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The effects of spatial elements of urban shared spaces on the subjective safety of elderly cyclists and pedestrians

Colophon

Title: The effects of spatial elements of urban shared spaces on the subjective safety of elderly cyclists and pedestrians

Author: Marijn Geurts

Contact: m.geurts.1@student.rug.nl

Student Number: s3934802

Bachelor: Spatial Planning and Design

University: Rijksuniversiteit Groningen

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Supervisor: Prof. Dr. Gert de Roo

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Abstract

In order to maintain traffic participation amongst elderly cyclists and pedestrians, it is crucial to sustain their feeling of safety. Especially, shared spaces are challenging for this target group. This research is focusing on the subjective safety of elderly cyclists and pedestrians in urban shared space traffic situations in Groningen. Hereby, the survey is based on previously identified influential spatial elements for subjective safety. The results of the survey were analysed with a binary logistic regression analysis in IBM SPSS Statistics 27. Hereby, four out of twelve elements show a significant outcome on the subjective safety of elderly cyclists and pedestrians. The biggest impact was observed for heavy vehicles, followed by vulnerable road users, road width, and clarity. Furthermore, vulnerable road users and road width allow for a distinction within the target group. The outcome of this research shows a potential impact on future policy implementations to improve the subjective safety of elderly cyclists and pedestrians in shared spaces.

1 Introduction

Cycling is a highly popular mode of transportation in the Netherlands. 28% of the movements per person per day are done by bicycle. This makes cycling, the second most used means of transportation after the use of the car (CBS, 2019). However, since 2015 the highest percentage of fatal accidents of all road users account for cyclists and last year, roughly 36% of fatal accidents were cyclists (Rijkswaterstaat, 2021). Especially, elderly people are involved in severe cycling accidents. Hereby, 50% of traffic fatalities were people in the age of 60 years or older. Another studies showed that the number of fatal accidents of people of 80 years and above are increasing since 2000 (Schepers & Schagen, 2020). Another studies has shown that, for the elderly, the chances of getting seriously injured in any type of traffic related collision are the largest compared to other age groups (Chong et al., 2010). Hereby, the main risk factors among elderly cyclists are poor vision, reduced muscle strength, poorer judgement and a reduced ability to comprehend traffic signs, signals and warnings (Ikpeze et al., 2018). Due to the demographic change, an increase in the number of elderly cyclists can be expected in the near future (CBS, 2022). Therefore, it is important to increase the cycling safety amongst elderly people. Not only the amount of accidents needs to be reduced, but also the feeling of unsafety in traffic amongst elderly people needs to be tackled. The so called ‘subjective safety’, which refers to people feeling unsafe in traffic, might influence the traffic participation (Furian et al., 2021; SWOV, 2012). If that safety is low, less traffic participation might take place (Furian et al., 2021). Especially, elderly people show lower mobility, and therefore, it is important to maintain their traffic participation. A low participation, and therefore, a low subjective safety, leads to a reduced feeling of inclusiveness. It is also linked to a decrease in their quality of life (Schepers & Schagen, 2020). Especially, a so-called ‘shared space’ traffic situation is being avoided by elderly people due to the reduced subjective safety (NHL & Kenniscentrum Shared Space, 2013).

In a shared space, multiple modalities such as bicycles, pedestrians and motorized vehicles share the same road in an integrated manner (Hamilton-Baillie, 2008). The initial motivation of implementing shared space traffic situations is the reduction of accidents. One of the ways to reduce accidents in shared space is to establish a sense of uncertainty. This increases the alertness of each individual road user and eventually leads to more attention, reactiveness, and reduction of speed participation (Hamilton-Baillie, 2008; Ikpeze et al., 2018; NHL & Kenniscentrum Shared Space, 2013). Thus, it is intended to lower the subjective safety. However, these situations are especially more challenging for elderly people and stand in contradiction with maintaining their traffic participation (Hamilton-Baillie, 2008; Ikpeze et al., 2018; NHL & Kenniscentrum Shared Space, 2013). This, in turn, reduces their mobility which contradicts one of the key goals of traffic planning. Even though mobility is not one of the main priorities in shared space, it should be designed in such a way, that it is easily accessible and passable for all users (NHL & Kenniscentrum Shared Space, 2013). Therefore, it is important to link subjective safety of elderly people to shared space traffic situations. This research focuses only on subjective safety among vulnerable road users, i.e. cyclists and pedestrians. The reason for this is due to the fact that the percentage of road users that feel unsafe is highest among vulnerable road users. It is only motorcyclists that feel more unsafe (Amundsen & Bjørnskau, 2003; Sørensen & Mosslemi, 2009).

Existing research investigated the influencing factors of Subjective Safety for cyclists and pedestrians in general (Sørensen & Mosslemi, 2009; Vlakveld et al., 2008; Oppelaar & Wittebrood, 2006). However, no research has been done regarding subjective safety for elderly cyclists and pedestrians in Shared Spaces. Hence, this case study focuses on the relationship between traffic related spatial elements of shared space and the subjective safety of elderly cyclists and elderly pedestrians in an urban setting. Firstly, the most important influencing elements of shared space on the subjective safety of elderly cyclists and pedestrians will be investigated. Afterwards, the differences in subjective safety between elderly cyclists and elderly pedestrians in relation to shared space traffic situations will be pointed out.

2 Theoretical framework

In this chapter, the most relevant concepts and theories that form the basis of this research will be discussed. Hereby, the concepts of shared space and subjective safety will be elaborated. Furthermore, a connection will be made between the concepts based on previous research and a conceptual model will be presented in order to show the relationships between them.

2.1 Subjective safety

In this research, the focus lies on traffic safety of elderly cyclists and pedestrians. First, it is necessary to define 'elderly people'. Namely, 'elderly' has been defined as a chronological age of 65 years old or older (Orimo et al., 2006). Accordingly, this definition will be used as a selection criterium for participant recruitment. Moving forward, the core concept of traffic safety can be split up into subjective safety and objective safety. Objective safety relates to the actual amount of crashes, injuries and fatalities in traffic. Subjective safety differs from objective safety in the sense that it is more difficult to quantify (Furian et al., 2021). Interestingly, the objective level of safety does not correspond to the actual feeling of safety that people experience in traffic. In fact, previous research showed that there is no relationship at all between the objective level of safety and the subjective feeling of safety (Sørensen & Mosslemi, 2009; SWOV, 2012). This means that subjective safety is a phenomenon that needs to be studied separately from objective safety.

2.1.1 Defining subjective safety

The concept of subjective safety in traffic refers to feeling unsafe in traffic and to anxiety of being unsafe in traffic for oneself or others (SWOV, 2012; Vlakveld et al., 2008). This is the case when someone experiences danger during traffic participation (SWOV, 2012; Vlakveld et al., 2008). Likewise, subjective safety has common ground with the concept of 'risk perception' and they can be used interchangeably (Furian et al., 2021). Further, subjective safety can be seen as an individual assessment of a traffic situation. This is shaped by a big variety of internal and external factors, such as personal experience, observation and interpretation of traffic situations, social norms, personality traits, level of information, the built environment, infrastructure and traffic volume.

In addition, subjective safety can relate to place or time. For instance, it is called time-related subjective safety when someone feels unsafe while participating in traffic during rush hours. Besides, when someone feels unsafe in traffic in their neighborhood in general, that is called space-related subjective safety. Additionally, combinations can also occur. For example, when a person feels unsafe at a certain place only and just during a specific time of the day. This can be referred to as time and space-related subjective safety. The overview of the different relations can be found in Figure 1.

	Related to location	Unrelated to location
Related to time	Feeling unsafe when crossing a busy street	Being afraid to drive at night
Unrelated to time	Anxious about unsafe traffic conditions in the district	Anxiety about unsafe traffic conditions in general

Figure 1: Examples of time and space-related subjective safety in traffic (SWOV, 2012).

In this research, the focus lies on subjective safety that is unrelated to time, but related to location. This is because pictures of specific shared space scenarios in the city of Groningen will be shown to the respondents. Then, they will be asked about the level of subjective safety that the participants feel when they participate in these situations in general, not a specific time of day. Thus, the focus lies on the subjective safety of the respondents and not on traffic conditions in general.

2.1.2 Personal factors

Previous studies on the subjective safety of cyclists and pedestrians in general have already stated that there are several specific factors that influence subjective safety. These traffic related factors form the basis of this research and they will be discussed in this chapter. A distinction was made between personal factors and spatial factors that influence subjective safety. Furthermore, for each individual factor, specifications will be given regarding a positive or negative effect on the subjective safety.

First, the personal factors will be explained. These personal factors can vary considerably for each individual road user and for some they may not play a role at all. For example, some people are generally more easily afraid than others, which may lead them to perceive traffic situations to be less safe than other people would. Also, some cyclists or pedestrians may feel more vulnerable than others, which may be the case for many of the elderly included in this research (Chong et al., 2010; Ikpeze et al., 2018; Oppelaar en Karin Wittebrood, 2006). In addition, some road users may have been a victim of a traffic accident or might have been the witness of a traffic accident. If one of either has occurred, the individual might interpret similar situations as unsafe as well (Oppelaar en Karin Wittebrood, 2006). Similarly, if an individual is in unsafe traffic situations regularly, they are likely to feel more afraid in traffic (Oppelaar en Karin Wittebrood, 2006). However, according to Sørensen & Mosslemi (2009), high traffic education levels have a positive influence on the feeling of safety of cyclists and pedestrians. Meaning, if they know the rules of the specific traffic situations, they feel safer. Likewise, if cyclists and pedestrians have more experience participating in traffic, they feel safer in traffic in general (Sørensen & Mosslemi, 2009).

2.1.3 Spatial factors

Second, the spatial factors influencing the subjective safety of cyclists and pedestrians in general will be addressed. Since this research mainly focuses on the spatial elements of traffic situations, it is key to state the currently known effects of spatial elements on subjective safety. According to SWOV (2012), the layout of the public space has an influence on how safe one perceives that place to be. This is because both the design and function of the public space influence the feelings of fear that people experience (Oppelaar en Karin Wittebrood, 2006; Sørensen & Mosslemi, 2009; SWOV, 2012; Vlakveld et al., 2008).

For example, factors such as the road conditions, pathway width, crossing distance and the number of crossings are shown to have a direct effect on subjective safety (Sørensen & Mosslemi, 2009). To be more specific, if road conditions are bad, for example when the road contains holes or if it is slippery, cyclists and pedestrians feel more unsafe.

Similarly, if the pathway width makes it difficult to pass each other, this decreases the feeling of safety. Also, if the crossing distances are too large, cyclists and pedestrians generally feel less safe as they might not have enough time to cross the road safely. The number of crossings also influences subjective safety negatively as this increases the chance of collisions (Sørensen & Mosslemi, 2009).

Further, if there is a lot of motorized traffic in 30 km/h areas, then participants in traffic generally feel less safe (Miedema et al., 1987; SWOV, 2012). Additionally, a similar study found that a larger amount of traffic in general makes cyclists and pedestrians feel less safe (Sørensen & Mosslemi, 2009).
Similarly, cyclists and pedestrians might feel unsafe when many people commit speeding offences, or if the speed of traffic is generally too high compared to them (Miedema et al., 1987; SWOV, 2012). A shared space situation is similar in the sense that traffic speed is generally very low (Great Britain. Department for Transport., 2011; Hamilton-Baillie, 2008; Lutz & Foorthuis, 2011; NHL & Kenniscentrum Shared Space, 2013). Especially, for elderly this might be challenging, as they might not be able to react quickly enough to vehicles passing in high speeds (Ikpeze et al., 2018).
Moreover, cyclists and pedestrians show a lower feeling of safety when there is a lot of motorized or heavy traffic, such as cars, trucks or buses in a traffic situation (van Haaf, 2002; SWOV, 2012; Sørensen & Mosslemi, 2009). Likewise, cyclists and pedestrians feel less safe when they do not have their own, separated lane, or in other words, when different traffic types are not separated (van Haaf, 2002; SWOV, 2012; Sørensen & Mosslemi, 2009). Thus, since there is no lane separation in a shared space, it can be expected that especially elderly cyclists and pedestrians feel less safe (NHL & Kenniscentrum Shared Space, 2013).
Besides, previous research has also shown that when it is difficult to oversee a traffic situation, the traffic participants will feel less safe (Oppelaar & Wittebrood, 2006; Sørensen & Mosslemi, 2009; van Haaf, 2002; Vlakveld et al., 2008). This means that when a traffic situation is judged as more chaotic, the traffic participants feel less safe. This could be the case for elderly cyclists and pedestrians in shared space. This is because many things come together in shared space and the elderly generally show a poorer judgement of traffic situations and show a lower reactiveness (Ikpeze et al., 2018; NHL & Kenniscentrum Shared Space, 2013). Similarly, if road users are more thoughtful of others the subjective safety is shown to increase. As a result, a higher feeling of safety is perceived if road users are taking each other more into account (Sørensen & Mosslemi, 2009).

2.2 Shared space

The concept of shared space started in the Netherlands in the 1970s and it refers to the design of a residential area, making a distinction between living space and traffic space as a co-factor(Clarke et al., 2006; Lutz & Foorthuis, 2011). As this research is investigating the traffic situation in shared spaces, the focus lies on the latter.
Firstly, introduced by Hans Monderman, shared space was initially incorporated to reduce the amount of traffic accidents. It is mostly found in urban areas and the segregation between all road users, such as bicycles, pedestrians and motorized vehicles, is reduced to a minimum(Hamilton-Baillie, 2008). This means, traffic control devices in the form of traffic signs, traffic lights, kerbs, etc., are absent (Clarke et al., 2006). The main intention of removing traffic control, is to increase the uncertainty for each road user, and therefore decreasing the subjective safety of each individual. One of the main theories that shared space is based on the so called 'risk homeostasis theory', which shows that people take more risks in relatively safe situations, while people in relatively unsafe situations tend to take less risks and vice versa (Wilde, 1982). This means that an increase in uncertainty leads to higher alertness and reduction of risk-taking behavior. Thus, it results in a higher interaction between road users, such as seeking for more eye contact. As a result, road users take less risk and feel more responsible for the outcome, which has the potential to reduce the amount of accidents (NHL & Kenniscentrum Shared Space, 2013). Especially, shared spaces can be challenging for elderly people, as high amount of alertness is required (Clarke et al., 2006; Ikpeze et al., 2018; NHL & Kenniscentrum Shared Space, 2013).

2.3 Conceptual model

The conceptual model that was used in this research, based on the theoretical framework is presented below. This model incorporates the existing knowledge and shows the theoretical underpinnings of this research.

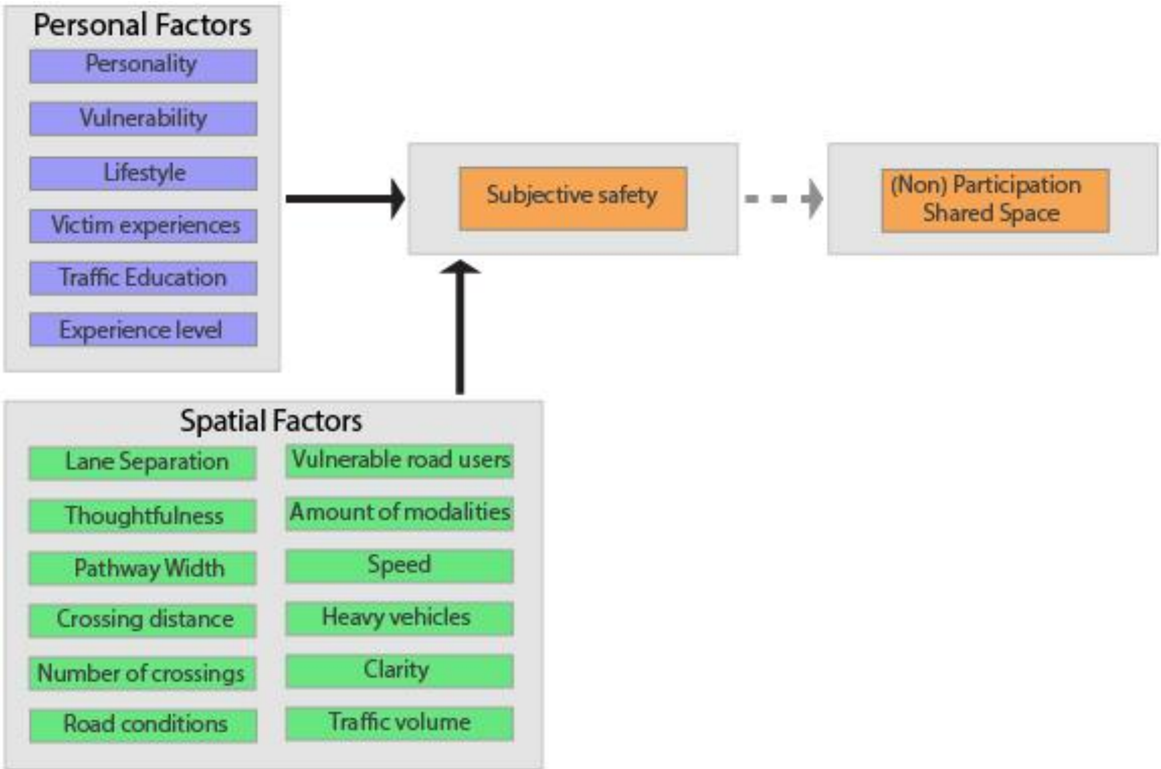

Figure 2: Conceptual model

2.4 Hypotheses

This case study focuses on the relationship between traffic related spatial elements of shared space and the subjective safety of elderly cyclists and elderly pedestrians in an urban setting. Based on the theoretical framework and the conceptual model as described above, it is hypothesized that for all of the listed spatial factors, the same outcome on the subjective safety will be found for elderly cyclists and pedestrians in urban shared space traffic situations.

In statistical terms the hypotheses are formulated differently. The null hypothesis can be formulated as follows: There is no relationship in the population between subjective safety and the different spatial factors. In other words, there is no relationship in the population between the dependent and independent variables. This null hypothesis can be rejected when a significant result is achieved. In this hypothesis the independent variables are the spatial elements listed in Appendix 1.

3 Methods

In order to answer the research questions, a case study was conducted using a quantitative approach including a survey. This survey is based on the theoretical framework provided above. The case study concerns the city of Groningen, located in the Netherlands. The main aim of this case study is to investigate the effect of shared space in the urban environment on the subjective safety of elderly cyclists and elderly pedestrians. In this chapter, a specification is given about the research area in which the survey was handed out. Furthermore, the survey design is thoroughly explained as well as the data analysis process and the choices that were made in that regard. Finally, the ethical considerations regarding the handling of the data will be covered.

3.1 Research area

The area in which this case study was performed, is the inner city of Groningen. This part of the city contains many shared space traffic situations. In these shared spaces, cars and trucks are prohibited to enter after noon. This creates traffic situations in which predominantly cyclists, pedestrians and mopeds are present. Therefore, these will most likely be the types of traffic the target group will relate their experiences to.

3.2 Survey design

In order to answer the research question and to test the hypotheses, a survey was used. A survey is a suitable method when hypotheses about theories are to be tested in order to make judgements about a sample. They can also be used in order to make general statements about a population (Roberts, 1999). In this research, the aim is to make statements about subjective safety concerning the population of elderly cyclists and pedestrians in shared spaces. Accordingly, the survey was designed to be filled in on paper since most of the participants did not have direct access to a computer or were not familiar with its use. The questions were directly related to the indicators affecting subjective as they were presented in the theoretical framework (Hamilton-Baillie, 2008; Lutz & Foorthuis, 2011; Miedema et al., 1987; NHL & Kenniscentrum Shared Space, 2013; Oppelaar en Karin Wittebrood, 2006; Sørensen & Mosslemi, 2009; SWOV, 2012; van Haaf, 2002; Vlakveld et al., 2008).

The survey, which is presented in Appendix 2, follows a clear structure which will be discussed here.

First of all, the questions one until seven are of a descriptive nature. These questions are meant to gather descriptive data about the participants, such as age, gender and educational background. Following the descriptive questions, the participants were questioned about personal factors that might influence their subjective safety. These are the questions eight until thirteen, as presented in Appendix 2. Furthermore, Questions 14 until 27 form the core for the data analysis as they concern the subjective safety and the spatial factors that were pointed out by previous research.

Each question relating to these factors can be answered in the form of a 5-Point Likert Scale. This five point scale typically allows the participant to express how much they agree or disagree with a statement (Preedy V. R. and Watson, 2010). Hereby, five answers are possible ranging from 'totally disagree' to 'totally agree'. Since this is the first research concerning the subjective safety of elderly cyclists and pedestrians in shared spaces, this choice was made. Hereby, accurate insights were gained as the five answer possibilities provided relatively nuanced answers.

3.3 Data collection & participant recruitment

The data was collected by means of the described survey about subjective safety related to elements of shared space. The participants were recruited from elderly homes that were located in close proximity to the city centre. Elderly homes were chosen in order to reach as many participants as possible. Their close proximity to the city centre makes it likely that these elderlies still participate in the shared space traffic situations in question (Figure 3).

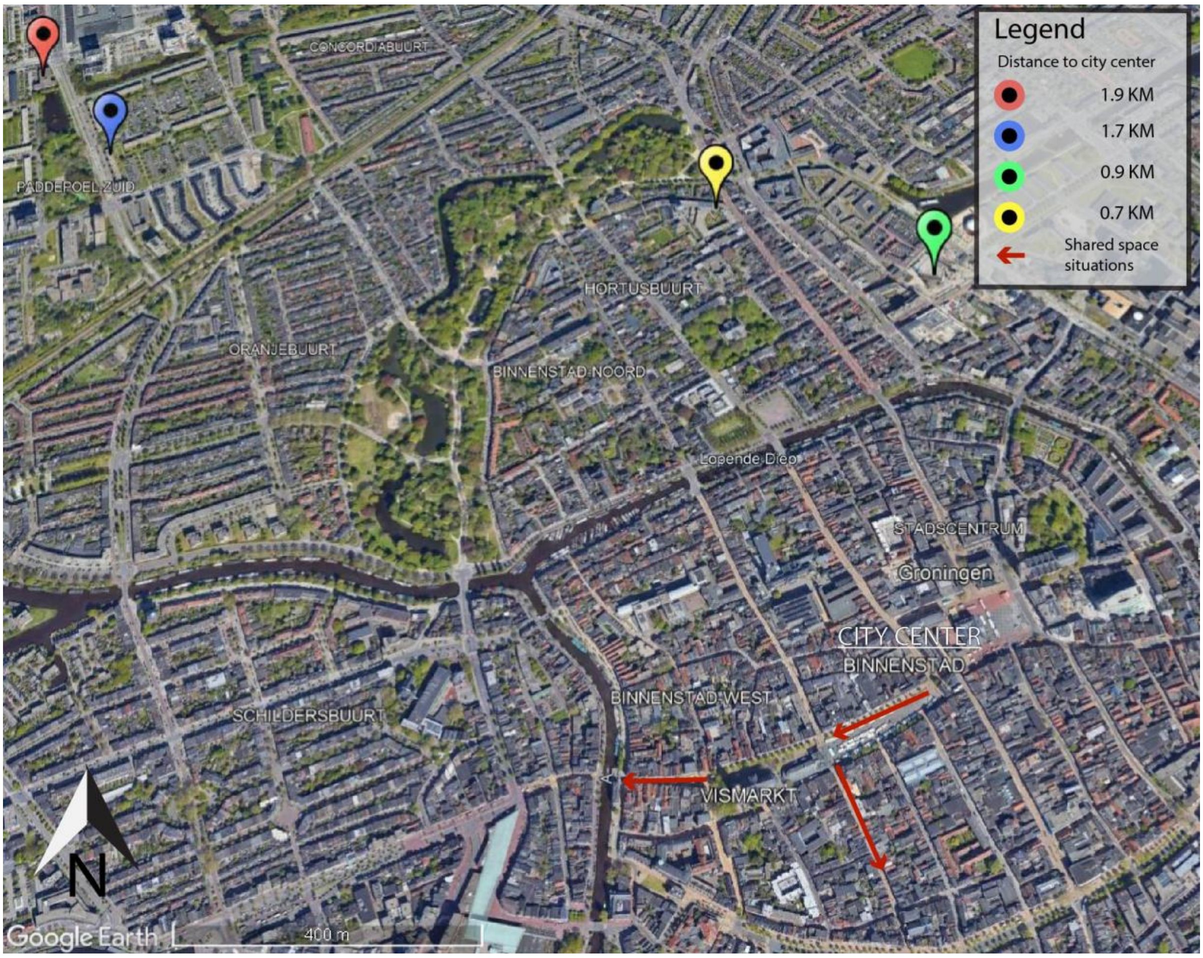

Figure 3: Elderly home locations

The data was collected between the 2nd and 31st of May 2022. One institution was an elderly community of which the inhabitants were still living independently. The other three institutions were a combination of elderly that required care on the one hand and sheltered homes called 'aanleunwoningen' in Dutch on the other hand. In one of these elderly homes a verbal introduction was given similar to the one provided in the survey and the questions were read out loud to seven participants who were not able to write down the answers or couldn't read the questions. Since two specific groups from the elderly population are investigated, the sampling method is a stratified random sampling. Hereby, the two strata are defined as elderly cyclists and elderly pedestrians. An advantage of this sampling method is that it assures the representation of separate groups in a population and it allows for a comparison between these groups. Furthermore, probability sampling allows for generalisability and it is the most commonly used in sampling methodology (Acharya et al., 2013).

3.4 Data analysis

The data that was collected contained a five point answer scale. This provided a large amount of nuanced data about the target group. In order to give an accurate description of the target group, a binary logistic regression analysis was chosen. A binary logistic regression is used in order to gain an understanding of the relationship between dependent and independent, or in other words x and y variables (Fritz & Berger, 2015). In this research, the dependent variable is the subjective safety of elderly cyclists and pedestrians and the independent variables are the spatial factors as listed in Appendix 1. This statistical analysis predicts the influence of each of the spatial factors on the

subjective safety of the elderly cyclists and pedestrians. Since this analysis concerns binary data, the gathered data was transformed into a binary scale which contains the values 0 and 1. In terms of the subjective safety, 0 stands no feeling of unsafety and a 1 stands for a feeling of unsafety. The spatial factors listed in the theoretical framework were coded according to their predicted effect on subjective safety based on existing literature. The value 0 stands for answer outcomes of the spatial factors that do not have a negative effect on the subjective safety. Accordingly, a value of 1 stands for answer outcomes of the spatial factors that have a negative effect on the subjective safety (Appendix 4). For accuracy, the variables have been checked for multicollinearity, as is required for a Binary Logistic Regression (Appendix 4). This ensures that the variables do not overly correlate with each other, which increases the accuracy of the final outcome. The results of the binary logistic regression analysis are presented in chapter 4.2.
Furthermore, after running a sign test on the spatial variables, it could be concluded that there was no significant difference between the answers given for cycling and for walking for most of the spatial factors (Appendix 7). In fact, there was no significant difference between the answers for cycling and walking for ten out of twelve independent variables. Thus, all of the answers were combined for cyclists and pedestrians.

Finally, in order to determine what the difference between elderly cyclists and pedestrians is exactly, two separate binary logistic regression analyses were run. One analysis involved the values for cyclists only. The other analysis involved the answer values for pedestrians only. Hereby, it could be determined what the differences are between elderly cyclists and elderly pedestrians in shared spaces. The results of these analyses are presented in chapter 4.3.

3.5 Ethical considerations

As there was little to no interaction between the participants and the researcher, no power relations were existent. In the cases where the researcher interacted with the participants, it was stressed that participation in this research would be entirely voluntary. The same counts for the written introduction of the survey, which also stated that the data would be entirely anonymous. As the majority of the surveys were handed out in letterboxes, verbal introductions were mostly not at play. The survey itself contained neither questions that would reveal the identity of the participants, nor questions about the exact address of the participants.

4 Results

The target group showed great interest towards this research and filled in the survey with great response. In this chapter, the results regarding the statistical analyses using IBM SPSS Statistics 27 will be covered. First, the relevant descriptive statistics regarding the spatial factors will be discussed to describe the population. Then, the binary logistic regression analysis will be shown. Lastly, the differences between elderly pedestrians and elderly cyclists will be given. For the entire chapter the dependent variable is the subjective safety and the independent variables are the spatial factors which are listed in Appendix 1.

4.1 Descriptive statistics

The descriptive statistics that are provided give a general description about the participants that were included in this research. The most relevant ones will be covered here. Further, the descriptive statistics concerning all survey questions are provided in Appendix 3. A total of 82 participants were included in this research, of which 56 were female and 26 were male. On average the age of the participants was 78, of which the oldest was 96 years old and the youngest was 60 years old (Table 3 & 4). Furthermore, a total of 82 participants have answered question 14 about subjective safety. Notably, only around 50% of the participants have cycled and around 98% has walked in shared spaces in the last year (Table 5 & 6). Concerning the subjective safety, a total of 41.5% of the participants generally feel unsafe in the pictured traffic situations (Table 16). Finally, according to the descriptive statistics of the Strongest Contributor variable in the table of Appendix 3, the factor that contributes the most to a feeling of unsafety in the pictured situations is the variable of thoughtfulness, which accounts for 14,6% of the participants (Table 30).

4.2 Binary logistic regression

A binary logistic regression analysis was performed to investigate if any of the spatial factors have a relationship with subjective safety. A relationship is shown by a significant (p<0,05) outcome. Hereby, an alpha level of .05 was used for the statistical analyses. For the spatial factors, according to the literature, the binary outcome value of 1 stands for the answer values that are expected to have a negative effect on subjective safety. Thus, 0 has no negative effect on subjective safety. In this analysis, the first category, which is 0, has been used as the reference. Therefore, the negative effect on subjective safety is always compared to its neutral or positive effect. The most important results can be seen in Table 1a and 1b, which will be discussed below. The comprehensive regression analysis, including the variable coding and their labels can be found in Appendix 4.

Binary logistic regression: Variables in the equation

		B	S.E.	Wald	df	Sig.
Step 1[a]	Lane Separation(1)	.153	.750	.042	1	.838
	Thoughtfulness(1)	-.051	.673	.006	1	.939
	Road Width(1)	1.705	.870	3.841	1	.050
	Crossing Distance(1)	.276	.758	.133	1	.716
	Number of Crossings(1)	-.057	.811	.005	1	.944
	Road Condition(1)	-.103	.774	.018	1	.894
	Vulnerable Road Users(1)	1.677	.800	4.390	1	.036
	Amount of Modalities(1)	-1.570	1.062	2.183	1	.140
	Traffic Speed(1)	1.040	1.007	1.066	1	.302
	Heavy Vehicles(1)	1.686	.763	4.876	1	.027
	Clarity(1)	1.551	.801	3.745	1	.053
	Traffic Volume(1)	.722	.775	.869	1	.351
	Constant	-3.233	.890	13.187	1	.000

Table 1a: Binary logistic regression outcome part 1

Binary logistic regression: Variables in the equation

		Exp(B)	95% C.I.for EXP(B)	
			Lower	Upper
Step 1[a]	Lane Separation(1)	1.166	.268	5.067
	Thoughtfulness(1)	.950	.254	3.551
	Road Width(1)	5.499	1.000	30.244
	Crossing Distance(1)	1.318	.298	5.829
	Number of Crossings(1)	.944	.193	4.624
	Road Condition(1)	.902	.198	4.112
	Vulnerable Road Users(1)	5.348	1.114	25.670
	Amount of Modalities(1)	.208	.026	1.670
	Traffic Speed(1)	2.829	.393	20.366
	Heavy Vehicles(1)	5.397	1.209	24.097
	Clarity(1)	4.715	.980	22.679
	Traffic Volume(1)	2.059	.451	9.406
	Constant	.039		

Table 1b: Binary logistic regression outcome part 2

To start, the null hypothesis for the model shown above is as follows: There is no relationship in the population between subjective safety and the different spatial factors. In other words, there is no relationship in the population between the dependent and independent variables. This null hypothesis can be rejected when a significant result is achieved.

First, the significant outcomes will be covered. As the regression results in Tables 1a and 1b indicate, the variable for road width is significant (p=0,050). Therefore, the null hypothesis can be rejected for this variable. Accordingly, this result shows that there is a relationship between road width in urban shared spaces and subjective safety of elderly cyclists and pedestrians. More specifically, a road which is too narrow is associated with a feeling of unsafety in elderly cyclists and pedestrians in urban shared spaces. In addition, the odds ratio (Exp(B)) indicates that a 1 standard deviation increase in the lack of road width makes it roughly 5.5 times more likely that elderly people feel unsafe in urban shared space traffic situations.
Also, the vulnerable road users variable is significant (p=0,036). The results show that, there is a relationship between the crowdedness in terms of cyclists and pedestrians and the subjective safety of elderly cyclists and pedestrians in urban shared spaces. To be more specific, the odds ratio (Exp(B)) indicates that it is roughly 5,4 times more likely that and elderly person would feel unsafe in the pictured situations if they are too crowded with cyclists and pedestrians.

Besides, a relationship between the presence of heavy vehicles and the subjective safety has been found as well. The significant result (p=0,027), in combination with the odds ratio, indicate that the presence of too many heavy vehicles in urban shared spaces lead to a lower subjective safety for elderly cyclists and pedestrians. In fact, it is roughly 5,4 times more likely that an elderly cyclist or pedestrian feels unsafe when too many heavy vehicles are present in the pictured traffic situations, according to the odds ratio (Exp(B)). Furthermore, this variable scored the highest in terms of the Wald statistic, which indicates that this variable has the largest effect on subjective safety of elderly cyclists and pedestrians in shared spaces.
In the same way, the clarity variable shows a significant result when rounded (p=0,053). This indicates that there is a relationship between the clarity of the traffic situation and the subjective safety of elderly cyclists and pedestrians in shared spaces. The odds ratio (Exp(B)) indicates that it is roughly 4,7 times more likely that elderly cyclists and pedestrians would feel unsafe in shared spaces if the traffic situation is not oversee-able or chaotic. However, the Wald statistic shows that the clarity in urban shared spaces has the smallest effect on the subjective safety of elderly cyclists and pedestrians.

Second, the non-significant results will be covered. The fact that these results are not significant, means that there is not enough evidence to conclude that they have an effect on the population level. However, the results are true for the participants, i.e. the sample.
For instance, the variable for lane separation is not significant. Thus, the null hypothesis has to be accepted, indicating that there is indeed no relationship between lane separation and subjective safety of elderly cyclists and pedestrians in shared spaces. In other words, for the population, the feelings of unsafety do not relate to the presence of lane separation.
Further, the variables for Crossing Distance, Traffic Speed and Traffic Volume show a non-significant relationship with subjective safety. This indicates that there is no relationship between these variables and the subjective safety of elderly cyclists and pedestrians in general in shared spaces.
The variables for thoughtfulness, the number of crossings, road conditions and the number of modalities show an unexpected outcome. These variables have the opposite effect on subjective safety than was found in literature. Namely, when people do not keep each other into account, the subjective safety was increased for the participants. The feeling of safety of the participants also increases when the number of crossing opportunities is larger and when the road conditions were bad. Finally, when the amount of different vehicle types, or modalities, increases, the feeling of safety of the participants goes up as well.

4.3 Additional results

In order to assess the differences in subjective safety levels between elderly cyclists and elderly pedestrians, two separate analyses were performed. In these analyses the same variables were used, however the outcomes for cyclists and pedestrians were analysed separately. Accordingly, the results show that the highly significant variable for vulnerable road users in Table 1a and 1b is only significant for pedestrians (p=0,0039). Besides, the significant variable for road width in Table 1a and 1b is only significant for cyclists (P=0,074) (Appendix 5 and 6). These findings indicate, on the one hand, that the significant outcome for vulnerable road users is most likely more true for elderly pedestrians than it is for elderly cyclists. On the other hand, the road width variable's significant value in Appendix 4 is most likely more true for elderly cyclists than for elderly pedestrians.

5 Conclusion

This case study analysed the relationship between traffic related spatial elements of shared space and the subjective safety of elderly cyclists and elderly pedestrians in an urban setting. Hereby, the most important influencing elements of shared space on the subjective safety of elderly cyclists and pedestrians were identified on the one hand. On the other hand, the researcher pointed out the differences in subjective safety between elderly cyclists and elderly pedestrians in relation to shared space traffic situations.

Existing research has identified twelve influential spatial elements for subjective safety of cyclists and pedestrians in general (Oppelaar & Wittebrood, 2006; Sørensen & Mosslemi, 2009; Vlakveld et al., 2008). However, none of them investigated the influence of those spatial elements in shared spaces on the subjective safety of the elderly target group. This research offers new insights linking the subjective safety of elderly cyclists and pedestrians to shared space traffic situations.

The most influencing factor for a decreased subjective safety of elderly cyclists and pedestrians in shared spaces are 'heavy vehicles'. More specifically, in case heavy vehicles are present, it is roughly 5.4 times more likely that elderly cyclists and pedestrians feel less safe compared to the absence of heavy vehicles. Secondly, if the road width is perceived as too narrow, it is significantly more likely that elderly pedestrians and especially elderly cyclists feel less safe in shared spaces. Furthermore, a decreased subjective safety of elderly cyclists and especially elderly pedestrians is observed if too many vulnerable road users are present in shared spaces. Lastly, the findings indicate that elderly cyclists and pedestrians find shared space traffic situations unclear and lead to a reduced subjective safety.

Besides, there are two variables showing significant differences between elderly cyclists and elderly pedestrians on their subjective safety in shared spaces. The variable vulnerable road users has a bigger impact on subjective safety for elderly pedestrians than for elderly cyclists in shared spaces. Furthermore, the road width shows a higher influence on the subjective safety of elderly cyclists than for elderly pedestrians in shared spaces.

The variables for thoughtfulness, the number of crossings, road conditions and the number of modalities show insignificant and contrary results compared to those found in literature. The remaining variables investigated in this research showed non-significant results. Therefore, this research showed that only four out of twelve variables have significance on elderly cyclists and pedestrians. Thus, comparing elderly cyclists and pedestrians to the cyclists and pedestrians in general, only one third of the previously found variables affect the subjective safety. The significant ones will be covered in the policy recommendation below.

6 Policy recommendations

Shared spaces are designed in such a way that they reduce subjective safety of road users in order to make them more attentive and to promote interactions to increase the objective safety (Hamilton-Baillie, 2008). However as Furian et al. (2021) indicated, feeling unsafe in a traffic situation might lead to the decision not to participate in them anymore. Especially, the elderly tend to avoid shared space traffic situations for that reason (NHL & Kenniscentrum Shared Space, 2013). As it is not the goal to exclude the elderly from shared space traffic situations, policy recommendations can be made following the findings.

First and foremost, it is highly recommended to forbid heavy vehicles from entering shared spaces in the city center entirely and to provide alternative route to the destinations. This is, however, already the case for Groningen as cars, trucks and buses are already not permitted to enter the urban shared spaces after noon. Ideally, they could be replaced by smaller delivery vehicles that have a smaller impact on the feeling of unsafety of the elderly. Secondly, the road width should be large enough to accommodate traffic, including vulnerable road users, in such a way that it is possible to overtake each other without an unsafe feeling. Finally, it is recommended to make it more clear to road users that they are entering a shared space traffic situation and to provide information as to what rules apply there.

7 Discussion

In this chapter, the shortcomings of this research and the recommendations for future research will be discussed. First the research design in general will be covered. Then, the survey design and data collection method will be discussed as well as the data analysis. Finally, some opportunities for future research will be given.

7.1 Research design

This first case study linking subjective safety of elderly cyclists and pedestrians to shared space traffic situations, offered a suitable method of answering the research questions as it integrated insights from previous studies into a specific context and related them specifically towards the elderly. Nevertheless, it is important to acknowledge the limitations in the ability to generalize the findings to the entire population of elderly cyclists and elderly pedestrians. This is mainly due to the fact that it concerns a single case study. However, the research design allows for ease of application of this research in other cities using shared spaces, which would make generalisation possible. Hence, multiple cities containing shared spaces should be compared in order to support the findings.

7.2 Survey design and data collection

In terms of survey design, the questions were formulated according to the findings of existing literature as it was previously explained. Thus, the existing theory could be applied in a different context, which created the opportunity to compare the specific findings of this specific context and target group to the general findings on cyclists and pedestrians. However, in terms of the formulation of questions, question 15 about the Lane Separation factor, is directly related to the feeling of safety of the participant. As the dependent variable is subjective safety, this might have led to a higher correlation in the regression analysis. However, since the result following the analysis was still insignificant, this did not affect the outcome drastically. Furthermore, the survey questions and answer possibilities might give an incomplete picture of the population. This non-sampling error may have occurred due to the formulation of questions or missing spatial factors.

Further, in terms of data collection, the elderly homes that were visited for data collection are located close to the city centre of Groningen where these shared space traffic situations are located. Thus, the people living there are most likely familiar with the pictured traffic situations. Hereby the participants could fill in the survey to the best of their knowledge, increasing the validity of the results. Three participants were a few years short of 65. Thus, they did not match the previously stated definition of 'elderly people' as described in the theoretical framework. However, since they were older than 60 and lived in an elderly home, they were still included in the analysis.

Finally, data was collected regarding three particular shared space examples. This was mainly done as they were found to be all-encompassing in terms of shared spaces in the centre of Groningen. However, this is based on the subjective judgement of the researcher. To conclude, in order to create a representative picture of other cases, more examples of shared spaces may be required.

7.3 Sampling

As previously explained in Section 3.3, a stratified probability sampling strategy was used in this research. Hereby, two strata, namely elderly pedestrians and elderly cyclists were compared to each other. Using this sampling strategy, it is possible that some members of the population are overrepresented compared to others. In this case, the data collection took place in elderly homes, of which three out of four elderly homes provided assisted living. The remaining one did not provide assistance and was only based on community living. As a result, the majority of the surveyed elderly required assisted living. Therefore, it cannot be excluded that some members of the population are more likely to be represented than others. Thus, it is likely that a sampling bias took place as independently living elderly people were in the minority. Besides, this research has a sample size of 82 participants, and is therefore not representative in terms of the wider populations of elderly cyclists and pedestrians. This also means, that a sampling error cannot be excluded.

7.4 Data analysis

Regarding the data analysis, the results show that most of the independent variables do not show a significant result. This means that the findings for these variables are true for the participants, but not for the general population. However, possibly, a type 2 error has occurred, which means that the researcher has failed to reject a null hypothesis that is actually false. This may be the case due to the small sample size of 82 cases. The same counts for the possibility of occurrence of a type 1 error, in which the researcher rejected the null hypothesis, even though it is accurate and should not be rejected. This is again related to the small sample size.

Some of the variables showed negative relationships, even though they were expected to be positive, as it was shown in the results. However, these variables were not significant. Thus, a type 2 error may have occurred, which is related to the small sample size.

7.5 Recommendations for future research

The researcher did not include any questions regarding the effect of subjective safety on traffic participation. In order to further support the policy recommendations, it would be interesting to know if subjective safety is the cause for non-participation in shared space traffic situations. For future research, this could be included, as well as an explanation as to why someone chose not to cycle in shared space traffic situations. In addition, a quantification for the level of subjective safety leading to non-participation in traffic would be useful as well as a quantification for the spatial factors affecting this. This would be useful for policymakers, as it will lead to concrete motives for change. Finally, future research should include more participants and multiple cases to reduce the chances of making type 1 and type 2 errors.

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Appendices

Appendix 1: Theoretical basis for survey

Independent Variable categories	**Factors influencing subjective safety**
Individual contextual factors that influence risk perception:	Personality: Some people are generally more fearful (Oppelaar & Wittebrood, 2006). Vulnerability: Having the feeling of being more vulnerable (Oppelaar & Wittebrood, 2006). Lifestyle: regularly being in potentially unsafe situations(Oppelaar & Wittebrood, 2006). Victim experiences: direct and indirect victim situations seem to increase fear for experiencing the same again. (Oppelaar & Wittebrood, 2006). Traffic education: having education about traffic and taking part in traffic influences subjective safety positively (Sørensen & Mosslemi, 2009). Cycling experience level: The more experienced the person is, the higher the subjective safety is (Sørensen & Mosslemi, 2009).
Situational contextual factors that influence risk perception:	Design of the public space: The layout of the public space influences subjective safety. Both the design and function of the public space influence the feelings of fear that people experience (Sørensen & Mosslemi, 2009; Vlakveld et al., 2008; Oppelaar & Wittebrood, 2006). Lane separation: Separated lanes for cyclists, pedestrians and cars have a positive effect on subjective safety for both cyclists and pedestrians (Sørensen & Mosslemi, 2009). Thoughtfulness: If drivers on the road are more thoughtful of other road users, subjective safety is increased (Sørensen & Mosslemi, 2009). Pathway width: The subjective safety of cyclists and pedestrians is negatively influenced by roads or pathways are too narrow (Sørensen & Mosslemi, 2009). Crossing distance: As the distance of crossing a street gets larger, subjective safety is decreased (Sørensen & Mosslemi, 2009). Number of crossings: The more crossings are in place, the lower the subjective safety (Sørensen & Mosslemi, 2009). Road conditions: If a road contains holes or is slippery or icy, the lower the subjective safety (Sørensen & Mosslemi, 2009). Vulnerable road users: If a traffic situation is crowded with cyclists and pedestrians, subjective safety is decreased (Sørensen & Mosslemi, 2009).

	Amount of modalities: More modalities results in a lower subjective safety than fewer modalities (Sørensen & Mosslemi, 2009). Speed: Speed affects subjective safety, the higher the speed the lower the subjective safety and vice versa (Sørensen & Mosslemi, 2009; Vlakveld et al., 2008). Specifically mopeds overtaking at high speeds with little distance to the elderly cyclists, makes elderly cyclists feel unsafe (Sørensen & Mosslemi, 2009). Heavy vehicles: The presence of heavy vehicles like trucks negatively influences the subjective safety of cyclists and pedestrians (Sørensen & Mosslemi, 2009). Clarity: The extent to which it is possible to oversee a traffic location influences subjective safety, the clearer a traffic location the higher the subjective safety and vice versa (Vlakveld et al., 2008; Oppelaar & Wittebrood, 2006). Traffic volume: Traffic volume influences subjective safety, the higher the traffic volume the lower the subjective safety and vice versa (Sørensen & Mosslemi, 2009).

Appendix 2: Survey

Vragenlijst verkeersveiligheidsgevoel

Inleiding:

Mijn naam is Marijn Geurts en ik wil in verband met mijn afstudeeronderzoek het verkeersveiligheidsgevoel van lopende en fietsende ouderen in de binnenstad van Groningen onderzoeken. In deze vragenlijst komen vragen naar voren over uw ervaring en uw opvattingen over verkeer en verkeersveiligheid. Het gaat hierbij om de verkeerssituaties binnen de grachten van Groningen die te herkennen zijn aan de 'gele klinkers'. Deze kunt u onder anderen vinden rondom de Vismarkt. Er zijn geen goede of foute antwoorden; uw eigen ervaring en perceptie zijn belangrijk. Deze vragenlijst zal alleen worden gebruikt voor mijn afstudeeropdracht en niet voor andere doeleinden en de gegevens zullen volstrekt anoniem blijven.
Kruis alstublieft 1 antwoord aan dat voor u het meest van toepassing is voor de meerkeuze vragen.

Algemene vragen:

1: In welke buurt van Groningen woont u?

……….

2: Wat is uw geslacht?

◯ Man ◯ Vrouw ◯ Onzijdig

3: In welk jaar bent u geboren?

……….

4: Wat is uw hoogst behaalde opleiding?

……….

5: Wat voor werk doet u /heeft u gedaan?

……….

6: Gedurende de laatste 12 maanden, hoe vaak heeft u in de binnenstad, binnen de grachten van Groningen gefietst?

◯ Nooit ◯ Een paar dagen per jaar ◯ Een paar dagen per maand ◯ 1 tot 3 dagen per week
◯ Minstens 4 dagen per week

7: Gedurende de laatste 12 maanden, hoe vaak heeft u in de binnenstad, binnen de grachten van Groningen gelopen?

◯ Nooit ◯ Een paar dagen per jaar ◯ Een paar dagen per maand ◯ 1 tot 3 dagen per week
◯ Minstens 4 dagen per week

Vismarkt

Folkingestraat

Brugstraat

Persoonlijke context:

8: Heeft u het gevoel dat u lichamelijk kwetsbaar bent?

◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

9: Bent u over het algemeen bang dat u zich bezeert?

◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

10: Bent u vaak in een mogelijk gevaarlijke situatie gekomen tijdens het lopen of fietsen gedurende uw leven?

Lopen:
◯ Nooit ◯ Zelden (1 of 2 keer) ◯ Soms (2-5 keer) ◯ Vaak (5-10 keer) ◯ Erg vaak(10+ keer)

Fietsen:
◯ Nooit ◯ Zelden (1 of 2 keer) ◯ Soms (2-5 keer) ◯ Vaak (5-10 keer) ◯ Erg vaak(10+ keer)

11: Hoe vaak bent u tijdens het lopen of fietsen het slachtoffer geworden van een ongeval of hoe vaak bent u getuige geweest?

Lopen:
◯ Nooit ◯ Zelden (1 of 2 keer) ◯ Soms (2-5 keer) ◯ Vaak (5-10 keer) ◯ Erg vaak(10+ keer)

Fietsen:
◯ Nooit ◯ Zelden (1 of 2 keer) ◯ Soms (2-5 keer) ◯ Vaak (5-10 keer) ◯ Erg vaak(10+ keer)

12: Kent u de verkeersregels van de situaties die op de foto's op de vorige pagina staan vermeld?

◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

13: Hoe ervaren bent u in het verkeer? (aankruisen wat van toepassing is)

Lopen:
◯ Zeer onervaren ◯ Onervaren ◯ Gemiddeld ◯ Ervaren ◯ Zeer ervaren

Fietsen:
◯ Zeer onervaren ◯ Onervaren ◯ Gemiddeld ◯ Ervaren ◯ Zeer ervaren

Specifieke vragen

Deze vragen gaan over de afgebeelde verkeerssituaties op de vorige pagina. Kruis alleen aan wat voor u van toepassing is.

14: Krijgt een onveilig gevoel als u deelneemt in de afgebeelde verkeerssituaties?

Op de fiets:
◯ Zeer onveilig gevoel ◯ Onveilig gevoel ◯ Neutraal ◯ Veilig gevoel ◯ Zeer veilig gevoel

Lopend:

◯ Zeer onveilig gevoel ◯ Onveilig gevoel ◯ Neutraal ◯ Veilig gevoel ◯ Zeer veilig gevoel

15: Geeft het feit dat auto's en fietsers geen aparte strook hebben u een onveilig gevoel in de afgebeelde situaties?

Op de fiets:
◯ Zeer onveilig gevoel ◯ Onveilig gevoel ◯ Neutraal ◯ Veilig gevoel ◯ Zeer veilig gevoel

Lopend:
◯ Zeer onveilig gevoel ◯ Onveilig gevoel ◯ Neutraal ◯ Veilig gevoel ◯ Zeer veilig gevoel

16: Vindt u over het algemeen dat de weggebruikers daar goed rekening met elkaar houden?

◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

17: Vindt u over het algemeen dat de paden daar breed genoeg zijn om elkaar te passeren?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

18: Vindt u over het algemeen dat de weg te breed is om over te kunnen steken?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

19: Vindt u over het algemeen dat er voldoende mogelijkheden zijn om over te steken?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

20: Vindt u over het algemeen dat de paden in goede staat zijn? (Qua gladheid, gaten in de weg etc.)

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

21: Vindt u over het algemeen dat het daar te druk is qua fietsers en voetvangers?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

22: Vindt u over het algemeen dat er daar te veel verschillende soorten weggebruikers op de weg zijn? (zoals fietsers, brommers, auto's, skateboards)

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

23: Vindt u over het algemeen dat de snelheid van het verkeer daar te hoog is?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

24: Vindt u over het algemeen dat er te veel zware voertuigen zoals vrachtwagens aanwezig zijn?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

25: Welke weggebruiker(s) vindt u daar het meest intimiderend? (Meerdere antwoorden mogelijk)

◯ Voetganger ◯ Fietser ◯ Elektrische fiets ◯ Brommer/Scooter ◯ Auto ◯ Vrachtauto

◯ Anders, namelijk: ……….

26: Vindt u dat de afgebeelde verkeerssituaties overzichtelijk zijn?

Op de fiets:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

Lopend:
◯ Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

27: Vindt u dat er in de afgebeelde situaties te veel verkeer is?

◯Volledig mee oneens ◯ Mee oneens ◯ Neutraal ◯ Mee eens ◯ Volledig mee eens

28: Welke van de bovenstaande factoren geeft u het sterkste gevoel van onveiligheid in de afgebeelde situaties? Kies er één

Vul één getal in van de vragen 14 tot en met 27:

……………………

29: Wat zou u verbeteren of anders willen aan de afgebeelde situaties om uzelf veiliger te voelen in het verkeer?

……

……

……

30: Overige opmerkingen of aanvullingen

……

……

……

Hartelijk bedankt voor uw deelname aan dit onderzoek.

Appendix 3: Descriptive Statistics

Q1 Neighbourhood

	N	%
BinnenstadOost	22	26.8%
BinnenstadNoord	17	20.7%
Paddepoel	20	24.4%
Selwerd	10	12.2%
Gravenburg	1	1.2%
Vinkhuizen	4	4.9%
Beijum	2	2.4%
Hoogkerk	2	2.4%
Corpus den hoorn	1	1.2%
Oosterpark	1	1.2%
leek	1	1.2%
de Wijert	1	1.2%

Table 2

Q2 Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	man	26	31.7	31.7	31.7
	vrouw	56	68.3	68.3	100.0
	Total	82	100.0	100.0	

Table 3

Q 3 Birth year

	N	Minimum	Maximum	Mean	Std. Deviation
Birth Year	82	1926.00	1960.00	1944.6707	8.29109
Valid N (listwise)	82				

Table 4

Q6 #Cycled in shared spaces

	N	%
Nooit	42	51.2%
Een paar dagen per jaar	2	2.4%
Een paar dagen per maand	11	13.4%
1 tot 3 dagen per week	15	18.3%
Minstens 4 dagen per week	12	14.6%

Table 5

Q7 #Walked in shared spaces

	N	%
Nooit	2	2.4%
Een paar dagen per jaar	20	24.4%
Een paar dagen per maand	24	29.3%
1 tot 3 dagen per week	18	22.0%
Minstens 4 dagen per week	18	22.0%

Table 6

Q8_Vulnerable

	N	%

Volledig mee oneens	13	15.9%
Mee oneens	16	19.5%
Neutraal	17	20.7%
Mee eens	29	35.4%
Volledig mee eens	7	8.5%

Table 7

Q9 Generally afraid

	N	%
Volledig mee oneens	15	18.3%
Mee oneens	16	19.5%
Neutraal	20	24.4%
Mee eens	18	22.0%
Volledig mee eens	13	15.9%

Table 8

Q10_Dangerous situations pedestrian

	N	%
Nooit	20	24.4%
Zelden (1 of 2 keer)	20	24.4%
soms (2-5 keer)	27	32.9%
Vaak (5-10 keer)	11	13.4%
Erg vaak (10+ keer)	3	3.7%
Missing System	1	1.2%
Total	82	100.0%

Table 9

Q10_ Dangerous situations pedestrian

		N	%
Nooit		23	28.0%
Zelden (1 of 2 keer)		16	19.5%
soms (2-5 keer)		24	29.3%
Vaak (5-10 keer)		14	17.1%
Erg vaak (10+ keer)		2	2.4%
Missing	System	3	3.7%
Total		82	100.0%

Table 10

Q11_ victim situations pedestrian

		N	%
Nooit		42	51.2%
Zelden (1 of 2 keer)		18	22.0%
soms (2-5 keer)		15	18.3%
Vaak (5-10 keer)		5	6.1%
Erg vaak (10+ keer)		1	1.2%
Missing	System	1	1.2%
Total		82	100.0%

Table 11

Q11_ victim situations cyclist

	N	%
Nooit	37	45.1%
Zelden (1 of 2 keer)	26	31.7%

soms (2-5 keer)	11	13.4%
Vaak (5-10 keer)	6	7.3%
Missing System	2	2.4%
Total	82	100.0%

Table 12

Q12_Knowledge traffic rules

	N	%
Volledig mee oneens	7	8.5%
Mee oneens	5	6.1%
Neutraal	31	37.8%
Mee eens	23	28.0%
Volledig mee eens	11	13.4%
Missing System	5	6.1%
Total	82	100.0%

Table 13

Q13_Experience level pedestrian

	N	%
Zeer onervaren	1	1.2%
Onervaren	1	1.2%
Gemiddeld	27	32.9%
Ervaren	32	39.0%
Zeer ervaren	20	24.4%
Missing System	1	1.2%
Total	82	100.0%

Table 14

Q13 Experience level cycling

	N	%
Zeer onervaren	10	12.2%
Onervaren	7	8.5%
Gemiddeld	18	22.0%
Ervaren	27	32.9%
Zeer ervaren	15	18.3%
Missing System	5	6.1%
Total	82	100.0%

Table 15

Q14 Unsafe Feeling as Pedestrian (Subjective Safety)

	N	%
neutral & Safe Feeling	60	73.2%
Unsafe Feeling	21	25.6%
Missing System	1	1.2%
Total	82	100.0%

Table 16

Q14 Unsafe Feeling as Cyclist (Subjective Safety)

	N	%
neutral & Safe Feeling	53	64.6%
Unsafe Feeling	29	35.4%

Table 17

Q15 Lane Separation

		N	%
neutral & Safe Feeling		28	34.1%
Unsafe Feeling		49	59.8%
Missing	System	5	6.1%
Total		82	100.0%

Table 18

Q 16 Thoughtfulness

		N	%
neutraal & Agree		40	48.8%
Disagree		37	45.1%
Missing	System	5	6.1%
Total		82	100.0%

Table 19

Q17 Road Width

		N	%
neutraal & Agree		50	61.0%
Disagree		27	32.9%
Missing	System	5	6.1%
Total		82	100.0%

Table 20

Q18 Crossing Distance

	N	%

Neutral & Disagree	54	65.9%
Agree	23	28.0%
Missing System	5	6.1%
Total	82	100.0%

Table 21

Q19 Number of Crossings

	N	%
neutraal & Agree	52	63.4%
Disagree	25	30.5%
Missing System	5	6.1%
Total	82	100.0%

Table 22

Q20 Road Condition

	N	%
neutraal & Agree	46	56.1%
Disagree	36	43.9%

Table 23

Q21 Vulnerable Road Users

	N	%
Neutral & Disagree	32	39.0%
Agree	45	54.9%
Missing System	5	6.1%
Total	82	100.0%

Table 24

Q22 Amount of Modalities

		N	%
Neutral & Disagree		30	36.6%
Agree		47	57.3%
Missing	System	5	6.1%
Total		82	100.0%

Table 25

Q23 Traffic Speed

		N	%
Neutral & Disagree		33	40.2%
Agree		44	53.7%
Missing	System	5	6.1%
Total		82	100.0%

Table 26

Q24 Heavy Vehicles

		N	%
Neutral & Disagree		39	47.6%
Agree		37	45.1%
Missing	System	6	7.3%
Total		82	100.0%

Table 27

Q26 Clarity

	N	%
neutraal & Agree	57	69.5%
Disagree	25	30.5%

Table 28

Q27 Traffic Volume

	N	%
neutraal & Agree	60	73.2%
Disagree	22	26.8%

Table 29

S28_Strongest_Contributor

		N	%
14.00		4	4.9%
15.00		11	13.4%
16.00		12	14.6%
17.00		3	3.7%
18.00		2	2.4%
19.00		3	3.7%
20.00		3	3.7%
21.00		5	6.1%
22.00		6	7.3%
23.00		3	3.7%
24.00		2	2.4%
25.00		10	12.2%
Missing	System	18	22.0%
Total		82	100.0%

Table 30

Appendix 4: Binary Logistic Regression

Binary Logistic Regression

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	76	92.7
	Missing Cases	6	7.3
	Total	82	100.0
Unselected Cases		0	.0
Total		82	100.0

Table 31

Dependent Variable Encoding

Original Value	Internal Value
Geen Onveilig Gevoel_ Neutraal	0
Onveilig gevoel	1

Table 32

Categorical Variables Codings

		Frequency	Parameter coding (1)
Traffic Volume	neutraal & mee eens	56	.000
	oneens	20	1.000
Thoughtfulness	neutraal & mee eens	40	.000
	oneens	36	1.000
Road Width	neutraal & mee eens	50	.000
	oneens	26	1.000

Crossing Distance	neutraal&oneens	54	.000
	mee eens	22	1.000
Number of Crossings	neutraal & mee eens	52	.000
	oneens	24	1.000
Road Condition	neutraal & mee eens	43	.000
	oneens	33	1.000
Vulnerable Road Users	neutraal&oneens	32	.000
	mee eens	44	1.000
Clarity	neutraal & mee eens	52	.000
	oneens	24	1.000
Heavy Vehicles	neutraal&oneens	39	.000
	mee eens	37	1.000
Traffic Speed	neutraal&oneens	33	.000
	mee eens	43	1.000
Amount of Modalities	neutraal&oneens	30	.000
	mee eens	46	1.000
Lane Separation	neutraal & veilig gevoel	28	.000
	onveilig gevoel	48	1.000

Table 33

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted: Unsafe Feeling: Geen Onveilig Gevoel_ Neutraal	Predicted: Unsafe Feeling: Onveilig gevoel	Predicted: Percentage Correct
Step 0	Unsafe Feeling	Geen Onveilig Gevoel_ Neutraal	44	0	100.0
		Onveilig gevoel	32	0	.0
	Overall Percentage				57.9

Table 34

a. Constant is included in the model.

b. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.318	.232	1.879	1	.170	.727

Table 35

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Lane Separation(1)	5.321	1	.021
		Thoughtfulness(1)	3.196	1	.074
		Road Width(1)	11.929	1	.001
		Crossing Distance(1)	.142	1	.706
		Number of Crossings(1)	8.681	1	.003
		Road Condition(1)	2.119	1	.146
		Vulnerable Road Users(1)	9.280	1	.002

	Amount of Modalities(1)	1.565	1	.211
	Traffic Speed(1)	5.264	1	.022
	Heavy Vehicles(1)	8.908	1	.003
	Clarity(1)	8.681	1	.003
	Traffic Volume(1)	.049	1	.824
Overall Statistics		29.715	12	.003

Table 36

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	34.950	12	.000
	Block	34.950	12	.000
	Model	34.950	12	.000

Table 37

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	68.505[a]	.369	.496

Table 38

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than ,001.

Classification Table[a]

Observed			Predicted: Unsafe Feeling: Geen Onveilig Gevoel_ Neutraal	Predicted: Unsafe Feeling: Onveilig gevoel	Predicted: Percentage Correct
Step 1	Unsafe Feeling	Geen Onveilig Gevoel_ Neutraal	37	7	84.1
		Onveilig gevoel	10	22	68.8
	Overall Percentage				77.6

Table 39

a. The cut value is ,500

Variables in the Equation

		B	S.E.	Wald	df	Sig.
Step 1[a]	Lane Separation(1)	.153	.750	.042	1	.838
	Thoughtfulness(1)	-.051	.673	.006	1	.939
	Road Width(1)	1.705	.870	3.841	1	.050
	Crossing Distance(1)	.276	.758	.133	1	.716
	Number of Crossings(1)	-.057	.811	.005	1	.944
	Road Condition(1)	-.103	.774	.018	1	.894
	Vulnerable Road Users(1)	1.677	.800	4.390	1	.036
	Amount of Modalities(1)	-1.570	1.062	2.183	1	.140
	Traffic Speed(1)	1.040	1.007	1.066	1	.302

	Heavy Vehicles(1)	1.686	.763	4.876	1	.027
	Clarity(1)	1.551	.801	3.745	1	.053
	Traffic Volume(1)	.722	.775	.869	1	.351
	Constant	-3.233	.890	13.187	1	.000

Table 40

Variables in the Equation

			95% C.I.for EXP(B)	
		Exp(B)	Lower	Upper
Step 1[a]	Lane Separation(1)	1.166	.268	5.067
	Thoughtfulness(1)	.950	.254	3.551
	Road Width(1)	5.499	1.000	30.244
	Crossing Distance(1)	1.318	.298	5.829
	Number of Crossings(1)	.944	.193	4.624
	Road Condition(1)	.902	.198	4.112
	Vulnerable Road Users(1)	5.348	1.114	25.670
	Amount of Modalities(1)	.208	.026	1.670
	Traffic Speed(1)	2.829	.393	20.366
	Heavy Vehicles(1)	5.397	1.209	24.097
	Clarity(1)	4.715	.980	22.679
	Traffic Volume(1)	2.059	.451	9.406
	Constant	.039		

Table 41

a. Variable(s) entered on step 1: Lane Separation, Thoughtfulness, Road Width, Crossing Distance, Number of Crossings, Road Condition, Vulnerable Road Users, Amount of Modalities, Traffic Speed, Heavy Vehicles, Clarity, Traffic Volume.

Regression Multicollinearity statistics

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	4.193	.961		4.363	.000
	Lane Separation	-.025	.125	-.029	-.203	.841
	Thoughtfulness	.154	.097	.183	1.589	.126
	Road Width	.124	.110	.150	1.126	.272
	Crossing Distance	.263	.097	.381	2.715	.012
	Number of Crossings	.109	.130	.112	.835	.413
	Road Condition	.200	.086	.314	2.316	.030
	Vulnerable Road Users	-.028	.127	-.040	-.220	.828
	Amount of Modalities	.196	.124	.281	1.584	.127
	Traffic Speed	-.452	.136	-.668	-3.334	.003
	Heavy Vehicles	-.062	.088	-.102	-.705	.488
	Clarity	-.322	.114	-.454	-2.820	.010
	Traffic Volume	-.322	.141	-.403	-2.280	.032

Table 42

Coefficients[a]

Model		Collinearity Statistics Tolerance	Collinearity Statistics VIF
1	(Constant)		
	Lane Separation	.474	2.109
	Thoughtfulness	.727	1.375
	Road Width	.539	1.855

	Crossing Distance	.487	2.052
	Number of Crossings	.532	1.878
	Road Condition	.523	1.912
	Vulnerable Road Users	.289	3.462
	Amount of Modalities	.305	3.280
	Traffic Speed	.239	4.184
	Heavy Vehicles	.458	2.185
	Clarity	.370	2.701
	Traffic Volume	.308	3.249

Table 43

a. Dependent Variable: Subjective Safety

Appendix 5: Binary logistic regression elderly pedestrians only

Logistic Regression Pedestrians

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	75	91.5
	Missing Cases	7	8.5
	Total	82	100.0
Unselected Cases		0	.0
Total		82	100.0

Table 44

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Geen Onveilig Gevoel_ Neutraal	0
Onveilig gevoel	1

Table 45

Categorical Variables Codings

		Frequency	Parameter coding (1)
Traffic Volume	neutraal & mee eens	55	.000
	oneens	20	1.000
Thoughtfulness	neutraal & mee eens	39	.000
	oneens	36	1.000

Road Width Pedestrians	neutraal & mee eens	55	.000
	oneens	20	1.000
Crossing Distance Pedestrians	neutraal&oneens	55	.000
	mee eens	20	1.000
Number of Crossings Pedestrians	neutraal & mee eens	55	.000
	oneens	20	1.000
Road Condition Pedestrians	neutraal & mee eens	46	.000
	oneens	29	1.000
Traffic Volume Pedestrians	neutraal&oneens	39	.000
	mee eens	36	1.000
Clarity Pedestrians	neutraal & mee eens	56	.000
	oneens	19	1.000
Heavy Vehicles Pedestrians	neutraal&oneens	41	.000
	mee eens	34	1.000
Traffic	neutraal&oneens	35	.000
	mee eens	40	1.000
NS22_Soortenweggebr_Lopen	neutraal&oneens	34	.000
	mee eens	41	1.000
NS15_Stroken_Lopen	neutraal & veilig gevoel	37	.000
	onveilig gevoel	38	1.000

Table 46

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted: NS14_Onveiliggevoel_Lopen: Geen Onveilig Gevoel_ Neutraal	Predicted: NS14_Onveiliggevoel_Lopen: Onveilig gevoel
Step 0	NS14_Onveiliggevoel_ Lopen	Geen Onveilig Gevoel_ Neutraal	55	0
		Onveilig gevoel	20	0
	Overall Percentage			

Table 47

Classification Table[a,b]

Observed			Predicted: Percentage Correct
Step 0	NS14_Onveiliggevoel_Lopen	Geen Onveilig Gevoel_ Neutraal	100.0
		Onveilig gevoel	.0
	Overall Percentage		73.3

Table 48

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-1.012	.261	15.009	1	.000	.364

Table 49

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	NS15_Stroken_Lopen(1)	6.461	1	.011
		Thoughtfulness(1)	.535	1	.464
		NS17_Padbreedte_Lopen(1)	2.479	1	.115
		NS18_Overstekenbreedte_Lopen(1)	.155	1	.694
		NS19_Overstekenmogelijk_Lopen(1)	7.593	1	.006
		NS20_Padenstaat_Lopen(1)	1.477	1	.224
		NS21_Drukte_Lopen(1)	11.189	1	.001
		NS22_Soortenweggebr_Lopen(1)	4.550	1	.033
		NS23_Snelheid_Lopen(1)	5.144	1	.023
		NS24_Zwarevoertuigen_Lopen(1)	9.686	1	.002
		NS26_Overzichtelijk_Lopen(1)	5.577	1	.018
		Traffic Volume(1)	.155	1	.694
	Overall Statistics		24.768	12	.016

Table 50

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	29.155	12	.004
	Block	29.155	12	.004
	Model	29.155	12	.004

Table 51

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	57.832[a]	.322	.469

Table 52

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a]

			Predicted	
			NS14_Onveiliggevoel_Lopen	
	Observed		Geen Onveilig Gevoel_ Neutraal	Onveilig gevoel
Step 1	NS14_Onveiliggevoel_ Lopen	Geen Onveilig Gevoel_ Neutraal	52	3
		Onveilig gevoel	7	13
	Overall Percentage			

Table 53

Classification Table[a]

			Predicted
Observed			Percentage Correct
Step 1	NS14_Onveiliggevoel_Lopen	Geen Onveilig Gevoel_ Neutraal	94.5
		Onveilig gevoel	65.0
	Overall Percentage		86.7

Table 54

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.
Step 1[a]	NS15_Stroken_Lopen(1)	1.548	.929	2.779	1	.096
	Thoughtfulness(1)	-.899	.834	1.163	1	.281
	NS17_Padbreedte_Lopen(1)	1.329	.953	1.944	1	.163
	NS18_Overstekenbreedte_Lopen(1)	-.406	.922	.194	1	.660
	NS19_Overstekenmogelijk_Lopen(1)	-.449	.927	.235	1	.628
	NS20_Padenstaat_Lopen(1)	1.090	.898	1.472	1	.225
	NS21_Drukte_Lopen(1)	1.788	.867	4.256	1	.039
	NS22_Soortenweggebr_Lopen(1)	-.512	1.068	.229	1	.632
	NS23_Snelheid_Lopen(1)	.987	1.028	.922	1	.337

	NS24_Zwarevoertuigen_Lopen(1)	1.497	.967	2.397	1	.122
	NS26_Overzichtelijk_Lopen(1)	.782	.839	.867	1	.352
	Traffic Volume(1)	1.773	.986	3.232	1	.072
	Constant	-5.040	1.281	15.487	1	.000

Table 55

Variables in the Equation

			95% C.I.for EXP(B)	
		Exp(B)	Lower	Upper
Step 1[a]	NS15_Stroken_Lopen(1)	4.704	.762	29.054
	Thoughtfulness(1)	.407	.079	2.086
	NS17_Padbreedte_Lopen(1)	3.777	.583	24.462
	NS18_Overstekenbreedte_Lopen(1)	.666	.109	4.060
	NS19_Overstekenmogelijk_Lopen(1)	.638	.104	3.926
	NS20_Padenstaat_Lopen(1)	2.973	.511	17.283
	NS21_Drukte_Lopen(1)	5.977	1.093	32.670
	NS22_Soortenweggebr_Lopen(1)	.600	.074	4.864
	NS23_Snelheid_Lopen(1)	2.683	.358	20.100
	NS24_Zwarevoertuigen_Lopen(1)	4.469	.671	29.739
	NS26_Overzichtelijk_Lopen(1)	2.185	.422	11.323
	Traffic Volume(1)	5.889	.852	40.700
	Constant	.006		

Table 56

Appendix 6: Binary logistic regression elderly cyclists only

Logistic Regression Cyclists

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	68	82.9
	Missing Cases	14	17.1
	Total	82	100.0
Unselected Cases		0	.0
Total		82	100.0

Table 57

a. If weight is in effect, see classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Geen Onveilig Gevoel_ Neutraal	0
Onveilig gevoel	1

Table 58

Categorical Variables Codings

		Frequency	Parameter coding (1)
Traffic Volume	neutraal & mee eens	50	.000
	oneens	18	1.000
Thoughtfulness	neutraal & mee eens	36	.000
	oneens	32	1.000

NS17_Padbreedte_Fietsen	neutraal & mee eens	46	.000
	oneens	22	1.000
NS18_Overstekenbreedte_Fietsen	neutraal&oneens	50	.000
	mee eens	18	1.000
NS19_Overstekenmogelijk_Fietsen	neutraal & mee eens	53	.000
	oneens	15	1.000
NS20_Padenstaat_Fietsen	neutraal & mee eens	45	.000
	oneens	23	1.000
NS21_Drukte_Fietsen	neutraal&oneens	34	.000
	mee eens	34	1.000
NS26_Overzichtelijk_Fietsen	neutraal & mee eens	51	.000
	oneens	17	1.000
NS24_Zwarevoertuigen_Fietsen	neutraal&oneens	44	.000
	mee eens	24	1.000
NS23_Snelheid_Fietsen	neutraal&oneens	42	.000
	mee eens	26	1.000
NS22_Soortenweggebr_Fietsen	neutraal&oneens	32	.000
	mee eens	36	1.000
NS15_Stroken_Fietsen	neutraal & veilig gevoel	33	.000
	onveilig gevoel	35	1.000

Table 59

Block 0: Beginning Block

Classification Table[a,b]

Observed			Predicted: NS14_Onveiliggevoel_Fietsen: Geen Onveilig Gevoel_ Neutraal	Predicted: NS14_Onveiliggevoel_Fietsen: Onveilig gevoel
Step 0	NS14_Onveiliggevoel_ Fietsen	Geen Onveilig Gevoel_ Neutraal	43	0
		Onveilig gevoel	25	0
	Overall Percentage			

Table 60

Classification Table[a,b]

Observed			Predicted: Percentage Correct
Step 0	NS14_Onveiliggevoel_Fietsen	Geen Onveilig Gevoel_ Neutraal	100.0
		Onveilig gevoel	.0
	Overall Percentage		63.2

Table 61

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	-.542	.252	4.650	1	.031	.581

Table 62

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	NS15_Stroken_Fietsen(1)	1.151	1	.283
		Thoughtfulness(1)	2.658	1	.103
		NS17_Padbreedte_Fietsen(1)	10.101	1	.001
		NS18_Overstekenbreedte_Fietsen(1)	.621	1	.431
		NS19_Overstekenmogelijk_Fietsen(1)	7.402	1	.007
		NS20_Padenstaat_Fietsen(1)	3.550	1	.060
		NS21_Drukte_Fietsen(1)	5.124	1	.024
		NS22_Soortenweggebr_Fietsen(1)	1.941	1	.164
		NS23_Snelheid_Fietsen(1)	1.596	1	.206
		NS24_Zwarevoertuigen_Fietsen(1)	2.795	1	.095
		NS26_Overzichtelijk_Fietsen(1)	4.744	1	.029
		Traffic Volume(1)	.850	1	.356
	Overall Statistics		17.823	12	.121

Table 63

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	19.257	12	.083
	Block	19.257	12	.083
	Model	19.257	12	.083

Table 64

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	70.189[a]	.247	.337

Table 65

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Classification Table[a]

Observed			Predicted: NS14_Onveiliggevoel_Fietsen: Geen Onveilig Gevoel_ Neutraal	Predicted: NS14_Onveiliggevoel_Fietsen: Onveilig gevoel
Step 1	NS14_Onveiliggevoel_ Fietsen	Geen Onveilig Gevoel_ Neutraal	37	6
		Onveilig gevoel	11	14
	Overall Percentage			

Classification Table[a]

Observed	Predicted: Percentage Correct

Step 1	NS14_Onveiliggevoel_Fietsen	Geen Onveilig Gevoel_ Neutraal	86.0
		Onveilig gevoel	56.0
	Overall Percentage		75.0

Table 66

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.
Step 1[a]	NS15_Stroken_Fietsen(1)	-.309	.715	.186	1	.666
	Thoughtfulness(1)	-.142	.708	.040	1	.841
	NS17_Padbreedte_Fietsen(1)	1.423	.798	3.182	1	.074
	NS18_Overstekenbreedte_Fietsen(1)	.593	.819	.524	1	.469
	NS19_Overstekenmogelijk_Fietsen(1)	1.239	.822	2.268	1	.132
	NS20_Padenstaat_Fietsen(1)	-.485	.772	.394	1	.530
	NS21_Drukte_Fietsen(1)	1.022	.821	1.547	1	.214
	NS22_Soortenweggebr_Fietsen(1)	.175	.988	.031	1	.860
	NS23_Snelheid_Fietsen(1)	-.400	.895	.200	1	.655
	NS24_Zwarevoertuigen_Fietsen(1)	.486	.689	.499	1	.480

	NS26_Overzichtelijk_Fietsen(1)	1.121	.787	2.031	1	.154
	Traffic Volume(1)	-.012	.828	.000	1	.988
	Constant	-2.073	.742	7.800	1	.005

Table 67

Variables in the Equation

		Exp(B)	95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1[a]	NS15_Stroken_Fietsen(1)	.735	.181	2.985
	Thoughtfulness(1)	.867	.217	3.473
	NS17_Padbreedte_Fietsen(1)	4.151	.869	19.834
	NS18_Overstekenbreedte_Fietsen(1)	1.809	.363	9.010
	NS19_Overstekenmogelijk_Fietsen(1)	3.451	.688	17.294
	NS20_Padenstaat_Fietsen(1)	.616	.136	2.797
	NS21_Drukte_Fietsen(1)	2.778	.555	13.896
	NS22_Soortenweggebr_Fietsen(1)	1.191	.172	8.256
	NS23_Snelheid_Fietsen(1)	.670	.116	3.871
	NS24_Zwarevoertuigen_Fietsen(1)	1.626	.422	6.271
	NS26_Overzichtelijk_Fietsen(1)	3.068	.657	14.334
	Traffic Volume(1)	.988	.195	5.007
	Constant	.126		

Table 68

a. Variable(s) entered on step 1: NS15_Stroken_Fietsen, Thoughtfulness, NS17_Padbreedte_Fietsen, NS18_Overstekenbreedte_Fietsen, NS19_Overstekenmogelijk_Fietsen, NS20_Padenstaat_Fietsen, NS21_Drukte_Fietsen, NS22_Soortenweggebr_Fietsen, NS23_Snelheid_Fietsen, NS24_Zwarevoertuigen_Fietsen, NS26_Overzichtelijk_Fietsen, Traffic Volume.

Appendix 7: Sign Test

The sign test was used to prove the fact that there was no difference between the answers for walking and cycling for most of the independent variables. A significant result indicates that there is a difference between the results for walking and cycling. Thus, an insignificant result means that there is no difference, which is the case for most of the variables. See test statistics below.

NPar Tests: Sign Test

Frequencies

		N
S15_Stroken_Lopen - S15_Stroken_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	17
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	15
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	42
	Total	74
S17_Padbreedte_Lopen - S17_Padbreedte_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	4
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	17
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	53
	Total	74
S18_Overstekenbreedte_Lopen - S18_Overstekenbreedte_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	12
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	7
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	53
	Total	72

S19_Overstekenmogelijk_Lopen - S19_Overstekenmogelijk_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	13
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	9
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	53
	Total	75
S20_Padenstaat_Lopen - S20_Padenstaat_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	10
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	8
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	55
	Total	73
S21_Drukte_Lopen - S21_Drukte_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	11
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	13
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	49
	Total	73
S22_Soortenweggebr_Lopen - S22_Soortenweggebr_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	10
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	16
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	48
	Total	74

S23_Snelheid_Lopen - S23_Snelheid_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	5
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	20
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	49
	Total	74
S24_Zwarevoertuigen_Lopen - S24_Zwarevoertuigen_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	4
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	12
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	59
	Total	75
S26_Overzichtelijk_Lopen - S26_Overzichtelijk_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	6
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	14
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	55
	Total	75
NS14_Onveiliggevoel_Lopen - NS14_Onveiliggevoel_Fietsen	Negative Differences[a,d,g,j,m,p,s,v,y,ab,ae]	13
	Positive Differences[b,e,h,k,n,q,t,w,z,ac,af]	5
	Ties[c,f,i,l,o,r,u,x,aa,ad,ag]	63
	Total	81

Table 69

Test Statistics[a]

	S15_Stroken_Lopen - S15_Stroken_Fietsen	S17_Padbreedte_Lopen - S17_Padbreedte_Fietsen	S18_Oversteekenbreedte_Lopen - S18_Oversteekenbreedte_Fietsen	S19_Oversteekenmogelijk_Lopen - S19_Oversteekenmogelijk_Fietsen	S20_Padenstaat_Lopen - S20_Padenstaat_Fietsen
Z	-.177				
Asymp. Sig. (2-tailed)	.860				
Exact Sig. (2-tailed)		.007[b]	.359[b]	.523[b]	.815[b]

Table 70

Test Statistics[a]

	S21_Drukte_Lopen - S21_Drukte_Fietsen	S22_Soortenweggebr_Lopen - S22_Soortenweggebr_Fietsen	S23_Snelheid_Lopen - S23_Snelheid_Fietsen	S24_Zwarevoertuigen_Lopen - S24_Zwarevoertuigen_Fietsen	S26_Overzichtelijk_Lopen - S26_Overzichtelijk_Fietsen
Z		-.981			
Asymp. Sig. (2-tailed)		.327			
Exact Sig. (2-tailed)	.839[b]		.004[b]	.077[b]	.115[b]

Table 71

Test Statistics[a]

	NS14_Onveiliggevoel_Lopen - NS14_Onveiliggevoel_Fietsen
Z	
Asymp. Sig. (2-tailed)	
Exact Sig. (2-tailed)	.096[b]

Table 72

a. Sign Test

b. Binomial distribution used.

Appendix 8: Syntax

The syntax contains the programming language of SPSS Statistics. Hereby, all the commands for the statistical analyses are included.

```
* Encoding: UTF-8.

LOGISTIC REGRESSION VARIABLES CQ14_Unsafe_Feeling
 /METHOD=ENTER CQ15_Lane_Separation CQ16_Thoughtfulness CQ17_Road_Width
CQ18_Crossing_Distance
  CQ19_Number_of_Crossings CQ20_Road_Condition CQ21_Vulnerable_Road_Users
CQ22_Amount_of_Modalities
  CQ23_Traffic_Speed CQ24_Heavy_Vehicles CQ26_Clarity CQ27_Traffic_Volume
 /CONTRAST (CQ16_Thoughtfulness)=Indicator(1)
 /CONTRAST (CQ27_Traffic_Volume)=Indicator(1)
 /CONTRAST (CQ18_Crossing_Distance)=Indicator(1)
 /CONTRAST (CQ21_Vulnerable_Road_Users)=Indicator(1)
 /CONTRAST (CQ22_Amount_of_Modalities)=Indicator(1)
 /CONTRAST (CQ23_Traffic_Speed)=Indicator(1)
 /CONTRAST (CQ24_Heavy_Vehicles)=Indicator(1)
 /CONTRAST (CQ15_Lane_Separation)=Indicator(1)
 /CONTRAST (CQ17_Road_Width)=Indicator(1)
 /CONTRAST (CQ19_Number_of_Crossings)=Indicator(1)
 /CONTRAST (CQ20_Road_Condition)=Indicator(1)
 /CONTRAST (CQ26_Clarity)=Indicator(1)
 /PRINT=CI(95)
 /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).

NPAR TESTS
 /SIGN=S15_Stroken_Fietsen S17_Padbreedte_Fietsen S18_Overstekenbreedte_Fietsen
  S19_Overstekenmogelijk_Fietsen S20_Padenstaat_Fietsen S21_Drukte_Fietsen
S22_Soortenweggebr_Fietsen
  S23_Snelheid_Fietsen S24_Zwarevoertuigen_Fietsen S26_Overzichtelijk_Fietsen
```

```
  NS14_Onveiliggevoel_Fietsen WITH S15_Stroken_Lopen S17_Padbreedte_Lopen
S18_Overstekenbreedte_Lopen
  S19_Overstekenmogelijk_Lopen S20_Padenstaat_Lopen S21_Drukte_Lopen
S22_Soortenweggebr_Lopen
  S23_Snelheid_Lopen S24_Zwarevoertuigen_Lopen S26_Overzichtelijk_Lopen
NS14_Onveiliggevoel_Lopen
  (PAIRED)
 /MISSING ANALYSIS.
```

Om verschil te testen tussen variablen:

```
NPAR TESTS
 /SIGN=S15_Stroken_Fietsen S17_Padbreedte_Fietsen S18_Overstekenbreedte_Fietsen
  S19_Overstekenmogelijk_Fietsen S20_Padenstaat_Fietsen S21_Drukte_Fietsen
S22_Soortenweggebr_Fietsen
  S23_Snelheid_Fietsen S24_Zwarevoertuigen_Fietsen S26_Overzichtelijk_Fietsen WITH
S15_Stroken_Lopen
  S17_Padbreedte_Lopen S18_Overstekenbreedte_Lopen S19_Overstekenmogelijk_Lopen
S20_Padenstaat_Lopen
  S21_Drukte_Lopen S22_Soortenweggebr_Lopen S23_Snelheid_Lopen
S24_Zwarevoertuigen_Lopen
  S26_Overzichtelijk_Lopen (PAIRED)
 /MISSING ANALYSIS.
```

Aparte logistic regression (test) lopers

```
LOGISTIC REGRESSION VARIABLES NS14_Onveiliggevoel_Lopen
 /METHOD=ENTER NS15_Stroken_Lopen CQ16_Thoughtfulness NS17_Padbreedte_Lopen
  NS18_Overstekenbreedte_Lopen NS19_Overstekenmogelijk_Lopen NS20_Padenstaat_Lopen
NS21_Drukte_Lopen
  NS22_Soortenweggebr_Lopen NS23_Snelheid_Lopen NS24_Zwarevoertuigen_Lopen
NS26_Overzichtelijk_Lopen
  CQ27_Traffic_Volume
 /CONTRAST (CQ16_Thoughtfulness)=Indicator(1)
 /CONTRAST (CQ27_Traffic_Volume)=Indicator(1)
 /CONTRAST (NS15_Stroken_Lopen)=Indicator(1)
 /CONTRAST (NS17_Padbreedte_Lopen)=Indicator(1)
 /CONTRAST (NS18_Overstekenbreedte_Lopen)=Indicator(1)
 /CONTRAST (NS19_Overstekenmogelijk_Lopen)=Indicator(1)
 /CONTRAST (NS20_Padenstaat_Lopen)=Indicator(1)
 /CONTRAST (NS21_Drukte_Lopen)=Indicator(1)
 /CONTRAST (NS22_Soortenweggebr_Lopen)=Indicator(1)
 /CONTRAST (NS23_Snelheid_Lopen)=Indicator(1)
 /CONTRAST (NS24_Zwarevoertuigen_Lopen)=Indicator(1)
 /CONTRAST (NS26_Overzichtelijk_Lopen)=Indicator(1)
 /PRINT=CI(95)
 /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```

Fietsers:

```
LOGISTIC REGRESSION VARIABLES NS14_Onveiliggevoel_Fietsen
```

```
  /METHOD=ENTER NS15_Stroken_Fietsen CQ16_Thoughtfulness NS17_Padbreedte_Fietsen
    NS18_Overstekenbreedte_Fietsen NS19_Overstekenmogelijk_Fietsen NS20_Padenstaat_Fietsen
    NS21_Drukte_Fietsen NS22_Soortenweggebr_Fietsen NS23_Snelheid_Fietsen
NS24_Zwarevoertuigen_Fietsen
    NS26_Overzichtelijk_Fietsen CQ27_Traffic_Volume
  /CONTRAST (CQ16_Thoughtfulness)=Indicator(1)
  /CONTRAST (CQ27_Traffic_Volume)=Indicator(1)
  /CONTRAST (NS15_Stroken_Fietsen)=Indicator(1)
  /CONTRAST (NS17_Padbreedte_Fietsen)=Indicator(1)
  /CONTRAST (NS18_Overstekenbreedte_Fietsen)=Indicator(1)
  /CONTRAST (NS19_Overstekenmogelijk_Fietsen)=Indicator(1)
  /CONTRAST (NS20_Padenstaat_Fietsen)=Indicator(1)
  /CONTRAST (NS21_Drukte_Fietsen)=Indicator(1)
  /CONTRAST (NS22_Soortenweggebr_Fietsen)=Indicator(1)
  /CONTRAST (NS23_Snelheid_Fietsen)=Indicator(1)
  /CONTRAST (NS24_Zwarevoertuigen_Fietsen)=Indicator(1)
  /CONTRAST (NS26_Overzichtelijk_Fietsen)=Indicator(1)
  /PRINT=CI(95)
  /CRITERIA=PIN(0.05) POUT(0.10) ITERATE(20) CUT(0.5).
```