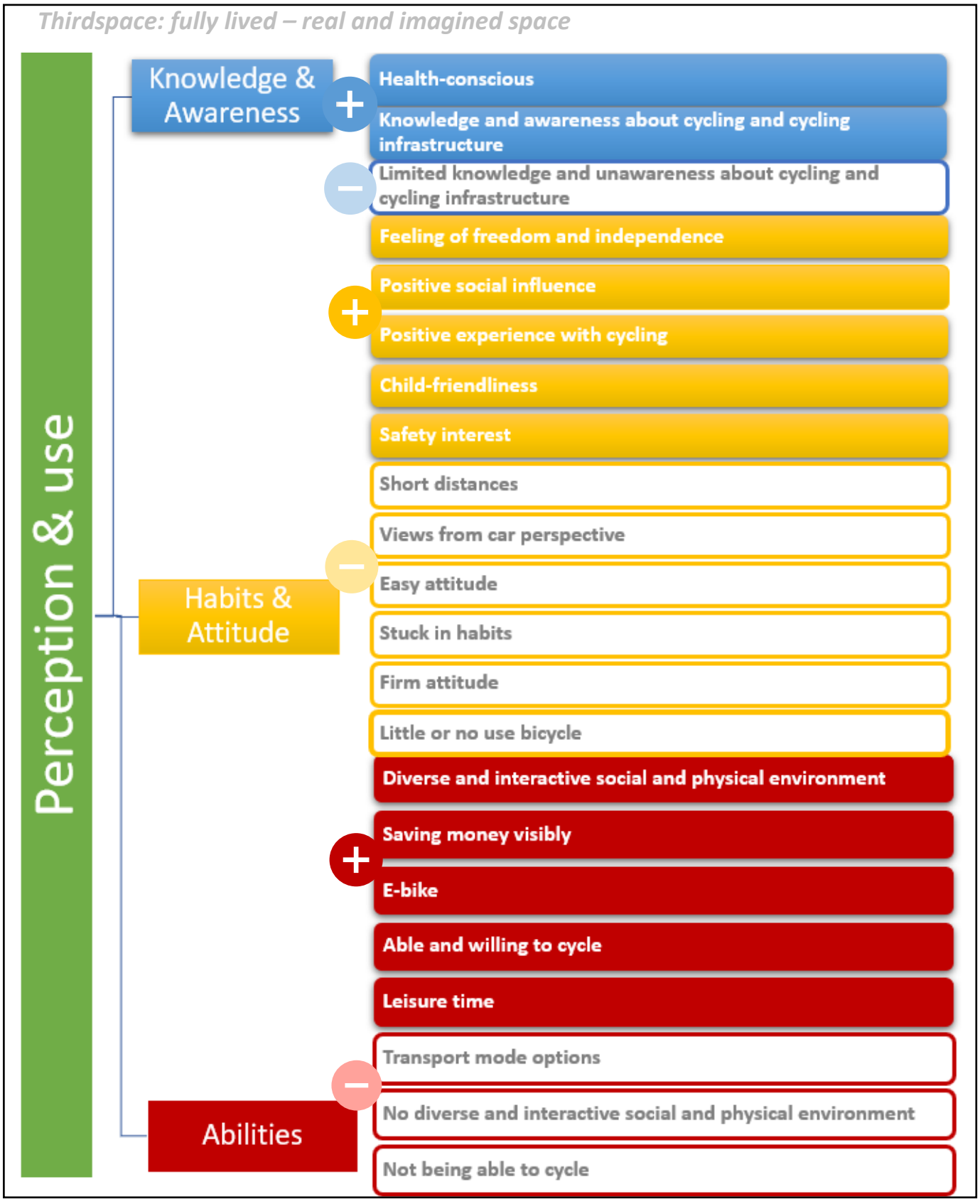


Figure 17. Space for perspective; the perception of FCRs by low SES residents (own figure)

6 CONCLUSION

By answering the two sub-questions, the main question is answered: “How do residents with low SES perceive fast cycle routes, and how is this perception grounded?” These answers can be found in the GT model (figure 17) ‘space for perspective’, which embodies the answers to the research question.

“HOW DO LOW SES RESIDENTS PERCEIVE FAST CYCLE ROUTES?”

This research points out that a two-way division can be made between a positive and a negative perception of FCRs. In general, the majority of the respondents have a positive perception of FCRs. However, some respondents have negative perceptions. The message of this research is that different elements influence these positive and negative perceptions. The elements that influence the shaping of a positive and a negative perception are highlighted on the grounds of key categories formed: (1) knowledge & awareness, (2) habits & attitude, and (3) abilities.

“HOW IS THE PERCEPTION OF FAST CYCLE ROUTES BY RESIDENTS WITH LOW SES GROUNDED?”

The elements that underpin the perception of FCRs by low SES residents are represented in the model ‘space for perspective’. It is a space where the characteristics of low SES residents and their perspective towards FCRs is presented. The model constructs a perspective for planners to look through. This space for perspective is the 'thirdspace', where the ‘firstspace’ and the ‘secondspace’ meet. It shows the interaction of the imagined space and infrastructure by planners and low SES residents' perceived and lived space.

The fundament of the perception of FCRs by low SES residents is founded upon by the key categories: (1) knowledge & awareness, (2) habits & attitudes, and (3)abilities. These three key categories are grounded from the data collected in this study and form the fundament of the perception and use of FCRs by low SES residents. The three main categories represent the main forces involved in shaping perception of FCR.

KNOWLEDGE AND AWARENESS SHAPE THE PERCEPTION AND USE OF FCRS

Firstly, knowledge and awareness are an essential factor in shaping perception and the use of FCRs. Low SES residents do have knowledge about the advantages of cycling and the cycling infrastructure in the neighbourhood and are aware of this. They are also aware of the health benefits of an active lifestyle. Thus, knowledge and awareness are often present, which influences the formation of a positive perception and the use of FCRs.

However, this knowledge and awareness is often limited. People are only partially aware of all developments in the environment or are influenced by selective perception. The downside is that this limited knowledge and awareness influences the shaping of a negative perception and use of FCRs.

HABITS & ATTITUDE SHAPE THE PERCEPTION AND USE OF FCRS

Secondly, the habits and attitudes of low SES residents play a main role in shaping the perception and the use of FCRs. FCRs provide the focus group with freedom and independence, which influences the shaping of a positive perception of the cycling infrastructure. Additional positive experiences of cycling also contribute to this shaping of a positive perception of FCRs. In addition, people have a relatively positive attitude towards cycling and towards each other, which positively influences the social

environment and shapes a positive perception of FCRs. In addition, children and traffic safety play a significant role in this group's life. Their interest in a safe living environment is therefore considerable. These elements influence the shaping of a positive perception and use of FCRs.

On the other hand, certain habits and attitudes influence the shaping of a negative perception and use of FCRs for low SES residents. It appears that low SES residents firmly adhere to their habits. In many cases, these habits are car or scooter oriented. Since there appears a firm attitude and sometimes easy attitude among the people, these habits are not easily changed. In addition, the direct living environment of the residents is often geared towards proximity, wherefore they travel relatively short distances every day. These attitudes and habits influence the formation of a negative perception and use of FCRs.

ABILITIES SHAPE THE PERCEPTION AND USE OF FCRS

Third, the abilities of this group play a crucial role in forming a positive or negative perception of FCRs. The fact that the bicycle is a relatively cheap means of transport, which can visibly save money, positively influences the perception, and use of FCRs. However, it appears that not everyone has the opportunity to use a bicycle. This may be due to financial reasons, but also due to health reasons. Not (being able to) using a bicycle (often) influences the shaping of a negative perception of FCRs. On the other hand, it became clear that having multiple transport possibilities influences the use and the perception of FCRs negatively.

Nevertheless, e-bikes and the possibility to be in a diverse and interactive social and physical environment positively influence the perception and use of FCRs. At the same time, this is also a pitfall, because when this is not available, the perception and use is negatively influenced. Next to that, low SES residents have much intention and are planning to cycle (more) and use the FCRs, which positively influences the perception and use of FCR.

These elements behind the perception and use of FCRs reflect low SES residents' perspectives and provide a new perspective for planners and policy-makers.

7 DISCUSSION

This research highlights three elements that influence the formation of a positive or negative perception of FCRs. In the existing literature on environmental perception and behaviour, these elements are also highlighted. In existing literature, 'attitude and habit', 'knowledge and awareness', and 'abilities' are often used as intermingled drivers behind behaviour and perception in the physical environment or mobility modes. These literary justified elements strengthen the arguments made in this study.

To Illustrate, Maldondo-Hinarejos et al. (2014), argue that attitudinal and perceptual elements influence cycling mode choice. Here, the relationship between behaviour and perception is emphasised, as are attitudes and abilities. Furthermore, Handy et al. (2014) places a strong emphasis on abilities**.** Besides pointing out individual and social factors, he emphasises the importance of distances, infrastructure, bicycle access, equipment, and costs (Handy et al., 2014). In the research of Schneider (2013), awareness, availability, and habits were given an important position in the determination of the mode choice. Furthermore, Acker et al. (2010) find important factors for active mobility in the discrepancy between reasoned and unreasoned influences on behaviour. Also, in the work of Götschi et al. (2017), different socially, physically, and individually related factors are considered to influence active mobility behaviour.

This chapter examines in more detail what has been written in the existing literature about the key categories with their elements that have emerged from this study and discusses how this relates to this study.

7.1 ATTITUDE AND HABITS DISCUSSED

Considering the grounded theory, the respondents' easy and cool attitude causes a more negative perception of FCRs and more use of the car or scooter. Steg (2005) in (Scheepers et al., 2013) confirms this relationship. She discusses the fact that using the car is based not only on instrumental values but also on status or appearance. She found that *"especially lower income persons judged cars more favourably than higher income groups"* (Scheepers, et al., 2013). This is also reflected in this study, where the car and scooter were often seen as luxurious and convenient, sometimes as a status symbol, and perceived cooler than the bicycle.

However, this was not always the case. The respondents were very adamant about not being influenced (or not wanting to be influenced) by others or the environment when it came to transport choice. Scheepers (2016) states that environmental factors hardly influence transport choice, which confirms this attitude.

According to Pol (2014), a person's impact on one's behaviour and choices is derived from attitude, personal values and norms, self-efficacy, and intrinsic and extrinsic motivation: *"An attitude is the positive or negative overall judgement regarding certain behaviour"* (Pol, 2014, n.d.). This positive or negative attitude is determined by what a person thinks and feels about a specific situation.

Azjen (1991) states in the Theory of Planned Behaviour that attitudes and intentions influence behaviour. Of the respondents who do not or hardly ever use a bicycle, many (especially the non-young ones) indicated that they intend to start cycling at some point. According to Ajzen's (1991) theory of planned behaviour, the individual aim is a central factor to perform a in a certain way. "*Intentions are assumed to capture the motivational factors that influence a behaviour; they are indications of how*

hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour" (Ajzen, 1991, p. 181). As there is often the intention to start cycling (again), it turns out that there is still a factor missing to go from intention to behaviour (Ajzen, 1991). These elements are visualised in the model, where it turns out that different elements influence the use and perception of FCRs.

Yet, the SOR-model (Stimulus, Organism, and Respons) of van Hagen & Govers (2019) confirms that positive social influences affect the formation of positive perceptions and use of FCRs. Even though respondents indicated that people do not influence them in their environment, this sometimes appears to be the case. For example, when using the e-bike. This behaviour can be supported by the SOR-model (Stimulus, Organism and Response) by Mehrabian & Russell (1974) in van Hagen & Govers (2019), which states that emotions, influenced by environmental stimuli, influence people's behaviour.

Next to that, the grounded theory also shows that remaining stuck in habits plays a role in shaping a negative perception of FCRs. The relation of FCR perception and habits is in line with Scheepers (2016), who states in her research that means of transport choice and route choice are habitual behaviours and that interventions aimed at stimulating travel with active forms of mobility should take this into account. The argument is also in line with human geographer David Seamon's 'body-ballet', with which he deals with the habits of people. Seamon believes that "*most everyday movement takes the form of habit*" (Cresswell, 2014, p. 63). According to Seamon, people drive same route to school or their work every day unconsciously. These movements originate below the level of conscious scrutiny: "*There is an inherent capacity of the body to direct behaviours of the person intelligently, and thus function as a special kind of subject which expresses itself in a pre-conscious way usually described by such words as 'automatic', 'habitual', involuntary', and 'mechanical'*" (Seamon, 1980, p.155 in Cresswell, 2014, p. 63). Barton et al. (2015) also argue that new choices are not made every day due to cognitive load, available time, and previous experiences: "*Hence habit will be used to short-cut to the 'assumed' most appropriate option*" (Barton et al., 2015, n.d.). This literature substantiates the findings in this study, where it is strongly argued that habits dominate over cycling infrastructure facilities in the neighbourhood.

7.2 KNOWLEDGE & AWARENESS DISCUSSED

According to Robbins and Judge (2013), the best decision-maker is a rational decision-maker who can maximise specific values within defined limits. The rational decision-making model assumes that the decision-maker has full knowledge, is able to recognize all relevant possibilities without bias, and chooses the most valuable option. In practice, most decision-making processes do not adhere to the rational model. People are generally satisfied with a satisfactory solution to a problem, not with the optimal solution. People often weigh up only a few options and choose the first option that seems satisfactory, leading to symptom relief. According to Robbins and Judge (2013), the most important decisions are made based on personal judgement rather than according to a fixed and logical method. Most people are unaware that they are making suboptimal decisions (Robbins & Judge, 2013).

This argument on limited information underpins the findings in this study about the behaviour of respondents based on the level of knowledge they have. Many respondents have never explored cycling infrastructure in their area or the most optimal way to travel. This limited knowledge and awareness explains why many of the respondents remain stuck in their old habits. They are satisfied

with this or do not know better. On the other hand, the respondents are well aware of the FCRs in their surroundings and also have knowledge about these cycle infrastructures. However, this knowledge and awareness is often limited. This limited knowledge and unawareness is a element wich influences the perception of FCRs in a negative way.

The available knowledge is built up from experiences and information from the past, whereby new knowledge is integrated or absorbed into existing knowledge (Pol, 2014). Certain knowledge and awareness about FCRs that influence the use and perception are based on this past experiences and information.

The human brain always and immediately intuitively links a positive or negative emotional value to everything it perceives. This connection happens in a fraction of the time it takes for the brain to make a consciously reasoned decision. So, people already have a positive or negative feeling about something, even before they have consciously thought about it. This means that the feeling already influences the reasoning and considerations that are made in the selection process (Pol, 2014). This fast linking of a positive or negative emotional value explains that many respondents say they do not know anything about FCRs or say they do not use FCRs, but it turned out to do so during the interview process. People often only include information that supports the preferred option in making choices. This is called 'retrospective rationalisation' (Pol, 2014). Retrospective rationalisations explain why often exposing oneself to information leads to a positive attitude about the subject of that information. This is called the 'mere exposure effect'. Just by repeating something often, the brain develops a positive attitude (Pol, 2014). This mere exposure effect was reflected in the results. At the end of the interview, respondents were often more interested in FCRs or cycling than before the interview. The respondents who had more experience and knowledge about cycling infrastructure generally had a positive perception. And the respondents who looked at it from a car perspective more often had negative perceptions. In this way, the mere exposure effect illustrates the influence of experience with cycling and FCRs on the shaping of a positive or a negative perception of FCRs.

According to Kirk et al. (1976), more knowledge encourages people to think about other behaviour. By increasing the knowledge and awareness of FCRs, the 'stimulus of information' creates an 'intervening process', making people think about their behaviour and subsequently do something with it (Kirk, 1963 in Patricios, 1976). More or different use of cycle infrastructure creates environmental stimuli, which in turn changes behaviour, leading to a change in perception (van Hagen & Govers, 2019; Mehrabian & Russell, 1974).

On the other hand, Scheepers (2016) argues that merely providing information is insufficient to encourage individuals to change their behaviour, primarily since people do not process all information when choosing. As a result of the fact that transport behaviour is habitual, a person may fail to discover improved substitutes due to his or her beliefs that lower the attentiveness to such information. This distortion, therefore, reduces the impact of information campaigns and helps to maintain existing behavioural patterns. The fact that providing information to encourage behavioural change is insufficient, emerges from the model formed in this study. It has become clear that not only (limited) knowledge and awareness influences the formation of positive or negative perceptions and use of FCRs. To break change the behaviour and perception, other elements presented in the model should be considered.

7.3 ABILITIES DISCUSSED

The way people act in place cannot always be seen as free will. "*Some actions are freer than others, and it is, therefore, necessary to take into account restraints on activities that are the product of social hierarchies and power relations within society*" (Cresswell, 2014, p. 65). This ties in with the fact that some respondents are not able to cycle, which is a driver behind forming a negative perception of FCRs. As highlighted in the research and confirmed by Cresswell (2014), this limitation in abilities should be considered when looking at the perception of FCR of low SES residents.

The effect of abilities on shaping perception is also reflected in the pyramid of van Hagen & Govers (2019) (figure 18). According to the 'dare, able to, and willing to cycle' model of van Hagen & Govers, cyclists first need to feel safe before they dare to cycle. Not daring to cycle is not often mentioned in the interviews. According to the respondents, the current bicycle infrastructure often suffices in terms of safety. Especially when looking at FCRs, these are experienced as very safe. Next, according to the model, the infrastructure should be designed so that it is possible to cycle quickly and easily. According to the respondents, this is often sufficient. However, the problem occurs that people do not have a bicycle or cannot cycle due to health reasons. When this is the case, one cannot 'want' to cycle either. No matter how attractive the surroundings are.

On the other hand, some respondents do not cycle but could. For this group, the trick is to entice them to cycle more often or over longer distances. The environment then has to be so attractive that people want to cycle there too. According to respondents, this is not always the case. FCRs are considered somewhat dull and monotonous by some respondents. Although they can cycle well on FCRs, attractiveness often turns out to be more critical. Therefore, by focusing more on attractive surroundings that correspond to the wishes of this group, more people could be enticed to cycle (more often). In this sense, the pyramid of van Hagen & Govers (2019) confirms the influence of not being able to cycle, little or no use of the bicycle, and the influence of no diverse and interactive social and physical environment on the formation of use and perception of FCR.

Figure 18. Dare, able to, and willing to cycle (van Hagen & Govers, 2019)

The literature above is in line with the grounded theory developed in this study, which represents how residents with low SES perceive FCRs, and what drives the formation of positive and negative perceptions. It offers more depth and more concrete applicability for this specific group than the

existing literature. In addition, it also gives insight into the differences between the conceived and the fully lived space.

7.4 CONCEIVED VS. FULLY LIVED

The difference between the conceived space and the perceived and lived space is highlighted in this research. The main requirements for a FCR, conceived by planners and policy-makers, include the following:

1. *Coherence: FCRs form the backbone of the regional cycle network.*
2. *Directness: FCRs provide a direct connection between the main origins and destinations on a regional scale.*
3. *Attractiveness: FCSs are attractively integrated into their surroundings so that both users and the surrounding area experience the added value and positively experience the route.*
4. *Safety: FCRs offer the opportunity to travel largely unhindered.*
5. *Comfort: FCRs are sufficiently broad for safe and smooth surpassing and meet the highest quality requirements regarding flatness and roughness of the roadway* (CROW, 2014).

The requirements three to five of FCRs, are considered the most important by low SES residents. These three requirements have the most impact on the shaping of positive or negative perceptions.

Number three ‘attractiveness’ is considered important, as the importance of a diverse and interactive social and physical environment plays a vital role in forming a perception of FCRs. Respondents prefer to be in an environment with social interaction and a diverse landscape. Numbers one and two, ‘directness’, and ‘coherence’, are less critical to low SES residents, whereas planners and policy-makers consider these requirements necessary. Having a chat with a person along the road or getting an ice cream with children is more complicated when cycling infrastructure focuses on the directness of coherence. An underlying reason for the low SES respondents finding coherence and directness less important is that the respondents mainly travel short distances daily. Planners and policy-makers design FCRs to cover relatively long distances of 5 to 30 kilometres. However, requirements number four ‘safety’ and number five ‘comfort’ are undoubted of great importance to the respondents. Respondents prefer to navigate through traffic unhindered and free of bumps, whereby the respondents indicate that FCRs are of great help.

Of the five requirements that planners and policy-makers believe FCRs should meet, ‘attractiveness’, ‘safety’ and ‘comfort’ are essential for low SES residents.

8 RECOMMENDATIONS, REFLECTION AND LIMITATIONS

In this section, recommendations for the research are given (8.1), and the research is reflected on where limitations are discussed (8.2).

8.1 RECOMMENDATIONS

In the next section, recommendations are given for practice (8.1.1) and subsequent research (8.1.2).

8.1.1 PRACTICE

This research provides a perspective into how planners could conceptualise FCRs and other infrastructure in future city planning. This perspective provides guidance for making FCRs and other infrastructure as accepted and accessible as possible for this group in society. It contributes to insights for planning future active and sustainable infrastructure, for providing a healthy and sustainable environment for all members of society.

Evaluating the ideas planners and policy-makers have for FCRs, with the perception and use of FCRs by low SES residents, a notable difference in interest appears. Since the purpose of FCRs, to easily cover longer distances by bicycle, does not fully match the purpose low SES residents have when they go cycling, it can be concluded that FCRs might not necessarily be designed for this specific group. However, some important requirements of FCRs are considered necessary by low SES. Even though the designers of FCRs might not have the same interests as low SES residents, these insights in perception and use of FCRs by SES residents do offer perspective for future policies and projects.

For instance, considering the interest of low SES residents in future (fast) cycling infrastructure implementation could result in more use of bicycles for this group. Since it appeared that this group prefers to cycle safely and comfortably in beautiful surroundings with much social interaction, this may be taken into account in the implementation of new cycling infrastructure projects.

These insights may also help in the participation, communication, marketing, and behavioural approach in future projects. Now that planners and policy-makers know what is important for low SES residents at the start of a project, it is clear what can be anticipated, and consensus can be reached more quickly.

Furthermore, the insights obtained in this study can contribute to bicycle stimulation projects to determine the appropriate actions for encouraging bicycle use. Because these results show how low SES residents look to cycling and their environment, stimulating bicycle projects can be easily anticipated. The elements that influence the shaping of a positive and negative perception and use of FCRs must be challenged to change this pattern. As this model represents practical and manageable elements, finding the right point to interrupt this pattern is facilitated. In addition, this study shows that stimulating bicycle use among this target group is a matter of strengthening motivation. Resistance does not necessarily have to be overcome. To achieve this motivation strengthening, all the elements from the grounded theory can be considered.

Another recommendation for planners and policy-makers of this research is to focus more on the knowledge and awareness of low SES residents. Focussing on knowledge can be done both physically and socially. More attention could be paid to clear wayfinding on the streets for cyclists. The cycling possibilities should stand out and should be understandable for everyone. For instance, the direction

of a cycle path should be clearly indicated, how far it is, but most importantly, it should be clearly indicated that there is a cycle path to be followed. In addition, awareness-raising campaigns about cycling infrastructure in the neighbourhood and the benefits that come with it can be considered. Awareness-raising can be done in a local newspaper, social media, community centre, schools and sports clubs, etcetera.

8.1.2 RESEARCH

For subsequent research, it would be interesting to carry out a similar study in a neighbourhood along FCRs with high SES or a neighbourhood with low SES where there are no FCRs in the neighbourhood to determine where the differences lie. As a result of this grounded theory study, which formed a 'space for perspective' for FCRs, other target groups and other places can be studied more effectively in the future. This model facilitates this process by providing specific elements that influence the formation of the perception of FCRs.

In addition, this research can be used in qualitative research. These research findings form a structure for the researcher on which the methods can be adapted. For instance, the grounded theory element can form a guideline for a future interview guide.

Finally, this research can contribute to quantitative research, where the model can serve as a guideline. In this way, the model can be applied on a larger scale to research the stimulation of cycling or the improvement of cycling infrastructure.

8.3 REFLECTION AND LIMITATIONS

In this study, the ability of the researcher herself to interpret things was crucial. This interpretability ensures that different interpretations may be made when another researcher repeats the research. This could be connected to the researchers' background knowledge and personality. Every researcher notices different details and aspects of data. It should therefore be mentioned that the researcher's knowledge and interpretation may bias this study.

Nevertheless, by being clear in the use of methods and by being open about the role of the researcher, these limitations are evident in advanced to be considered in subsequent research (Vennix, 2011). The fact that the researcher kept an open mind while conducting the in-depth interviews, asked open questions, and tried to steer as little as possible with questions, also contributes to the reliability of the study. The researcher was open to surprise to collect as much new information as possible. By using a topic list with several example questions, the researcher maintained the focus of the conversation. Furthermore, by using the constant comparative method, the researcher was forced to unfreeze thinking and shape new thoughts, resulting in a theory with less researcher bias. The grounded theory is prone to be empirically valid due to the level of validation through constant comparison. The data has been examined throughout the whole process. This makes the data 'closely mirror reality' (Eisenhardt, 1989, p. 547). Due to this tight link between the theory and the data, the theory can be used by following studies, for further testing and development (Eisenhardt, 1989).

In this study, 23 respondents were interviewed, spread over ten interviews. After having interviewed these 23 respondents, theoretical saturation was reached. Sufficient in-depth insights had been obtained within the delimited topic to answer the research questions and hardly any new information

was obtained. This contributes to the validity of the research. However, this theory, created from a small sample of participants, can hardly represent the perceptions of everyone around the world. Nevertheless, this theoretical framework developed from the grounded theory study can steer potential quantitative studies by indicating variables to be researched and research questions and outlining the research findings (Corbin & Strauss, 2014). In addition, to determine if the theory could be generalised to different populations, this theory could be tested for empirical verification with quantitative research (Creswell, 2014, p.89).

The following should then be mentioned. That is, the fact that the interviews were conducted on sunny summer days. If the interviews had been conducted in winter or with poor weather conditions, this might have impacted the respondents' answers. In addition, the interviews in this study were conducted on a focus group of 'adults'. In retrospect, there was a difference visible in the answers given by younger and older adults. The age differences could be considered in future studies. Another issue worth mentioning is that the focus group in this study was 'low SES residents'. However, the case of this study is a working-class neighbourhood in which the respondents all have a Dutch background. A neighbourhood where residents with low SES live with many people with a migrant background could lead to considerably different results.

Last but not least, a lesson the researcher learned from this work is that it is advisable to switch off the recording of an interview only once the interview has been completed. It turned out that many respondents still gave useful information during the post-interview conversation. In addition, it became clear to the researcher how to deal with different focus groups. During the interviews with residents of the Kolping neighbourhood, it appeared to her that this target group is best approached as personally as possible. Low SES residents were best approachable from a personal point of view rather than as organisation's employee. These lessons learned are something to bear in mind for follow-up research.

Finally, it is essential to note that this study was conducted during the covid-19 pandemic. The measures in place at the time of the research may have influenced the results of this study.

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APPENDIX

APPENDIX A: PICTURES KOLPING NEIGHBOURHOOD AND FAST CYCLE ROUTES

Photo's in and around the Kolping neighbourhood, Nijmegen (Cyclomedia, 2020):


Dukenburg 2
Wijchen 8
Grave 12
F173b
Centrum 3
F173b
Heyendaal 3
Beuningen 6
13
24
45

APPENDIX B: INTERVIEW INFORMATION

Number of interviews: 10

Number of respondents: 23; 14 female/ 9 males

Location: Kolpingbuurt, Nijmegen

Background respondents: Dutch

Age of respondents: between 20 and 69

Work/education: Low SES

Interview-number	***Date***	***Time***	***Gender***	***Age***
1	4-8-2020	13.00u	1 Woman	32
2	5-8-2020	15.00u	3 Women	50, 64, 54
3	12-8-2020	14.00u	1 woman + 1 man	69
4	12-8-2020	16.00u	4 men	Between 25 en 55
5	12-8-2020	17.00u	1 woman	61
6	19-8-2020	15.30u	2 women + 1 man	50, 20, 25
7	20-8-2020	10.00u	1 woman	44
8	20-8-2020	19.00u	4 women + 1 man	54, 52
9	15-9-2020	19.00u	1 woman + 1 man	64 en 65
10	16-9-2020	16.00u	1 man	60
			Total: 23	
			Men: 9	
			Women: 14	

Interview -number:	*Background*	*Educational level*
1	Dutch	MBO
2	Dutch	High school
3	Dutch	Mavo
4	Dutch	MBO or high school
5	Dutch	High school
6	Dutch	Administration /VMBO-basic Security / VMBO-basic nursing
7	Dutch	MBO
8	Dutch	High school
9	Dutch	High school
10	Dutch	High school

Interview-number:	*Work*
1	Health and care
2	-, -, Cleaner
3	Former entrepreneur
4	Roofer
5	Former housekeeper/ cooking assistant nursing home, now incapacitated
6	Housewife/student MBO/Local fast-food restaurant
7	Doctor assistant
8	Cleaner, health and care, postman
9	Former housewife and truck driver/welder, now voluntary work
10	Former factory worker, now incapacitated

Interview-number:	*Household*	*Location interview*
1	2 adults + 4 children	Kolping

2	2 adults + 1 child/ alone/ 2 adults	Kolping
3	2 adults	Kolping
4	-	Kolping
5	Alone	Kolping
6	-	Kolping
7	1 adult, 3 children	Kolping
8	2 adults	Kolping
9	2 adults	Kolping
10	2 adults	Kolping

Interview-number:	***Duration interview (min.)***
1	45
2	50
3	40
4	20
5	25
6	40
7	20
8	30
9	30
10	30

APPENDIX C: TOPIC LIST; UNSTRUCTURED INTERVIEW GUIDE (DUTCH)

Let op! Ik wil leren van dit gesprek! Open vragen! Niet te veel mening! Laat de respondenten vertellen en zorg voor een prettig gesprek! Goed luisteren en doorvragen! Praat over gebeurtenissen in plaats en tijd/ concreet!

Thema's met mogelijk voorbeeldvragen:

1. **Vervoer/fietsen algemeen:**
    a. *Kunt u mij wat vertellen over de laatste keer dat u hebt gefietst? Waarheen/met wie/ hoe ver/ wanneer?*
    b. *Hoe was dat?*
    c. *Waarmee verplaats u zich het meest? Waarmee reist u het meest?*
    d. *Waar gaat u dan naartoe? Hoe ver?*
    e. *Waarom kiest u daarvoor?*

2. **Sociale omgeving & fietsen:**
    a. *Op welke manier komt fietsen voor in hoe u bent opgegroeid?*
    b. *Hoe komt fietsen voor in het leven van uw kinderen?*
    c. *Op welke manier verplaatsen mensen zich in uw omgeving/hier in de buurt?*
    d. *Welke invloed heeft uw sociale omgeving op fietsen?*
    e. *Welke invloed hebben normen en waarden op fietsen?*

3. **Fysieke omgeving & fietsen:**
    a. *Stel, een belangrijk persoon zou hier op visite komen en met u een stuk gaan fietsen. Waar zou u dan heen gaan? En waarom?*
    b. *Kunt u mij wat vertellen over de fietsroutes in uw omgeving?*
    c. *Welke invloed heeft de fysieke omgeving op fietsen?*
    d. *Als u de plannen mocht maken voor de inrichting van uw buurt, wat zou u dan veranderen met betrekking tot infrastructuur? En fietsinfrastructuur/ snelfietsroutes?*
    e. *Welke invloed hebben fietspaden uw fietservaring/fietsgebruik?*
    f. *Welke invloed heeft natuur op uw fietservaring/gebruik?*
    g. *Hoe kiest u uw route uit? Wat is hierbij belangrijk?*
    h. *Welke invloed heeft de snelfietsroute op uw fietservaring/fietsgebruik? Wat is hierbij belangrijk?*

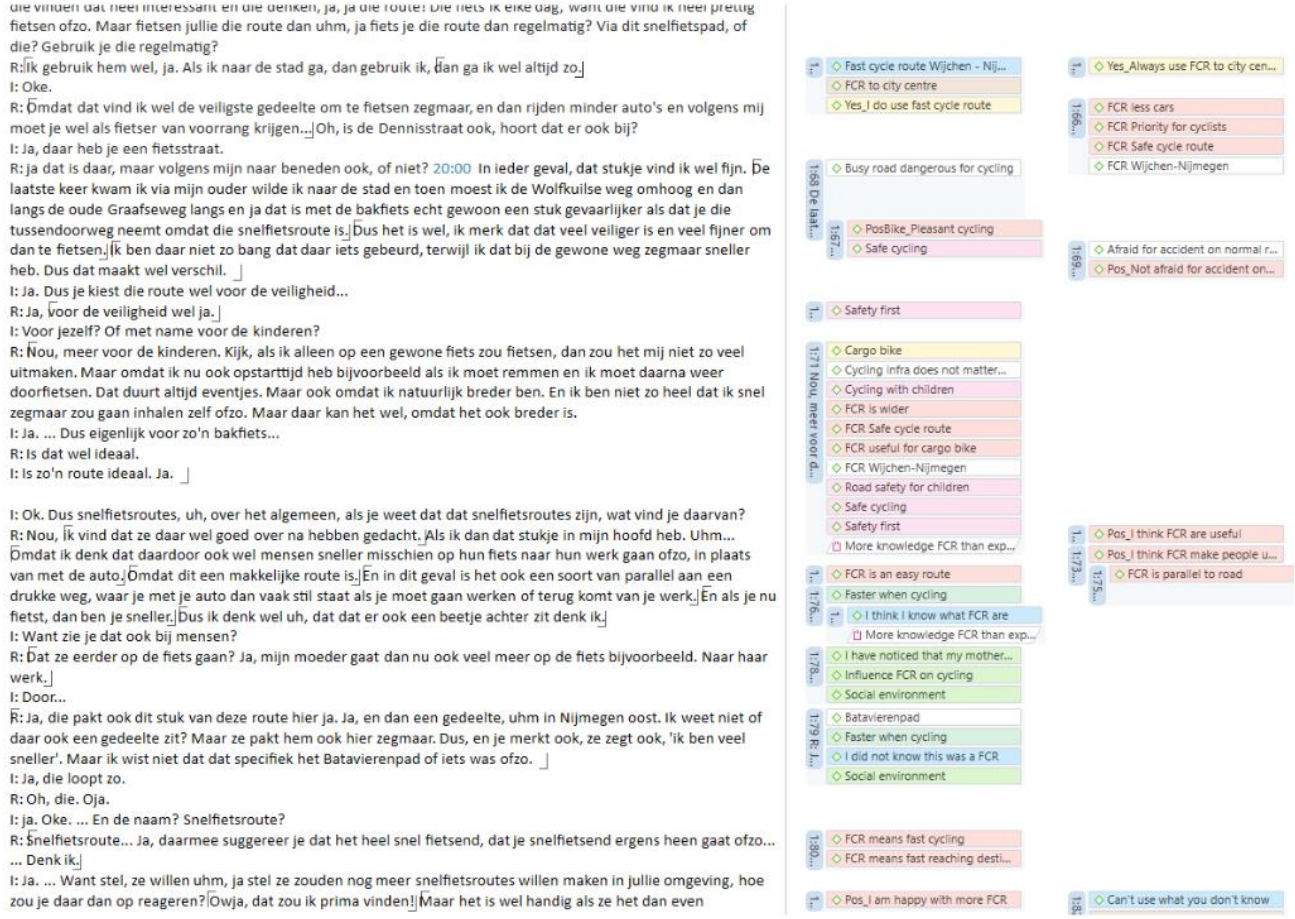
4. **Snelfietsroutes**
    Batavierenpad Zuid (Beuningen – Heyendaal) & route Wijchen – Nijmegen
    a. *Kunt u mij wat vertellen over de snelfietsroute Batavierenpad Zuid en/of de route Wijchen – Nijmegen?*
    b. *Hoe ziet een snelfietsroute eruit? Waar zijn ze voor?*
    c. *Kunt u mij vertellen over de laatste keer dat u over een van de snelfietsroutes fietste? Wat viel u op? Hoe voelde u zich? Waar ging u heen? Met wie? Hoe ver? Wat voor weer was het?*
    d. *Wat is uw ervaring met snelfietsroutes? Waarom?*
    e. *Hoe zou u de snelfietsroutes omschrijven/ aanbevelen aan iemand die ze nog niet kent?*

5. **(Corona)**
    a. *Welke invloed heeft corona op uw manier van verplaatsen?*
    b. *Welke invloed heeft corona op uw manier van bewegen?*
    c. *Ziet u verschil met voor en tijdens corona?*

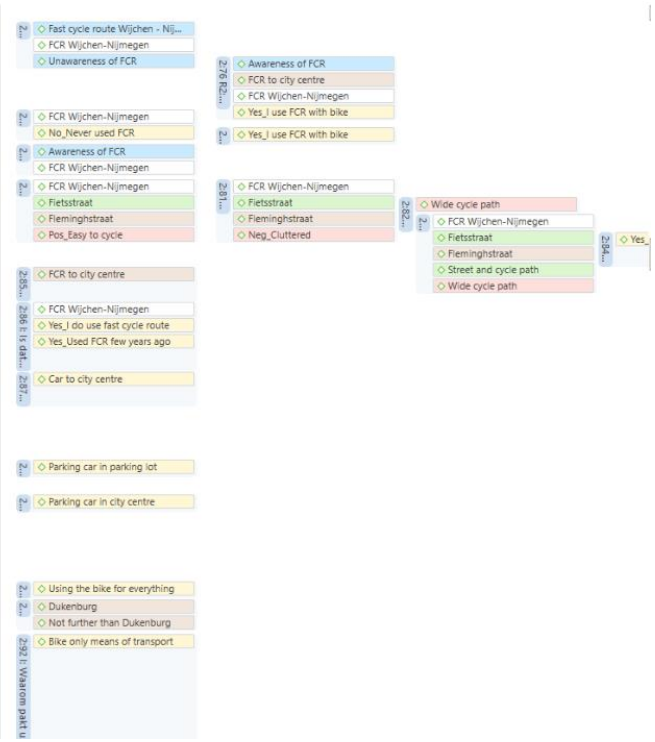
6. **Persoonlijke informatie:**
    a. *Naam:*
    b. *Leeftijd:*
    c. *Achtergrond:*
    d. *Opleiding:*
    e. *Werk:*
    f. *Huishouden:*
    g. *Etc.*

APPENDIX D. CODE BOOK

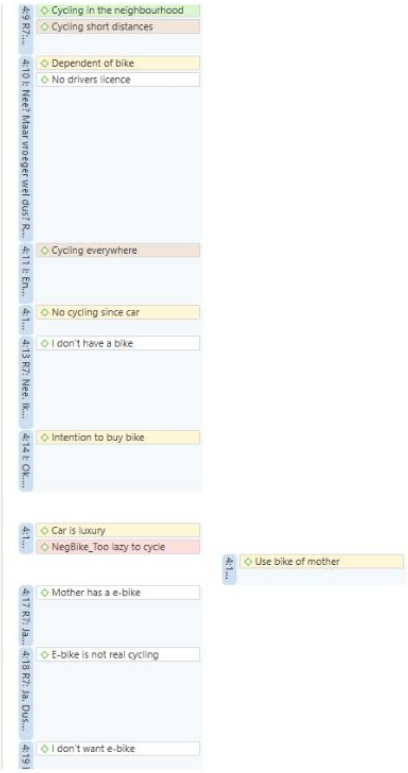
Open coding examples:



I: Of die van Wijchen naar Nijmegen... Hebben jullie daar wel eens op met de fiets op gefietst?
R2: Wijchen naar Nijmegen? Wat is... Welke is Wijchen naar Nijmegen?
I: Dat is die aan die kant van het spoor. Die waar de auto te gast is.
R2: Oh die hier... Je bedoelt de Fleminghstraat?
I: Ja.
R2: Ja, daar heb ik wel eens gefietst! Daar fietste ik wel eens als ik naar de stad fietste ofzo.
R4: Ikke niet! Ik heb die nog niet gefietst.
R2: Ja, daar heb ik wel eens gefietst.
R4: Maar ik ken het wel hoor!
I: En wat vinden jullie daarvan?
R2: Daar kan goed... Dat zeg ik, als fietser kan je daar goed fietsen! Alleen je moet bij sommige stukjes is het onoverzichtelijk en dan zie je niet of er auto's tegemoetkomen. Maar opzich kun je daar goed fietsen hoor! Is een breed fietspad. Het is eigenlijk een weg, maar het is een fietspad, dus hij is breed.
I: Oké... Dus u heeft er wel eens gefietst...
R2: Ja.
I: En waar ging u toen naar toe?
R2: Naar de stad, naar het centrum. Ja...
I: Is dat lang geleden?
R2: Ja, een aantal jaar ja. Een jaartje of drie denk ik, vier, vijf.
I: Een tijdje terug.
R2: Ja, wel lang.
I: Dus nu met de auto naar de stad?
R2: Ja.
I: En de auto dan ergens parkeren...
R2: Dat denk ik wel he! Daar kan je niet mee het centrum in haha!
I: Haha, ja in een parkeergarage of?
R2: Ja in een parkeergarage. Waar moet je hem anders zetten in de stad?
I: Ja, een beetje buiten het centrum...
R2: Nee, ik zet hem altijd in het centrum.
I: Oké...16:05
...
R2: Maargoed, (naam R3) jij bent degene die het meeste fietst! Jij fietst altijd!
R3: Ja dag! Ik fiets niet veel!
R2: Jij doet alles met de fiets!
I: Ja, maar alleen in Dukenburg! Want verder kom ik niet. Alleen hier!
R2: Wij nooit!
I: Waarom pakt u makkelijk de fiets?
R3: Ja, dat is m'n enigste vervoer!
I: Ja.
R3: Ik heb niks ander haha!
R2: Haha
R3: Dus ik moet wel op de fiets haha.



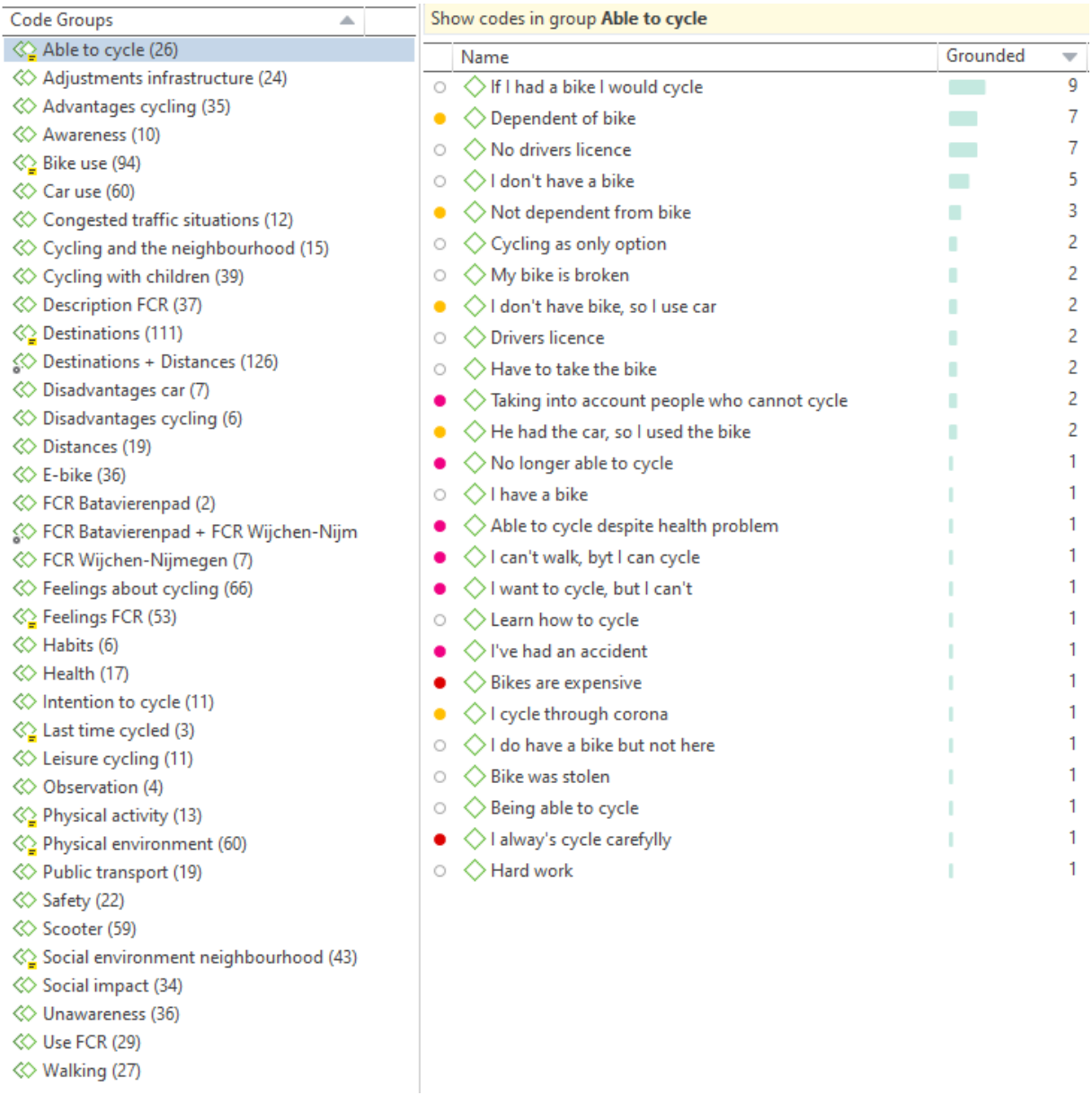
R7: Maar, af en toe wel eens gewoon hier de fiets gepakt, maar niet uh, dat ik echt op de fiets ga eigenlijk.
I: Nee? Maar vroeger wel dus?
R7: Vroeger wel ja.
I: Waarom vroeger wel?
R7: Ja... Dat was makkelijker hé. Moest op de fiets.
I: Ok.
R7: Kon niet he, had nog geen rijbewijs.
I: En waar fietste ja dan naartoe?
R7: Overal. Naar school. Overal.
I: Ok. En nu, omdat je dus een auto hebt, pak je de fiets niet meer.
R7: Nee. Ik heb niet eens een fiets.
I: Je hebt geen fiets?
R7: Nee.
I: Ok. En denk je dat je die ooit nog wel gaat kopen?
R7: ... Misschien wel. Later.
I: En waarom later dan?
R7: Ja, geen zin om te fietsen haha. Beter met de auto!
R8: Hij pakt de fiets van mama wel.
R7: Ja, Ok! Maarja, nou is het tegenwoordig ook elektrische fiets enzo.
R8: Ons moeder heeft elektrische fiets. Die pakt hij. 02:43
R7: Ja. Dus dat is ook niks. Dat is ook niet fietsen. Noem ik dat.
I: Oh... Nee? Hoezo niet?
R7: Ja... Gaat allemaal vanzelf toch? Hoef je niks te doen.
I: Dus dat zou je wel willen?

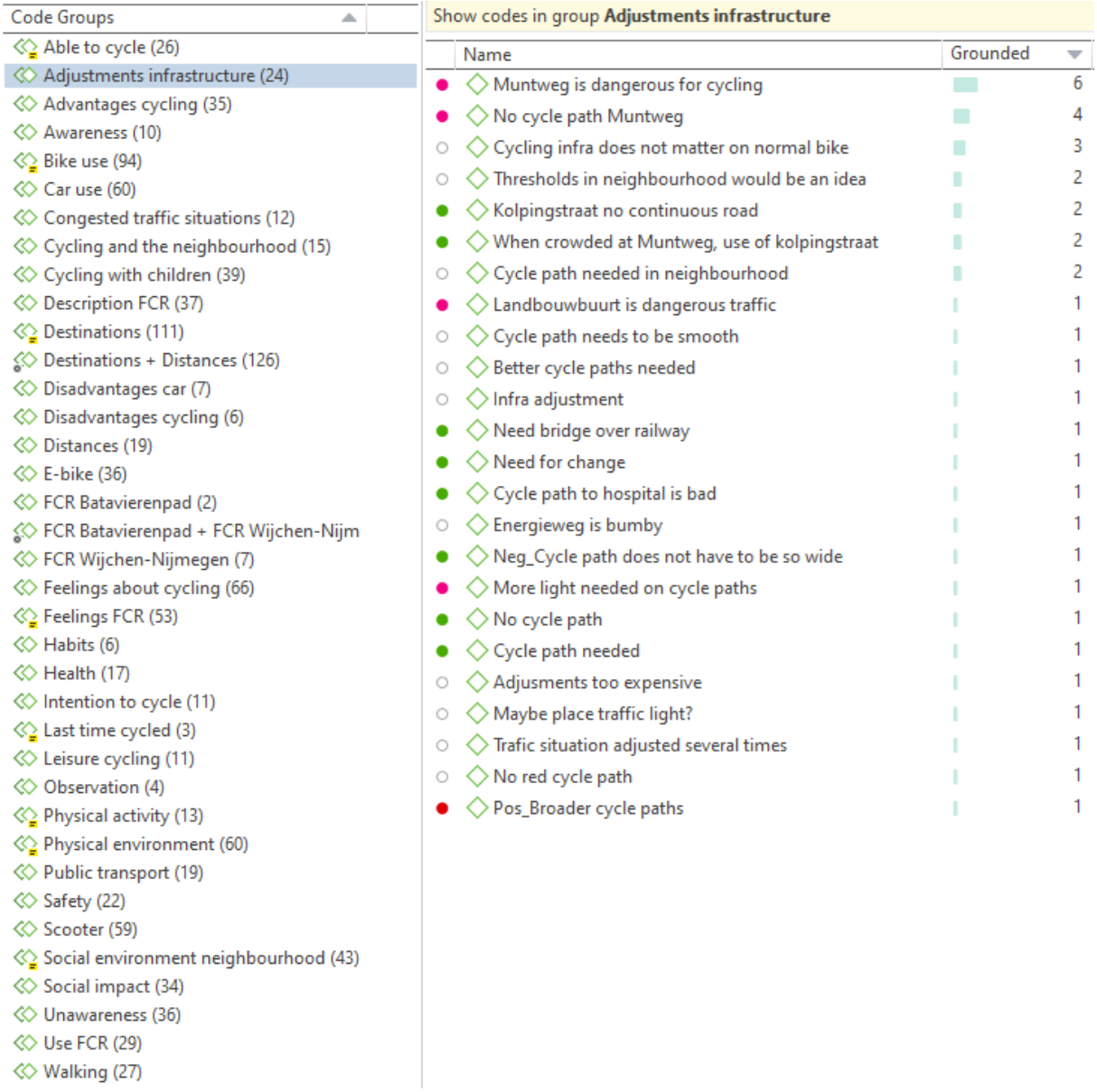


Code groups:

Name	Size
Destinations + Distances	126
Destinations	111
Bike use	94
Feelings about cycling	66
Car use	60
Physical environment	60
Scooter	59
Feelings FCR	53
Social environment neighbourhood	43
Cycling with children	39
Description FCR	37
E-bike	36
Unawareness	36
Advantages cycling	35
Social impact	34
Use FCR	29
Walking	27
Able to cycle	26
Adjustments infrastructure	24
Safety	22
Public transport	19
Distances	19
Health	17
Cycling and the neighbourhood	15
Physical activity	13
Congested traffic situations	12
Leisure cycling	11
Intention to cycle	11
Awareness	10
FCR Batavierenpad + FCR Wijchen-Nijmegen	9
FCR Wijchen-Nijmegen	7
Disadvantages car	7
Habits	6
Disadvantages cycling	6
Observation	4
Last time cycled	3
FCR Batavierenpad	2

Example of the codes in groups:





Code Groups

- Able to cycle (26)
- Adjustments infrastructure (24)
- Advantages cycling (35)
- Awareness (10)
- Bike use (94)
- Car use (60)
- Congested traffic situations (12)
- Cycling and the neighbourhood (15)
- Cycling with children (39)
- Description FCR (37)
- Destinations (111)
- Destinations + Distances (126)
- Disadvantages car (7)
- Disadvantages cycling (6)
- Distances (19)
- E-bike (36)
- FCR Batavierenpad (2)
- FCR Batavierenpad + FCR Wijchen-Nijm
- FCR Wijchen-Nijmegen (7)
- Feelings about cycling (66)
- Feelings FCR (53)
- Habits (6)
- Health (17)
- Intention to cycle (11)
- Last time cycled (3)
- Leisure cycling (11)
- Observation (4)
- Physical activity (13)
- Physical environment (60)
- Public transport (19)
- Safety (22)
- Scooter (59)
- Social environment neighbourhood (43)
- Social impact (34)
- Unawareness (36)
- Use FCR (29)
- Walking (27)

Show codes in group **Adjustments infrastructure**

Name	Grounded
Muntweg is dangerous for cycling	6
No cycle path Muntweg	4
Cycling infra does not matter on normal bike	3
Thresholds in neighbourhood would be an idea	2
Kolpingstraat no continuous road	2
When crowded at Muntweg, use of kolpingstraat	2
Cycle path needed in neighbourhood	2
Landbouwbuurt is dangerous traffic	1
Cycle path needs to be smooth	1
Better cycle paths needed	1
Infra adjustment	1
Need bridge over railway	1
Need for change	1
Cycle path to hospital is bad	1
Energieweg is bumby	1
Neg_Cycle path does not have to be so wide	1
More light needed on cycle paths	1
No cycle path	1
Cycle path needed	1
Adjusments too expensive	1
Maybe place traffic light?	1
Trafic situation adjusted several times	1
No red cycle path	1
Pos_Broader cycle paths	1

Code Groups
Able to cycle (26)
Adjustments infrastructure (24)
Advantages cycling (35)
Awareness (10)
Bike use (94)
Car use (60)
Congested traffic situations (12)
Cycling and the neighbourhood (15)
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Description FCR (37)
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Observation (4)
Physical activity (13)
Physical environment (60)
Public transport (19)
Safety (22)
Scooter (59)
Social environment neighbourhood (43)
Social impact (34)
Unawareness (36)
Use FCR (29)
Walking (27)

Show codes in group **Advantages cycling**

Name	Grounded
Independent	8
Faster when cycling	5
Cycling together	5
Corona Annoying face mask PT	5
Pleasant cycling	4
Cycling with stops	4
No risk of getting a fine	3
Only cycling with good weather	3
Bike is cheapest means of transport	2
Cycling as only option	2
Bike is faster than PT	2
Cycling is free	2
Cycling to city centre is faster	2
leisure time	2
No big time difference car of bike	2
Bike is always available	2
Bike is better than car	1
Meeting people on the way	1
Bike keeps me from getting lazy	1
Bike is not much slower	1
Bike keeps me buzy	1
Bike fine light	1
Chat while cyling in neighbourhood	1
Bike is available for everyone	1
Car and PT cost money	1
Cycling faster than car	1
Too far to walk	1
Too hot to walk	1
Playground while cycling	1
Quite place while cycling	1
Places to have a drink while cycling	1
Places to relax while cycling	1
Cycling with friends	1
Bike is free	1

APPENDIX E: INFORMATION RESPONDENTS POSITIVE AND NEGATIVE PERCEPTION AND USE OF FCR

Of the 24 respondents, six respondents expressed a negative perception of FCRs during the interviews, 16 respondents expressed positive perceptions, and one respondent remains unidentified. It is important to note that the six respondents with a negative perception do not all have an overall negative perception of FCRs, but they sometimes emphasise negative feelings and thoughts about FCRs in the interviews.

Based on the interviews, it appeared that ten respondents use FCRs regularly, seven respondents indicated that they use them occasionally, and five respondents do not use FCRs at all or hardly at all. Again, one remains unidentified.

Looking at bicycle use, it turns out that eleven respondents regularly use a bicycle, two sometimes do so, and nine respondents do not or hardly cycle.

Respondent	Gender	age	education	background	work	perception FCR	use FCR	bike use
1	woman	32	MBO	Dutch	Health care	Pos. / neutral	Bike, cargo bike, children	Often
2	woman	50	High school	Dutch	-	Pos. / neurtal / neg.	seldom	seldom
3	woman	64	High school	Dutch	-	Neutral	bike everyday	everday, only means of transport
4	woman	54	High school	Dutch	Cleaner	Pos / neutral/ neg.	seldom	seldom
5	woman	69	Mavo	Dutch	own shop (retirement)	pos.	sometimes	e-bike, often
6	man	69	Mavo	Dutch	own shop (retirement)	pos/neg.	seldom	seldom
7	man	25	MBO	Dutch	roofer	pos.	scooter	seldom
8	man	27	-	Dutch	-	-	-	often
9	man	29	-	Dutch	-	pos.	sometimes	sometimes
10	man	50	-	Dutch	-	pos.	often	everyday, only means of transport
11	woman	61	High school	Dutch	housekeeping / incapacitated	pos	sometimes	Often
12	woman	20	MBO	Dutch	student	pos /neutral	scooter / e-bike	seldom
13	woman	50	MBO	Dutch	housemother	pos /neutral	scooter and e-bike	sometimes
14	man	25	MBO	Dutch	snack bar	neg	scooter	never
15	woman	41	MBO	Dutch	doctor's assistant	Pos / neutral/ neg.	often, bike	often
16	woman	50	-	Dutch	-	pos	seldom	seldom
17	woman	53	-	Dutch	health care	pos	seldom	seldom
18	woman	54	-	Dutch	Cleaner	pos	sometimes	often, e-bike
19	woman	60	-	Dutch	-	pos	often	everyday, only means of transport
20	man	50	-	Dutch	Postman	pos.	bike, everyday	everyday
21	woman	64	High school	Dutch	housemother	pos	seldom	often, e-bike
22	man	65	High school	Dutch	truck driver / welder (retired: now volunteer)	pos	seldom	often, e-bike
23	man	60	-	Dutch	factory (now incapacitated)	pos	sometimes, scooter	never

Negative perception FCR

The following six respondents indicated in the interviews that they have (some) negative perceptions of FCRs:

Respondent	Interview	Characteristics
2	2	Dutch woman, 50 years old
3	2	Dutch woman, 64 years old
4	2	Dutch woman, 54 years old
6	3	Dutch man, 69 years old
14	6	Dutch man, 25 years old
15	7	Dutch woman, 41 years old

Codes representing a negative perception of FCRs (Atlas ti.):

	1: Interview1 (123)	2: Interview2 (208)	3: Interview3 (99)	4: Interview4 (110)	5: Interview5 (74)	6: Interview6 (145)	7: Interview7 (83)	8: Interview8 (110)	9: Interview9 (84)	10: Interview... (93)	Totals
Neg_Car on FCR is dangerous 1						1					1
Neg_Cluttered 1		1									1
Neg_Cycle path does not have to be so wide 1			1								1
Neg_Don't think FCR to city centre is faster 2		2									2
Neg_Even if FCR is faster, I will take familiar route 1		1									1
Neg_FCR are sometimes inconvenient and annoying for car drivers 2			1			1					2
Neg_FCR is not faster 1		1									1
Neg_FCR or not, I don't care 2		1		1							2
Neg_FCR to city centre not safe by night 1							1				1
Neg_I am not interested in FCR 1		1									1
Neg_I do not intend to cycle via FCR to city centre 3		3									3
Neg_Intention government to make more people cycle with FCR 1			1								1
Totals	0	10	3	1	0	2	1	0	0	0	17

Positive perception FCR

Codes representing a positive perception of FCRs (Atlas ti.):

	1: Interview1 (123)	2: Interview2 (208)	3: Interview3 (99)	4: Interview4 (110)	5: Interview5 (74)	6: Interview6 (145)	7: Interview7 (83)	8: Interview8 (110)	9: Interview9 (84)	10: Interview... (93)	Totals
Pos_Better cycle paths for scooter 1						1					1
Pos_Broader cycle paths 1										1	1
Pos_Convenience 5		2	3								5
Pos_Decent cycle path 1			1								1
Pos_Dennenstraat is nice FCR 1										1	1
Pos_Easy to cycle 1		1									1
Pos_FCR are fine 2			1				1				2
Pos_FCR are good 9			4	2			1	1	1		9
Pos_FCR fast from place to place 1		1									1
Pos_FCR important for cyclists and scooters 1						1					1
Pos_FCR is faster than route with more stops 1		1									1
Pos_FCR is not on my route, otherwise I would use them 1										1	1
Pos_FCR is safe for children 1							1				1
Pos_FCR is safer 1						1					1
Pos_FCR is safer than Muntweg to city centre 1						1					1
Pos_FCR is same km, but faster 1		1									1
Pos_FCR less stops 1		1									1
Pos_FCR no bumbs 2			1			1					2
Pos_FCR to Dukenburg is fastest route 1							1				1
Pos_FCR useful for scooter 1		1									1
Pos_Feeling of growing up 2	1									1	2

Pos_I am happy with FCR	4	1		2					1			4
Pos_I am happy with more FCR	1	1										1
Pos_I am interested in FCR	1	1										1
Pos_I do think FCR to city centre is faster	1		1									1
Pos_I think FCR are useful	1	1										1
Pos_I think FCR make people use bike	1	1										1
Pos_Ideal	1					1						1
Pos_No detour	1				1							1
Pos_Not afraid for accident on FCR	1	1										1
Pos_Not cycling around	1				1							1
Pos_Positive experience FCR	1	1										1
Pos_Priority for cyclists is good	2				1			1				2
Pos_Safe feeling	1	1										1
Totals		9	9	12	5	1	5	5	2	1	4	53