The impact of various factors on travel satisfaction for train commuters in Groningen and their subsequent influence on their willingness to keep using the train

university of
groningen

faculty of spatial sciences

Colophon

Title:	The impact of various factors on travel satisfaction for train commuters in Groningen and their subsequent influence on their willingness to keep using the train
Version:	Research step 7: Final version Bachelor Thesis
Author:	Frank Versprille
Student number:	s4122771
Contact:	f.versprille@student.rug.nl
Course:	Bachelor project SPD
Programme:	BSc Spatial Planning and Design
University:	University of Groningen
Faculty:	Faculty of Spatial Sciences
Academic year:	2021-2022
Supervisor:	Dr. S. Ramezani
Second assessor:	Dr. F. Niekerk
Date:	17.06.2022
Word count:	6586

Abstract

Much research has been done on travel satisfaction, the differences between public transport and private car use on travel satisfaction, factors influencing travel satisfaction, commuting, and the willingness to keep using the same mode of transport. However, this knowledge has not been applied to the regional train services in the province of Groningen. Therefore, this study combines different literature sources to get an extensive model in which 18 factors influence travel satisfaction in trains. Furthermore, this knowledge is used in a quantitative study into travel satisfaction and willingness to keep using this mode of transport in the province of Groningen. Based on data from 110 respondents, it is shown that all identified factors show significant correlations with perceived travel satisfaction, from which the category of human resources shows the strongest correlation, whilst the built environment shows the least. Moreover, this study shows that travel satisfaction is lower than measured during the annual national study specified for the province of Groningen. Finally, the study concludes that a higher travel satisfaction correlates with a higher willingness to keep using the train as their general mode of transport. Future policy should primarily focus on station clarity, human resources and punctuality to prevent people from switching to private car use and convince people currently using their private car to start using the train. Improvements on these three factors will have the most impact.

Keywords

Travel satisfaction | Commuters | Willingness to keep using the train | Public transport

Table of Content

List of tables and figures

1. Background

Commuting is ordinary for the working population across the globe (Stutzer and Frey, 2008). On average, every commuter in the Netherlands spends 491km on a train annually to travel to work (CBS, 2019). This travel behaviour can lead to crowded trains during peak hours, which causes lower travel satisfaction due to increased stress and discomfort (Costal, Pickup and Di Martino, 1988; Stutzer and Frey, 2008; Cantwell, Caulfield and O'Mahony, 2009). On the other hand, commuting comes with various positive aspects. It is known that people using the train for their commute are generally less stressed compared to people using a private car (Wener and Evans, 2011). Moreover, the use of trains over private cars positively impacts the climate (Chapman, 2007) and significantly lowers city congestion (Nguyen-Phuoc *et al.*, 2020). Therefore, it may be concluded that striving for more commuting by trains is beneficial for both individual commuters and the global environment. These positive impacts on the climate and congestion could be further increased, as approximately 68% of all travel in the Netherlands takes place in a private car (CBS, 2019). Numbers from CBS (2014) show that about 53% of commuters are people travelling for work during peak hours, whilst about 22% are students. In the Netherlands, about 1 out of 6 people aged 18-25 own a private car. This number increases to more than 1 in 2 people when looking at people aged 25-65 (CBS, 2020). Considering that students are predominantly aged between 18-25, it can be expected that the most significant share of private car users is people commuting to work. It is interesting to see what factors can improve travel satisfaction in trains, to make this mode of transport more attractive.

Pawlasova (2015) and Mouwen (2015) both identified fifteen factors that influence travel satisfaction in trains. It is interesting to see if and how the studied factors influence travel satisfaction for commuters in the province of Groningen, how satisfied they are with their travel and what implication this level of satisfaction has on their willingness to keep using the train. This knowledge will add to the existing literature by providing insight if the established factors (Mouwen, 2015; Pawlasova, 2015) apply to the province of Groningen, thereby adding to the knowledge if these factors are generally applicable. Finally, the outcomes of this research can be helpful by providing insights into which factors influence travel satisfaction the most in the province of Groningen. This knowledge can then be used for designing policies to make travel by train more attractive and prevent people from switching to other modes of transport, such as a private car.

2. Research Problem

This research aims to find out what factors influence travel satisfaction for train commuters, how satisfied train commuters are in the province of Groningen, and what implications this level of satisfaction has on their willingness to keep using this mode of transport.

This research adopts the following research question:

"By which factors, how and to what degree does travel satisfaction for train commuters in the province of Groningen influence their willingness to keep using this mode of transport?"

Consequently, the questions that follow from the main research question are:

1. What factors influence travel satisfaction for train commuters?

2. To what degree do these different factors impact travel satisfaction?
3. How satisfied are train commuters in the province of Groningen with their commute?
4. How and to what degree does travel satisfaction in trains influence the willingness to keep using the train as mode of transport?

3. Structure

This thesis is structured around multiple study methods. Firstly, a literature study was conducted, the results of which can be found in the theoretical framework. The theoretical framework is followed by the conceptual framework and set up for the quantitative research. Then, the methodology of the entire study is presented in chapter 7. The final chapters will comprise the results and conclusions subsequently.

4. Theoretical Framework

In this study, the first sub-question uses travel satisfaction in trains as the dependent variable and various factors as independent variables. The final sub-question uses travel satisfaction in trains as independent variable and the willingness to keep using the train as mode of transport as independent variable. The following chapter will summarise and compare existing literature on the relationships between these variables.

4.1. Travel satisfaction

4.1.1. Background, stress and categories

Much research has been done on travel satisfaction. In their study, De Vos and Witlox (2017) note that the cognitive background of satisfaction consists of four elements: the presence of positive feelings, the absence of negative feelings, domain satisfaction and overall satisfaction with life. The presence of positive and negative feelings can be referred to as the short term and can be referred to as a person's mood. Domain satisfaction is the medium-term satisfaction with certain domains in life (e.g. job satisfaction). Life satisfaction is a cognitive evaluation of how good one's life is over a more extended period. When this notion is put in the perspective of travel, trip satisfaction refers to the presence of positive feelings or the absence of negative feelings during a trip. Trip satisfaction can thus be seen as a short-term attribution of emotion in a specific moment. The overall satisfaction with daily travel, such as a regular commute, can be regarded as (medium-term) domain satisfaction (Vos and Witlox, 2017).

Travel satisfaction is mediated through the perceived levels of stress from travellers (Cantwell, Caulfield and O'Mahony, 2009). Stress can be perceived as any factor that disrupts the homeostasis in the human body. These factors can comprise many forms, ranging from being subtle and hardly recognisable to very clear and noticeable (Kopin, 1995). By combining these notions, it may be concluded that all factors that influence travel satisfaction will do so through provoking some form of stress on the commuter.

To emphasise the importance of stress mitigation, it is worth noticing that, besides influencing travel satisfaction, stress can negatively influence people's personal life (Wener, Evans and Boately, 2005), can have a negative effect on the overall quality of life (Costal, Pickup and Di Martino, 1988) and can contribute to serious health problems (Wener, Evans and Boately, 2005). Therefore, it can be deemed important to reduce stress and improve travel satisfaction. Not solely for a commute, but for the lives of commuters and travellers in general.

Stress can be caused by many factors, and it is essential to get a clear view of those. Both de Oña et al. (2013) and Antonucci et al. (2014) found that factors affecting customer satisfaction

with public city transport can be grouped into four categories: service organisation, safety and reliability, human resources, and comfort and cleanliness. Service organisation is related to punctuality and regularity of service; safety and reliability is related to the security of passengers and baggage and the reliability of operation; human resources is related to personnel's professionalism; and comfort and cleanliness is related to the overall hygiene and seating possibilities (Antonucci *et al.*, 2014). These studies were conducted in the public transport network in Spain, but it may be assumed that the categories are also applicable in The Netherlands. These four mentioned categories are already comprehensive; however, built environment factors are not separately addressed, whilst these factors do impact travel satisfaction (Ye and Titheridge, 2017). Therefore, built environmental factors influencing travel satisfaction will also be addressed.

4.1.2. Identified factors

Within the five beforementioned categories, different factors can be distinguished. Pawlasova (2015), in her research, identified fifteen variables for the factors that influence travel satisfaction. These variables are timetable clarity, service continuity, station proximity, information, service frequency, punctuality, transport speed, vehicle cleanliness, transport comfort, safety, fare, and overall satisfaction with public transport. Mouwen (2015) conducted his study in The Netherlands, which resulted in a locally representative view of variables. He also identified fifteen variables, namely: punctuality, transport speed, service frequency, fare, personnel behaviour, driver behaviour, on-board information, ticket-selling ease, information, safety at stations, cleanliness, ease of boarding, seating capacity, noise and safety on board. Das et al. (2013) conducted a similar research in the monorail from Kuala Lumpur. This study found various variables including station cleanliness, ticket counter, on-board information, punctuality of train arrival, cleanliness in the trains and security and installation of CCTV. Additionally, van Hagen and Heiligers (2011) found that station surroundings have an impact on the overall travel satisfaction. Some overlaps exist when Pawlasova's (2015) variables are combined with those from Das et al. (2013); van Hagen and Heiligers (2011); and Mouwen (2015). When these overlaps are accounted for and the remaining variables are sorted by the categories provided by Oña et al. (2013) and Antonucci et al. (2014), as well as the built environment, all variables can be listed as follows:

Built environment
- Station information clarity:
    o Timetables and other sources of information at the station are sufficiently available and explicit. As a result, it is easy to navigate and get informed.
- Service continuity:
    o Transfers to and from the train are time and space manageable. The platforms are logically located, and walking distances are optimised.
- Station proximity:
    o The train station is located logically and accessible without any problem.
- Station safety:
    o The station is free of unnecessary hazardous objects; fencing and warning signage are in place, and lighting is well arranged.
- Station cleanliness:
    o The train station is cleaned regularly, and there is no lack of maintenance.
- Station surroundings:

- o The train station and its surroundings are attractive places. Greenery is in place, and the overall impression is good.

Service organisation
- Train information:
    - o Information in the train vehicles is sufficiently available, accurate, and explicit.
- Service frequency:
    - o The frequency of trains is sufficient concerning the number of passengers using the trajectory.
- Punctuality:
    - o Trains arrive and leave at the scheduled times.
- Transport speed:
    - o The travel time is in proportion to the distance travelled.
- Ticket selling ease:
    - o Buying a ticket is easy, and the check-in process is intuitive and efficient.
- Fare:
    - o The price paid for the trip is affordable and in proportion to the travel distance.
- Overall satisfaction:
    - o Overall satisfaction with the national public transport network in general.

Comfort and cleanliness
- Vehicle cleanliness:
    - o The insides of trains are clean, and there is no lack of maintenance.
- Transport comfort:
    - o Travelling on the train is comfortable, and there is enough seating capacity for all travellers.
- Noise:
    - o The trains are well insulated, and noise from outside and the tracks are not disturbingly present.

Safety and reliability
- Safety:
    - o The train is free of unnecessary hazardous objects; doors and safety installations function well, and tracks are constructed so that unexpected extreme movements are prevented.

Human resources
- Personnel behaviour:
    - o Personnel is kind, patient and understanding. Furthermore, they appear approachable and calmly address any remarks or questions.

Of the 18 different factors, service punctuality can be deemed the most critical factor influencing travel satisfaction (Brons and Rietveld, 2009; Oña *et al.*, 2013; Antonucci *et al.*, 2014; Mouwen, 2015; Pawlasova, 2015). As opposed to punctuality, the impact of comfort on overall travel satisfaction is disputed. Brons and Rietveld (2009) and Antonucci et al. (2014) found that comfort is one of the most important influences, whilst Oña et al. (2013) and Pawlasova (2015) state that it is not. Moreover, Brons and Rietveld (2009) found that regular travellers attach relatively more importance to comfort than irregular travellers.

Besides the general importance of various factors, is good to note that the perception and attributed importance of the various factors are very personal for respondents. As noted by Mouwen (2015), many authors in transportation research point to the heterogeneity in

passengers' perceptions of the different aspects of the service provided (Andreassen, 1995; Baltes, 2003; Tyrinopoulos and Antoniou, 2008; Brons and Rietveld, 2009; Eboli and Mazzulla, 2009; Dell'Olio, Ibeas and Cecín, 2010; Diana, 2012).

Finally, demographic factors also influence travel satisfaction. In their study, De Vos and Witlox (2017) note that older people have more positive feelings and a more positive evaluation of their trip, which indicates that travel satisfaction increases with age. Moreover, St-Louis et al. (2014) and Yavuz and Welch (2010) found that gender differences significantly impact travel satisfaction for metro users and pedestrians in Canada, namely that male travellers were 3,5% (St-Louis *et al.*, 2014) more satisfied. This phenomenon is attributed to women's higher experienced sense of crime insecurity. These conclusions cannot be directly extrapolated to this study; however, the underlying effect might also apply in The Netherlands.

4.2. Willingness to keep using the train

Many factors can influence a person's decision for their general mode of transport for their commute. These factors include, but are not limited to, income, job typology, travel time and accessibility to public transport (Corpuz, 2007). When starting a commute, someone will consider if the mode of transport that is always used is also favourable with the specific circumstances of that day in mind. These circumstances can involve a wide variety of things, such as weather conditions, evening plans and other particularities (Kim, 2020). The consideration to change the general mode of transport is less dependent on daily circumstances and thus much less elastic (Asensio, 2002). The willingness to keep using the train as general mode of transport can thus be defined as the indication from commuters if they will or will not keep using the train as their general, daily mode of transport.

5. Conceptual Model

The conceptual model of this study, which is based upon the theoretical framework, is shown in Figure 1.
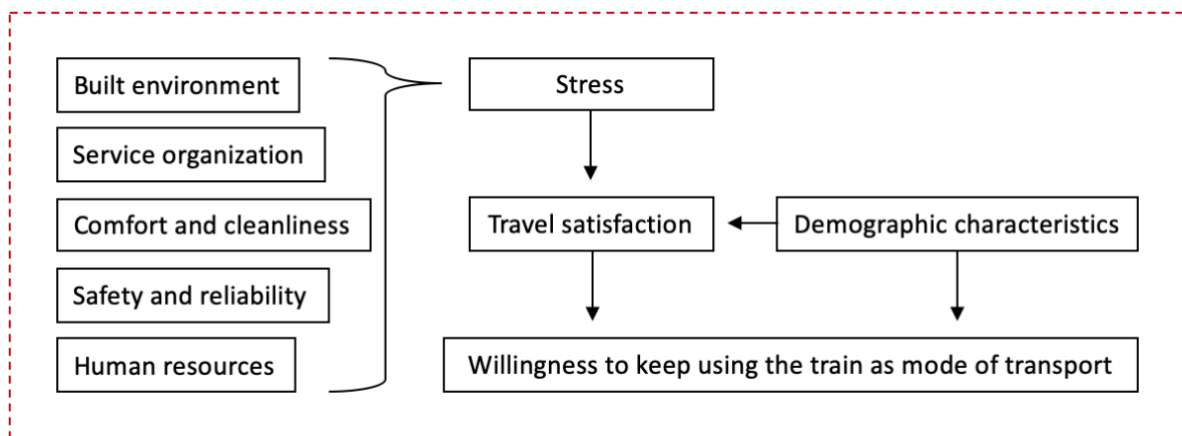

Figure 1 - Conceptual model

The conceptual model shows how the main concepts within this research interrelate. It can be seen that different factors influence travel satisfaction, which then influences the willingness to keep using the train as a mode of transport.

9

6. Hypotheses

With the existing literature in mind, it can be expected that a lower attribution of value to the presented factors will negatively influence travel satisfaction. This negative influence will lead to a lower willingness to keep using the train as a mode of transport. This effect will be marginalised by external factors, such as a lack of alternative modes of transport or obligations by employers.

7. Methodology

This research used a mixed-methods approach to answer the research questions. Firstly, a literature review was conducted to identify factors influencing travel satisfaction. The results of this review formed the basis for a mainly quantitative survey. A quantitative approach is best suited here as the main focus of the study is on making generalised inferences on a larger population, as well as comparing the results of different studies. At the end of the survey, a qualitative question was added. This was done to gain insights in the reasoning behind value attributions of respondents. This mixed-method has been developed over the past years and proves its value (Kelle, 2006).

A schematic overview of the research design can be found in Figure 2.
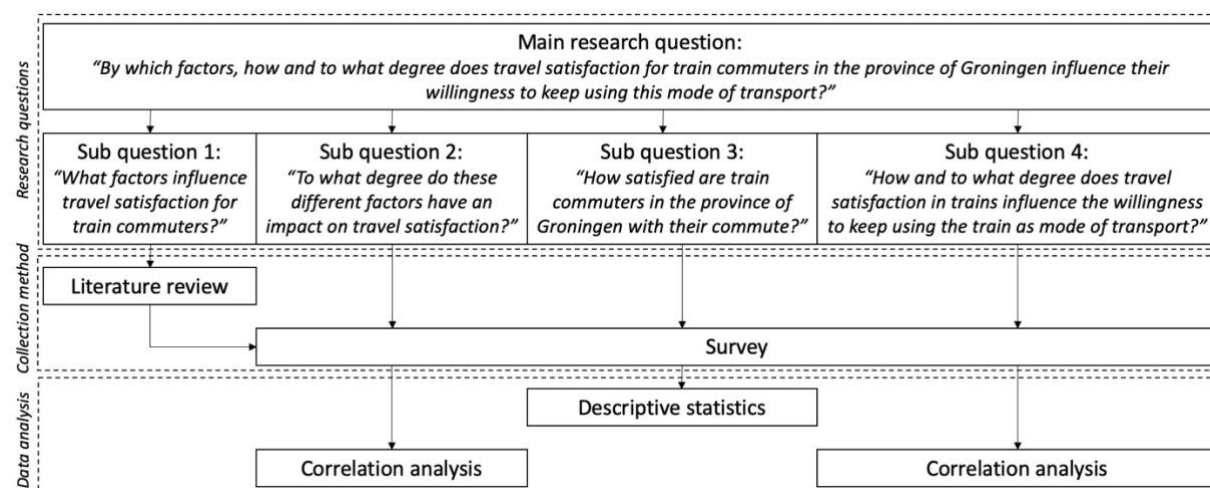
Figure 2 - Schematic overview of research design

7.1. Data collection

To answer the various research questions. Data was collected using a literature review and a survey. A detailed description of the methodological approach can be found in Appendix 1: Methodological approach.

7.1.1. Literature review

A literature review has been conducted to answer sub-question 1 (See 4.1.). Academic publications were found using three different databases: PubMed, SmartCat and Google Scholar. Various combinations of keywords were used to find relevant literature within these databases. Keywords include, but are not limited to: *"Travel satisfaction", "Perceived travel satisfaction", "Travel satisfaction factors", "Mode of transport choice factors", "Train satisfaction", and "Willingness to change travel behaviour".*

7.1.2.   Survey
7.1.2.1.   Survey setup
A mainly quantitative research method was implemented to answer the second, third, and fourth sub-questions. This method is optimal for descriptive research (Kelley *et al.*, 2003) and for conceptualising reality into variables, measuring them, and studying relationships between them (Punch, 2005). Furthermore, within the domain of quantitative design, a survey was conducted. A conceptualisation of dependent and independent variables was established, as is common in experimental designs (Punch, 2005). As previously mentioned, a qualitative open-ended question is added to gain insights into the reasoning of respondents. The survey was conducted online via the survey tool Qualtrics, which the University of Groningen provided.

7.1.2.2.   Study area
This study is focused on commuters in the province of Groningen. The city of Groningen is the biggest city within the province and thus the place that attracts the most commuters.

Within the city, there are three train stations, which are situated at the ends of the three directions trains operate within the province (See Figure 3). To get a representative result, the survey was conducted in trains on the trajectories of "Groningen - Groningen Noord" and "Groningen - Groningen Europapark". On the first trajectory, a constant alteration was made between

Figure 3 - Rail map Groningen 2020 (NS, 2019)

the trains going to and from Eemshaven and Delfszijl, respectively. This method ensured the best randomisation of the origin of respondents in the sample.

7.1.2.3.   Respondent recruitment
Potential respondents were approached using a random sampling technique. A quick talk determined if the individual was part of the target population of commuters. This method reduced the number of people filling in the survey redundantly. The survey also contained a question about travel purpose and frequency to ensure all non-commuters can be left out in further analyses.

The approaching of respondents was done during different rush-hour periods, as these moments are accompanied by the most travel movements, especially among the target population.

The potential respondents were approached and given a flyer (See Appendix 3: Survey invitation flyer) when they seemed to be part of the target population. The flyer contained general information about the research and a QR code linked to the Qualtrics survey.

7.1.2.4.   Survey content
The survey consists of various sections set out in this paragraph.

The first section asks respondents about their socio-demographic characteristics (age, gender, residence) and travel behaviour (travel time, frequency, and purpose), aimed at filtering responses to prevent people outside the target group from being included in the analysis. For

example, a respondent that only uses the train sporadically for family visits cannot be considered a commuter.

The second section asks respondents about their travel satisfaction. They are asked to indicate to what extent they agree with statements that correspond to the 18 factors. The statements are easy to understand, whereby answer possibilities are presented on a 5-point Likert scale, having the anchor points "Disagree", "Somewhat disagree", "Neither agree or disagree", "Moderately agree", and "Very much agree". According to Casper et al. (2019), these anchor points lead to the most equidistant answer possibilities. It is interesting to note that Nemoto and Beglar (2014) conclude that any survey should not include "Neutral", whilst Casper et al. (2019) conclude that the association of "Neutral" and "Neither agree or disagree" is identical.

The third section asks respondents about their overall travel satisfaction using a 10-point numerical scale. It may be assumed that this way of attributing value to a situation feels natural for most citizens in The Netherlands, as the school system utilises this method to mark assignments.

The final section of the survey asks respondents about their willingness to keep using the train as a mode of transport. These statements were also presented with the 5-point Likert scale, in line with the second section.

The default language of the survey was English, as this research is conducted in that language. However, respondents might not be too familiar with the English language. Therefore, the survey was also available in Dutch, which ensured commuters always understood the posed question, which contributed to the internal validity of the survey.

No alterations were made between negative and positive phrased questions in all questions and statements to prevent confusion. To overcome acquiescence and response bias, alternating questions are sometimes done. However, Sauro and Lewis (2011) found that this comes with significant downsides which do not outweigh the positive effects. Finally, all questions and statements resulted in ordinal data, as various studies have shown that a Likert scale cannot be translated to interval or ratio data (Parker, Mcdaniel and Crumpton-young, 2002; Casper *et al.*, 2019).

An overview of all survey questions can be found in Appendix 2: Overview survey questions.

7.2. Data quality and analysis

The collected data was analysed using various statistical analyses.

Sub-question 1 has been answered using a literature review, shown in chapter 4.1. Approximately 210 invites were handed out for the survey, which resulted in 110 respondents filling out the full survey. The answers were filtered before making further analyses. Respondents using the train for other purposes than work, school or university, and respondents using the train less than twice a week, were excluded. This filtering resulted in 81 respondents being included in the analysis, making the quality of the data sufficient. The results of the analysis are presented in chapter 8.

Sub-question 2 involved a correlation analysis using Spearman's Rank-Order Correlation test. This test is suitable for ordinal data. This analysis shows the direction and degree of influence of the various factors on travel satisfaction. Attributing strength to Spearman's Rho values is different for various research fields (Akoglu, 2018). For this research, the various attributions by Dancey and Reidy (2007) are used. They consider a value of 0 - 0,3 weak; a value of 0,4 - 0,6 moderate; and a value of 0,7 - 0,9 strong. Values of 0 and 1 are zero and perfect, respectively.

For answering sub-question 3, a descriptive analysis was made from the collected data. Moreover, a 1-sample T-test was conducted to compare the average travel satisfaction to that

of an annual survey. Finally, a 2-sample T-test is used to compare the mean travel satisfaction of men and women.

Sub-question 4 was answered by a correlational analysis, again using the Spearman's Rank-Order Correlation test.

7.3. Ethical considerations

To act ethically is crucial. Therefore, various steps have been taken to ensure safe and transparent research:

1. Respondents were allowed to terminate their participation and were informed that their participation was entirely voluntary. Moreover, no pressure was issued on the respondent in any way.
2. Confidentiality was ensured to the respondent, and minimal personal data was collected.
3. Respondents are kept anonymous. Thus, no results are presented so that answers can be linked to individual respondents.
4. The purpose of the research was clearly communicated so that respondents could freely determine if they wished to participate.

A complete survey overview can be found in Appendix 2: Overview survey questions and Appendix 3: Survey invitation flyer.

8. Results

The results of the study are presented. Data from 110 valuable respondents was collected, after which a selection was made. As described in section 7.2, this selection resulted in 81 respondents being analysed. Gender was evenly dispersed, and the average age was 28,4 years old. An extensive overview of the descriptive statistics covering the demographics of the survey can be found in Appendix 4: Descriptive statistics survey.

8.1. Identified factors influencing travel satisfaction

The literature study identified 18 factors influencing travel satisfaction for commuters. These factors can be categorised into five different categories. The full results of the literature study can be found in chapter 4.1.

8.2. Impact of various factors on travel satisfaction

As is shown in Table 1 and Figure 4, all 18 factors have a significant (all factors are significant at the 0.01 level, apart from service continuity and service frequency, which are significant at the 0.05 level (2-tailed)) and positive correlation with travel satisfaction, which implies that the results from the studies by Pawlasova (2015) and Mouwen (2015) are also applicable in the province of Groningen. Some factors stand out:

For the built environment, the strongest correlating factor is station clarity. The presence of well-placed and clear signing to redirect commuters to their trains has a substantial (correlation coefficient of 0,551) correlation with the overall satisfaction of the commute. On the other hand, service continuity is least correlated, which means that walking distances at the station are less related to travel satisfaction. Both these findings are in line with the results from Pawlasova (2015).

Within the category of service organisation, service frequency is weakly correlated to travel satisfaction. This is interesting to note as this factor has a strong correlation in both the study by Pawlasova (2015) and Mouwen (2015). On the other hand, following the conclusions of various earlier studies (Brons and Rietveld, 2009; Del Castillo and Benitez, 2012; Oña *et al.*, 2013; Antonucci *et al.*, 2014; Le-Klähn, Hall and Gerike, 2014; Mouwen, 2015; Pawlasova,

2015; van Lierop, Badami and El-Geneidy, 2018), the correlation strength of punctuality is strongest. This shows that a critical factor influencing travel satisfaction for commuters is the reliability of trains running on time.

Following the findings of Brons and Rietveld (2009) and Antonucci et al. (2014), this study found that cleanliness in trains and transport comfort are critical influences on travel satisfaction. On the other hand, noise levels have a more negligible impact. This can be explained by the increase in speech privacy when some background noise is present, as people prefer having their conversations in a more private manner (Jeon, Jang and Hong, 2014).

In line with Pawlasova's (2015) and Mouwen's (2015) conclusions, safety is neither the most nor the least influential factor. This can be explained by safety already being considered an important factor for many years. The Netherlands has a relatively high safety standard concerning driver advisory systems and network safety measures (Verstappen, Pikaar and Zon, 2022). Moreover, many safety measures have been taken over the past years, thereby comforting travellers (Yavuz and Welch, 2010; Jafarian and Rezvani, 2012; Maskeliūnaitė and Sivilevičius, 2012).

Finally, personnel behaviour is one of the most influential factors influencing travel satisfaction. This is in line with the findings from both Pawlasova (2015) and Mouwen (2015). Moreover, other studies show that personal contact is crucial for good customer relations (Avkiran, 1999; Shell and Buell, 2022).

Category	Variable	Correlation type	Significance (2-tailed)	Correlation strength	Average strength
Build environment	Station information clarity	Significant – Positive	0.000	Moderate – 0,551	Moderate - 0,422
	Service continuity	Significant – Positive	0.023	Weak – 0,252	
	Station proximity	Significant – Positive	0.000	Moderate – 0,522	
	Station safety	Significant – Positive	0.000	Moderate – 0,465	
	Station cleanliness	Significant – Positive	0.000	Weak – 0,392	
	Station surroundings	Significant – Positive	0.001	Weak – 0,351	
Service organisation	Train information	Significant – Positive	0.000	Moderate – 0,548	Moderate – 0,466
	Service frequency	Significant – Positive	0.046	Weak – 0,223	
	Punctuality	Significant – Positive	0.000	Moderate – 0,611	
	Transport speed	Significant – Positive	0.000	Moderate – 0,459	
	Ticket selling ease	Significant – Positive	0.000	Moderate – 0,507	
	Fare	Significant – Positive	0.000	Weak – 0,389	
	Overall satisfaction	Significant – Positive	0.000	Moderate – 0,526	
Comfort and cleanliness	Vehicle cleanliness	Significant – Positive	0.000	Moderate – 0,518	Moderate – 0,452
	Transport comfort	Significant – Positive	0.000	Moderate – 0,501	
	Noise	Significant – Positive	0.002	Weak – 0,338	
Safety and reliability	Safety	Significant – Positive	0.000	Moderate – 0,470	Moderate – 0,470
Human resources	Personnel behaviour	Significant – Positive	0.000	Moderate – 0,540	Moderate – 0,540

Table 1 - Factor correlation results

When analysing the factor correlation results, it is interesting to compare the different categories provided by Oña et al. (2013) and Antonucci et al. (2014). The average correlation is highest for human resources, thereby indicating that human contact has more impact on satisfaction than any non-human factor. Various studies show how being valued and treated with respect has an immense influence on satisfaction and well-being (Ellemers, Doosje and Spears, 2004; Maller *et al.*, 2006; Eriksen *et al.*, 2012; Skorpen, Rehnsfeldt and Thorsen, 2015). On the other hand, the built environment seems the least correlated, which implies that the overall satisfaction with a commute is more related to the time spent on the train and its

service, than the time spent at the station. Ye and Titheridge (2017) also concluded that the built environment is less likely to have a direct impact on travel satisfaction, but rather indirectly through travel characteristics.

It is interesting to see that comfort and cleanliness in this study is weakly correlated to travel satisfaction. This can be explained by noise (being weakly correlated as previously mentioned) having a mitigating effect on the strong correlation of vehicle cleanliness and transport comfort. The latter, as mentioned in line with other studies (Brons and Rietveld, 2009; Antonucci *et al.*, 2014).

Safety and reliability; and human resources both having only one factor in this study is limiting the possibility to calculate a representative mean and extrapolate the numbers into a categorical value, to compare with other categories. In future research (See chapter 9.2) these could be elaborated upon, especially considering their high correlation values.
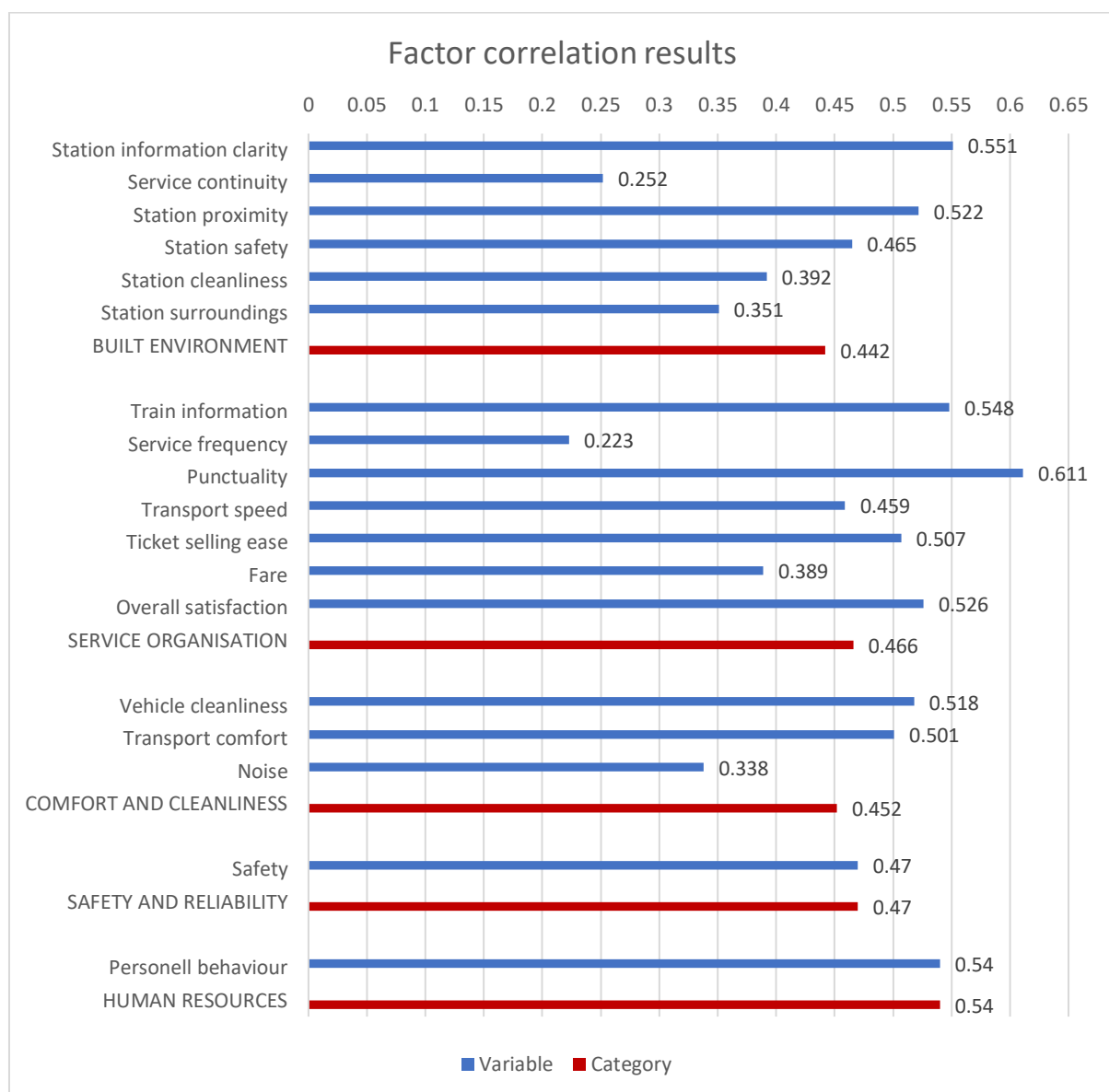

Figure 4 - Factor correlation results

Finally, as is shown in Figure 5, three respondents rated their commute as insufficient in this study. When looking into the reasoning behind this mark, it can be seen that especially one respondent gave a low score for punctuality and also mentioned this later as the reason influencing his decision to keep using the train or seek an alternative (See page 65, respondent 4). This case underpins that service organisation and punctuality are crucial for the overall travel satisfaction.

Overall I grade my travel satisfaction in the train with the following mark: - Grade:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	1.2	1.2	1.2
	4.00	1	1.2	1.2	2.5
	5.00	1	1.2	1.2	3.7
	6.00	8	9.9	9.9	13.6
	7.00	38	46.9	46.9	60.5
	8.00	27	33.3	33.3	93.8
	9.00	4	4.9	4.9	98.8
	10.00	1	1.2	1.2	100.0
	Total	81	100.0	100.0	

Figure 5 - Travel satisfaction marks

A complete overview of the statistical output can be found in Appendix 5: Statistical output Sub2.

8.3. Satisfaction of commuters

A national study into travel satisfaction for regional public transport services is conducted annually. The studies done in past years indicate that the overall satisfaction with public transport services increases slowly (CROW-KpVV, 2021). Another general tendency noted in past years is that regional train services on average score 0,2 points lower than national train services. For example, in 2021, the regional train services in the province of Groningen scored a 7,7 out of 10, whilst the national train services scored a 7,9 (CROW-KpVV, 2021) (See Figure 6).

Results of this study show that commuters in the province of Groningen on average rate their commute with a 7,3 out of 10 (See Figure 5, Figure 6 and Appendix 6: Statistical output Sub3). A One sample T-test analysis, comparing the study to a reference value of 7,7 (See Appendix 6: Statistical output Sub3), shows that this outcome is significantly lower than the results from the annual study. This difference can be explained by only commuters, and thus regular travellers, being included in the analysis. Susilo and Cats (2014) found that regular travellers are on average less satisfied.

Figure 6 - Satisfaction train services

Finally, there is no significant (significance 0.142 (2-tailed), See Appendix 5: Statistical output Sub2) difference between the average travel satisfaction of men and women in this study (See Figure 7). This is in contrast with other studies (Yavuz and Welch, 2010; St-Louis *et al.*, 2014) and might again be explained only commuters being included in the analysis. Commuters

generally tend to travel at a standard time and thus have a higher chance of meeting the same people daily (Abkowitz, 1981). This makes that people are surrounded by socially related people, enhancing the feeling of safety (Eller and Frey, 2019)
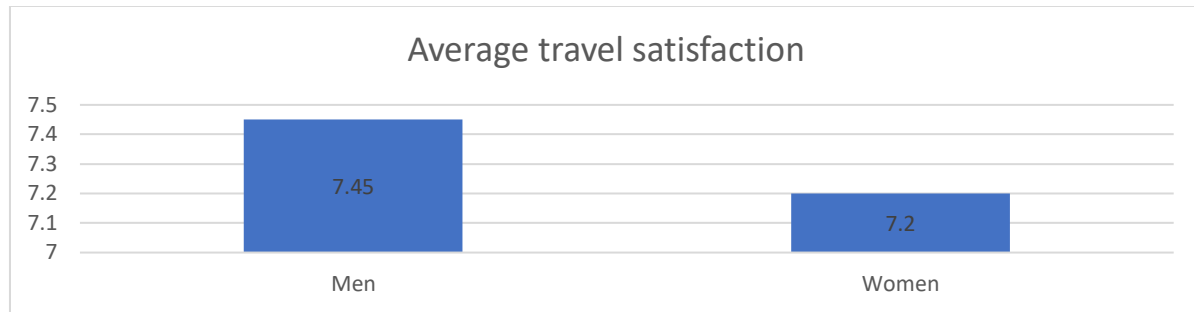
Figure 7 - Average travel satisfaction

8.4. Impact of travel satisfaction on willingness to keep using the train

The statistical analysis shows that, in line with the hypothesis (See chapter 6), a significant correlation exists between travel satisfaction and the willingness of commuters to keep using the train as their mode of transport. However, with a Spearman's Rho value of 0,299, the correlation can be considered weak (Dancey and Reidy, 2007).

This weak correlation can partially be explained by the mitigating factor of commuters not having an entirely free choice of mode of transport. No matter their satisfaction with the commute, they are to take the train due to either having no other option or their employer covering public transport costs. This study indicates that this effect is also relevant in Groningen, as the qualitative open-ended question has ten respondents indicating that they travel by train due to the mentioned circumstances (See Appendix 7: Statistical output Sub4). Moreover, it is interesting that the three respondents who rated their commute as insufficient (See Figure 5) still indicate that they will not stop using the train as their mode of transport (See Figure 8). This is further support for the mitigating effect argument.

An overview of the statistical output and answers from respondents can be found in Appendix 7: Statistical output Sub4.
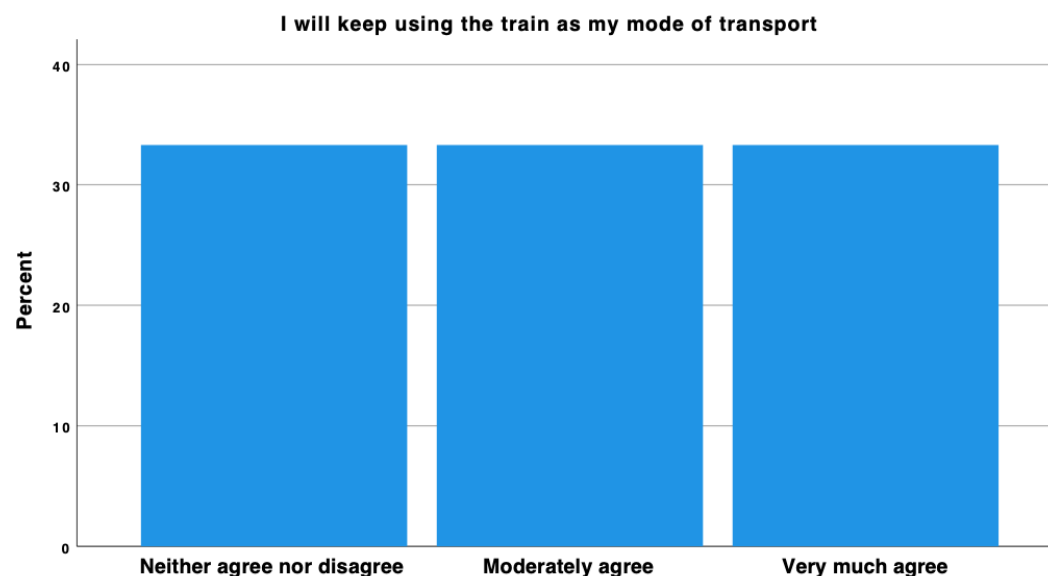
Figure 8 - Willingness to keep using the train

9. Conclusions

9.1. Substantive conclusions

This study aimed to identify factors that influence travel satisfaction in trains, measure the average travel satisfaction of commuters in the province of Groningen, and see the subsequent effect on the willingness of commuters to keep using the train as their standard mode of transport. The following conclusions can help design policies to prevent commuters from switching to private car use and convince commuters currently using their private car to start using the train.

Eighteen different factors influencing travel satisfaction in trains have been identified. These factors are all significantly correlated with the overall travel satisfaction for commuters in the province of Groningen. Of the individual factors, punctuality has the strongest correlation, which underpins the importance of punctuality, in line with other (inter)national studies (Brons and Rietveld, 2009; Del Castillo and Benitez, 2012; Oña *et al.*, 2013; Antonucci *et al.*, 2014; Le-Klähn, Hall and Gerike, 2014; Mouwen, 2015; Pawlasova, 2015; van Lierop, Badami and El-Geneidy, 2018).

All factors can be categorised into five categories. Of these categories, human resources have the strongest correlation - underpinning the importance of social contact- and the built environment the least – implying that the overall satisfaction with a commute is more related to the time spent on the train and its service than the time spent at the station.

Examining travel satisfaction in Groningen, the results of this study show that commuters rate their commute with a 7,3 out of 10. This number is significantly lower than the results of an annual national study (CROW-KpVV, 2021). This might be explained by regular travellers being generally less satisfied (Susilo and Cats, 2014). Moreover, there is no significant difference between the travel satisfaction of men and women, which can be explained by only commuters being included in the analysis. The higher social relatedness leads to a generally higher perception of safety (Eller and Frey, 2019).

Finally, travel satisfaction is weakly but significantly correlated to the willingness to keep using the train as their mode of transport, which is in line with the hypothesis and implications of other studies (Costal, Pickup and Di Martino, 1988; Wener, Evans and Boately, 2005; Cantwell, Caulfield and O'Mahony, 2009; Oña *et al.*, 2013; Antonucci *et al.*, 2014). However, this correlation is weakened by the mitigating effect of people having no choice but to either use the train for their commute or their commute being paid for by an employer. This makes commuters willing to keep using the train as mode of transport, despite rating their travel as insufficient.

The weakly correlated willingness to travel satisfaction with travel satisfaction is not a reason to neglect improvements. On the contrary, results show that station clarity, human resources and punctuality are factors that need particular focus in policy advice. To prevent commuters from switching to private car use and convince commuters currently using their private car to start using the train, improvements on these three factors will have the most impact.

9.2. Limitations and future research

The data collection process has some limitations on which recommendations are based. Firstly, using only the trajectories between three stations makes for less representation of commuters that do not travel to the city of Groningen for their work. Therefore, the study would be more representative by also addressing stations further to Eemshaven, Delfszijl, and Bad Nieuweschans. Second, due to strict policy of the NS on spreading flyers, few people have been approached between Groningen and Groningen Europapark. This results in an

overrepresentation of commuters living in the northern villages, as opposed to the eastern villages, of the province. Third, it would be beneficial to include more qualitative elements in the research. This would enable better inferences to be made. For example, knowing the reasoning behind value attributions could help develop policies to improve travel satisfaction. Future research could include more factors within all described categories, but, as mentioned earlier, especially in safety and reliability and human resources. When this is done, an exploratory factor analysis could be done. This analysis would create various intercorrelated constructs. The influence of these constructs on the willingness to keep using the train could then be analysed using multiple linear regression. This would allow for a more detailed analysis. Besides, it would be interesting to expand the research to commuters now travelling by other modes of transport. Insights into their motivation to use other modes of transport than the train could provide another perspective on train commuting and thereby lead to insights into what factors must be improved for them to be convinced to travel by train (again).

References

Abkowitz, M.D. (1981) 'An analysis of the commuter departure time decision', *Transportation*, 10(3), pp. 283–297. doi:10.1007/BF00148464.

Akoglu, H. (2018) 'User's guide to correlation coefficients', *Turkish Journal of Emergency Medicine*, 18(3), pp. 91–93. doi:10.1016/j.tjem.2018.08.001.

Andreassen, T.W. (1995) '(Dis)satisfaction with public services: The case of public transportation', *Journal of Services Marketing*, 9(5), pp. 30–41. doi:10.1108/08876049510100290.

Antonucci, L. *et al.* (2014) 'Passenger satisfaction: a multi-group analysis', *Quality & Quantity*, 48(1), pp. 337–345. doi:10.1007/s11135-012-9771-7.

Asensio, J. (2002) 'Transport Mode Choice by Commuters to Barcelona's CBD', *Urban Studies*, 39(10), pp. 1881–1895. doi:10.1080/0042098022000003000.

Avkiran, N.K. (1999) 'Quality customer service demands human contact', *International Journal of Bank Marketing*, 17(2), pp. 61–74. doi:10.1108/02652329910258862.

Baltes, M. (2003) 'The Importance Customers Place on Specific Service Elements of Bus Rapid Transit', *Journal of Public Transportation*, 6(4), pp. 1–19. doi:10.5038/2375-0901.6.4.1.

Brons, M. and Rietveld, P. (2009) 'Improving the Quality of the Door-to-Door Rail Journey: A Customer-Oriented Approach', *Built Environment*, 35(1), pp. 122–135. doi:10.2148/benv.35.1.122.

Cantwell, M., Caulfield, B. and O'Mahony, M. (2009) 'Examining the Factors that Impact Public Transport Commuting Satisfaction', *Journal of Public Transportation*, 12(2), pp. 1–21. doi:10.5038/2375-0901.12.2.1.

Casper, W. *et al.* (2019) 'Selecting response anchors with equal intervals for summated rating scales', *Journal of Applied Psychology*, 105. doi:10.1037/apl0000444.

CBS (2014) *Studenten en scholieren pieken in de ochtendspits*, *Centraal Bureau voor de Statistiek*. Available at: https://www.cbs.nl/nl-nl/nieuws/2016/37/studenten-en-scholieren-pieken-in-de-ochtendspits (Accessed: 27 February 2022).

CBS (2019) *Hoeveel wordt er met het openbaar vervoer gereisd?*, *Centraal Bureau voor de Statistiek*. Available at: https://www.cbs.nl/nl-nl/visualisaties/verkeer-en-vervoer/personen/openbaar-vervoer (Accessed: 27 February 2022).

CBS (2020) *Autopark groeit sterker dan bevolking*, *Centraal Bureau voor de Statistiek*. doi:10/autopark-groeit-sterker-dan-bevolking.

Chapman, L. (2007) 'Transport and climate change: a review', *Journal of Transport Geography*, 15(5), pp. 354–367. doi:10.1016/j.jtrangeo.2006.11.008.

Corpuz, G. (2007) 'Public Transport or Private Vehicle: Factors That Impact on Mode Choice', *30th Australasian Transport Research Forum*, p. 11.

Costal, G., Pickup, L. and Di Martino, V. (1988) 'Commuting — a further stress factor for working people: evidence from the European Community', *International Archives of Occupational and Environmental Health*, 60(5), pp. 377–385. doi:10.1007/BF00405674.

CROW-KpVV (2021) *OV-Klantenbarometer 2021*. Available at: https://www.crow.nl/downloads/pdf/verkeer-en-vervoer/crow-kpvv/ov-klantenbarometer/ov-klantenbarometer-2021-hoofdrapport.aspx (Accessed: 8 May 2022).

Dancey, C.P. and Reidy, J. (2007) *Statistics Without Maths for Psychology*. Pearson Education.

Das, A.M. *et al.* (2013) 'CONSUMERS SATISFACTION OF PUBLIC TRANSPORT MONORAIL USER IN KUALA LUMPUR', *Journal of Engineering Science and Technology*, 8(3), pp. 272–283.

Del Castillo, J.M. and Benitez, F.G. (2012) 'A Methodology for Modeling and Identifying Users Satisfaction Issues in Public Transport Systems Based on Users Surveys', *Procedia - Social and Behavioral Sciences*, 54, pp. 1104–1114. doi:10.1016/j.sbspro.2012.09.825.

Dell'Olio, L., Ibeas, A. and Cecín, P. (2010) 'Modelling user perception of bus transit quality', *Transport Policy*, 17(6), pp. 388–397. doi:10.1016/j.tranpol.2010.04.006.

Diana, M. (2012) 'Measuring the satisfaction of multimodal travelers for local transit services in different urban contexts', *Transportation Research Part A: Policy and Practice*, 46(1), pp. 1–11. doi:10.1016/j.tra.2011.09.018.

Eboli, L. and Mazzulla, G. (2009) 'A New Customer Satisfaction Index for Evaluating Transit Service Quality', *Journal of Public Transportation*, 12(3), pp. 21–37. doi:10.5038/2375-0901.12.3.2.

Ellemers, N., Doosje, B. and Spears, R. (2004) 'Sources of respect: The effects of being liked by ingroups and outgroups', *European Journal of Social Psychology*, 34, pp. 155–172. doi:10.1002/ejsp.196.

Eller, E. and Frey, D. (2019) 'Psychological Perspectives on Perceived Safety: Social Factors of Feeling Safe', in Raue, M., Streicher, B., and Lermer, E. (eds) *Perceived Safety: A Multidisciplinary Perspective*. Cham: Springer International Publishing (Risk Engineering), pp. 43–60. doi:10.1007/978-3-030-11456-5_4.

Eriksen, K. *et al.* (2012) 'Recognition as a valued human being: Perspectives of mental health service users', *Nursing ethics*, 19, pp. 357–68. doi:10.1177/0969733011423293.

van Hagen, M. and Heiligers, M. (2011) 'Proefstation Leiden, sturen op beleving', *Colloquium Vervoersplanlogisch Speurwerk*, p. 18.

Jafarian, E. and Rezvani, M.A. (2012) 'Application of fuzzy fault tree analysis for evaluation of railway safety risks: an evaluation of root causes for passenger train derailment', *Technological and Economic Development of Economy*, 18(3), pp. 544–566.

Jeon, J.Y., Jang, H.S. and Hong, J.Y. (2014) 'Evaluation of Speech Privacy in Passenger Cars of High-Speed Trains Based on Room Acoustic Parameters', *Acta Acustica united with Acustica*, 100(4), pp. 649–658. doi:10.3813/AAA.918744.

Kelle, U. (2006) 'Combining qualitative and quantitative methods in research practice: purposes and advantages', *Qualitative Research in Psychology*, 3(4), pp. 293–311. doi:10.1177/1478088706070839.

Kelley, K. *et al.* (2003) 'Good practice in the conduct and reporting of survey research', *International Journal for Quality in Health Care: Journal of the International Society for Quality in Health Care*, 15(3), pp. 261–266. doi:10.1093/intqhc/mzg031.

Kim, K. (2020) 'Effects of Weather and Calendar Events on Mode-Choice Behaviors for Public Transportation', *Journal of Transportation Engineering, Part A: Systems*, 146(7), p. 04020056. doi:10.1061/JTEPBS.0000371.

Kopin, I.J. (1995) 'Definitions of stress and sympathetic neuronal responses', *Annals of the New York Academy of Sciences*, 771, pp. 19–30. doi:10.1111/j.1749-6632.1995.tb44667.x.

Le-Klähn, D.-T., Hall, C. and Gerike, R. (2014) 'Analysis of Visitor Satisfaction with Public Transport in Munich', *Journal of Public Transportation*, 17(3). doi:http://doi.org/10.5038/2375-0901.17.3.5.

van Lierop, D., Badami, M.G. and El-Geneidy, A.M. (2018) 'What influences satisfaction and loyalty in public transport? A review of the literature', *Transport Reviews*, 38(1), pp. 52–72. doi:10.1080/01441647.2017.1298683.

Maller, C. *et al.* (2006) 'Healthy nature healthy people: "contact with nature" as an upstream health promotion intervention for populations', *Health Promotion International*, 21(1), pp. 45–54. doi:10.1093/heapro/dai032.

Maskeliūnaitė, L. and Sivilevičius, H. (2012) 'Expert evaluation of criteria describing the quality of travelling by international passenger train: technological, economic and safety perspectives', *Technological and Economic Development of Economy*, 18(3), pp. 544–566. doi:10.3846/20294913.2012.710178.

Mouwen, A. (2015) 'Drivers of customer satisfaction with public transport services', *Transportation Research Part A: Policy and Practice*, 78, pp. 1–20. doi:10.1016/j.tra.2015.05.005.

Nemoto, T. and Beglar, D. (2014) 'Developing Likert-Scale Questionnaires', *In JALT 2013 conference proceedings*, pp. 1–8.

Nguyen-Phuoc, D.Q. *et al.* (2020) 'Traffic congestion relief associated with public transport: state-of-the-art', *Public Transport*, 12(2), pp. 455–481. doi:10.1007/s12469-020-00231-3.

NS (2019) *SPOORKAART VAN NEDERLAND 2020*, *SPOORKAART VAN NEDERLAND 2020 Tabellen Spoorboekje Bnl/Btl*. Available at:

https://www.ns.nl/binaries/_ht_1574840979865/content/assets/ns-nl/dienstregeling/december-2019/spoorkaart-trajecten.pdf (Accessed: 10 May 2022).

Oña, J. de *et al.* (2013) 'Perceived service quality in bus transit service: A structural equation approach', *Transport Policy*, 29, pp. 219–226. doi:10.1016/j.tranpol.2013.07.001.

Parker, P.L., Mcdaniel, H.S. and Crumpton-young, L.L. (2002) 'Do Research Participants Give Interval or Ordinal Answers in response to Likert scales?' IIE Annual Conference.

Pawlasova, P. (2015) 'The Factors Influencing Satisfaction with Public City Transport: A Structural Equation Modelling Approach', *Journal of Competitiveness*, 7(4), pp. 18–32. doi:10.7441/joc.2015.04.02.

Punch, K. (2005) *Introduction to Social Research Quantitative and Qualitative Approaches*. London: SAGE Publications Ltd.

Sauro, J. and Lewis, J.R. (2011) 'When designing usability questionnaires, does it hurt to be positive?', in *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*. New York, NY, USA: Association for Computing Machinery (CHI '11), pp. 2215–2224. doi:10.1145/1978942.1979266.

Shell, M.A. and Buell, R.W. (2022) *Mitigating the Negative Effects of Customer Anxiety through Access to Human Contact*. SSRN Scholarly Paper 3328971. Rochester, NY: Social Science Research Network. doi:10.2139/ssrn.3328971.

Skorpen, F., Rehnsfeldt, A. and Thorsen, A.A. (2015) 'The significance of small things for dignity in psychiatric care', *Nursing Ethics*, 22(7), pp. 754–764. doi:10.1177/0969733014551376.

St-Louis, E. *et al.* (2014) *The happy commuter: A comparison of commuter satisfaction across modes*. doi:10.1016/j.trf.2014.07.004.

Stutzer, A. and Frey, B.S. (2008) 'Stress that Doesn't Pay: The Commuting Paradox*', *Scandinavian Journal of Economics*, 110(2), pp. 339–366. doi:10.1111/j.1467-9442.2008.00542.x.

Susilo, Y.O. and Cats, O. (2014) 'Exploring key determinants of travel satisfaction for multi-modal trips by different traveler groups', *Transportation Research Part A: Policy and Practice*, 67, pp. 366–380. doi:10.1016/j.tra.2014.08.002.

Tyrinopoulos, Y. and Antoniou, C. (2008) 'Public transit user satisfaction: Variability and policy implications', *Transport Policy*, 15(4), pp. 260–272. doi:10.1016/j.tranpol.2008.06.002.

Verstappen, V.JMP., Pikaar, E.N. and Zon, R.GD. (2022) 'Assessing the impact of driver advisory systems on train driver workload, attention allocation and safety performance', *Applied Ergonomics*, 100, p. 103645. doi:10.1016/j.apergo.2021.103645.

Vos, J. de and Witlox, F. (2017) 'Travel satisfaction revisited. On the pivotal role of travel satisfaction in conceptualising a travel behaviour process', *Transportation Research Part A: Policy and Practice*, 106, pp. 364–373. doi:10.1016/j.tra.2017.10.009.

Wener, R., Evans, G.W. and Boately, P. (2005) 'Commuting Stress: Psychophysiological Effects of a Trip and Spillover into the Workplace', *Transportation Research Record*, 1924(1), pp. 112–117. doi:10.1177/0361198105192400114.

Wener, R.E. and Evans, G.W. (2011) 'Comparing stress of car and train commuters', *Transportation Research Part F: Traffic Psychology and Behaviour*, 14(2), pp. 111–116. doi:10.1016/j.trf.2010.11.008.

Yavuz, N. and Welch, E.W. (2010) 'Addressing Fear of Crime in Public Space: Gender Differences in Reaction to Safety Measures in Train Transit', *Urban Studies*, 47(12), pp. 2491–2515. doi:10.1177/0042098009359033.

Ye, R. and Titheridge, H. (2017) 'Satisfaction with the commute: The role of travel mode choice, built environment and attitudes', *Transportation Research Part D: Transport and Environment*, 52, pp. 535–547. doi:10.1016/j.trd.2016.06.011.

Appendix 1: Methodological approach

	What information?	Moment of collection	Sources	Documentation	Analysis
RQ: "By which factors, how and to what degree does travel satisfaction for train commuters in the province of Groningen influence their willingness to keep using this mode of transport?"	The influence of travel satisfaction from train commuters in the province of Groningen on their willingness to keep using the same mode of transport	During data collection (week 12 until 16) and whilst writing Theoretical Framework	Qualtrics using a survey, based upon academic literature	The data will be derived and documented through the various sub questions	Data will be analysed in SPSS (see chapter 6 "Methodology")
SQ1: "What factors influence travel satisfaction for train commuters?"	Factors that influence travel satisfaction for train commuters	Whilst writing Theoretical Framework (week 6 until 12)	Academic literature	N/A	Reading and comparing academic articles. Citing all used sources
SQ2: "To what degree do these different factors have an impact on travel satisfaction?"	Degree of impact from factors upon travel satisfaction	During data collection (week 12 until 16)	Qualtrics using a survey	Data is archived in Qualtrics, imported in Excel and then exported to SPSS	Data will be analysed in SPSS (see chapter 6 "Methodology")
SQ3: "How satisfied are train commuters in the province of Groningen with their commute?"	Degree of satisfaction of train commuters in the province of Groningen	During data collection (week 12 until 16)	Qualtrics using a survey	Data is archived in Qualtrics, imported in Excel and then exported to SPSS	Data will be analysed in SPSS (see chapter 6 "Methodology")
SQ4: "How and to what degree does travel satisfaction in trains influence the willingness to keep using the train as mode of transport?"	Influence of travel satisfaction on the willingness to keep using the same mode of transport	During data collection (week 12 until 16)	Qualtrics using a survey	Data is archived in Qualtrics, imported in Excel and then exported to SPSS	Data will be analysed in SPSS (see chapter 6 "Methodology")

Appendix 2: Overview survey questions
Screenshots of the full survey are presented in order.

English - United Kingdom ⬍

Dear respondent,

Thank you for your participation!

First and foremost, participation in this survey is completely voluntarily and you are allowed to terminate this participation at any time.

Second, completion of the survey is completely anonymous. Any gathered personal data cannot be traced back to individuals. The results will be published within the University of Groningen.

The purpose of this survey is to gain insight into the extent to which travel satisfaction influences the willingness to keep using the train as mode of transport. Hereby, you'll also be asked about the factors influencing your travel satisfaction. The results of this survey are used for writing a bachelor's project and therefore have educational purposes only.

The survey will take about 4 minutes.

In case you have any questions, do not hesitate to contact me (Frank Versprille) via f.versprille@student.rug.nl

I hereby agree that my answers will be anonymously used for the educational purposes described above.

O Yes

→

English - United Kingdom ⇕

What is your age in years?

What gender do you identify as?

○ Male

○ Female

○ Non-binary / third gender

○ Prefer not to say

Do you live in the city of Groningen?

○ Yes

○ No

Why do you use the train?

○ Travel to school / university

○ Travel to work

○ Travel to visit family/friends

○ Travel for other reasons

How often do you use the train?

○ Daily

○ 4-6 times a week

○ 2-3 times a week

○ Once a week

○ Less then once a week

What is your average travel time?

- ○ 0-15 Minutes
- ○ 15-30 Minutes
- ○ 30-45 Minutes
- ○ 45-60 Minutes
- ○ 60+ Minutes

←

→

English - United Kingdom ⬍

The train station is safe to use

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The train station is clean and maintained

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

Timetables and signing at the train station are easy to understand

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

It is easy to transfer from other modes of transport (car, bus, etc.) to the train (enough time / good walking distance)

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The train station and its surroundings are an attractive place

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

The train station is accessible without any problem

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

←   →

English - United Kingdom ⬍

Trains generally arrive on time

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The speed of the travel by train is satisfactory

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

Buying a ticket and/or checking in is easy

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The price of the train is affordable and in correspondence to the trip

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The public transport system in The Netherlands is satisfactory

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

←   →

English - United Kingdom ▲▼

The amount of trains per hour is sufficient for the number of travellers

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

Information in the train vehicles is easy to find and understand

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

The insides of trains are clean and maintained

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

Travelling in the train is comfortable with enough seating capacity

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

The train is quiet enough

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

Travelling in the train feels safe

- ○ Disagree
- ○ Somewhat disagree
- ○ Neither agree nor disagree
- ○ Moderately agree
- ○ Very much agree

Train personnel is kind, patient and understanding

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

←   →

English - United Kingdom ⬍

Overall I grade my travel satisfaction in the train with the following mark:

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Grade:

←   →

English - United Kingdom ⬍

I will keep using the train as my mode of transport

○ Disagree
○ Somewhat disagree
○ Neither agree nor disagree
○ Moderately agree
○ Very much agree

What other factors can influence your decision to keep using the train as your general mode of transport?

←   →

English - United Kingdom ⬍

To save your answers, please click the red button below.

If you have any other comments, please leave them below. If you have any questions, do not hesitate to contact me (Frank Versprille) via f.versprille@student.rug.nl

←   →

We thank you for your time spent taking this survey.
Your response has been recorded.

Appendix 3: Survey invitation flyer

Beste Reiziger,

Helpt u mij mee? Mijn naam is Frank Versprille. Voor mijn bachelorproject doe ik onderzoek onder forenzen naar reistevredenheid en de invloed hiervan op de wil om de trein als standaard vervoersmiddel te blijven gebruiken. U zou mij enorm helpen door deze anonieme enquête in te vullen.

Het invullen duurt ongeveer 4-5 minuten.

Mocht u vragen hebben dan beantwoord ik deze uiteraard graag. Ik ben bereikbaar via f.versprille@student.rug.nl

Heel erg bedankt!

Dear Traveler,

Will you help me out? My name is Frank Versprille. For my bachelor thesis I am doing research under commuters on travel satisfaction and their willingness to keep using the train as general mode of transport. You would help me enormously by filling in this anonymous survey.

It will take about 4-5 minutes to complete.

If you have any questions, please don't hesitate to contact me via f.versprille@student.rug.nl

Thank you!

In het geval dat deze QR-code niet werkt kunt u onderstaande URL gebruiken:
In case the QR code doesn't work you can use the following link:
https://rug.eu.qualtrics.com/jfe/form/SV_81FkSSFGoLbFZ2K

Appendix 4: Descriptive statistics survey

Gender

What gender do you identify as?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	51	46.4	46.4	46.4
	Female	54	49.1	49.1	95.5
	Non–binary / third gender	4	3.6	3.6	99.1
	Prefer not to say	1	.9	.9	100.0
	Total	110	100.0	100.0	

Age

Statistics

What is your age in years?

N	Valid	101
	Missing	9
Std. Deviation		12.618
Variance		159.222
Minimum		15
Maximum		69

Histogram

Mean = 28.4
Std. Dev. = 12.618
N = 101

What is your age in years?
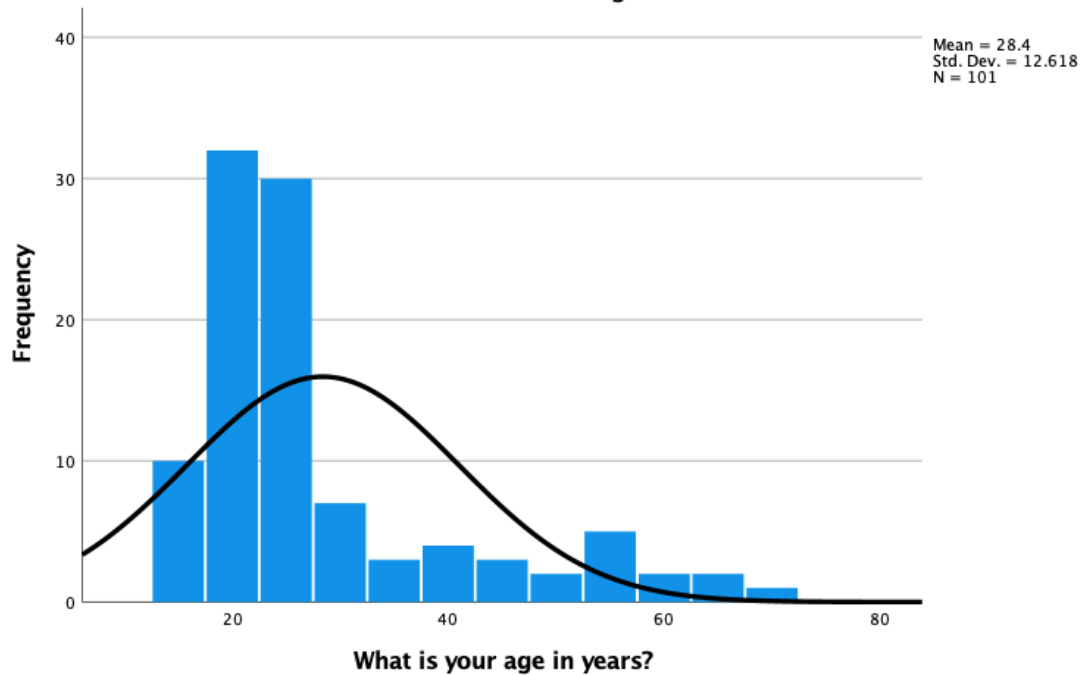
Travel motivation

Why do you use the train?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel to school / university	36	32.7	32.7	32.7
	Travel to work	57	51.8	51.8	84.5
	Travel to visit family/friends	12	10.9	10.9	95.5
	Travel for other reasons	5	4.5	4.5	100.0
	Total	110	100.0	100.0	

Travel frequency

How often do you use the train?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Daily	16	14.5	14.5	14.5
	4–6 times a week	37	33.6	33.6	48.2
	2–3 times a week	38	34.5	34.5	82.7
	Once a week	11	10.0	10.0	92.7
	Less then once a week	8	7.3	7.3	100.0
	Total	110	100.0	100.0	

Appendix 5: Statistical output Sub2

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Timetables and signing at the train station are easy to understand	4.16	.901	81
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	7.2469	1.07855	81

Correlations

		Timetables and signing at the train station are easy to understand	Overall I grade my travel satisfaction in the train with the following mark: - Grade:
Timetables and signing at the train station are easy to understand	Pearson Correlation	1	.551[**]
	Sig. (2-tailed)		.000
	Sum of Squares and Cross-products	64.914	42.790
	Covariance	.811	.535
	N	81	81
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	.551[**]	1
	Sig. (2-tailed)	.000	
	Sum of Squares and Cross-products	42.790	93.062
	Covariance	.535	1.163
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Timetables and signing at the train station are easy to understand - Overall I grade my travel satisfaction in the train with the following mark: - Grade:	.551	.000	.378	.686

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q9
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The train station is accessible without any problem
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.522**
	Sig. (2-tailed)		.000
	N	81	81
The train station is accessible without any problem	Pearson Correlation	.522**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The train station is accessible without any problem	.522	.000	.343	.665

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q8
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	It is easy to transfer from other modes of transport (car, bus, etc.) to the train (enough time / good walking distance)
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.252[*]
	Sig. (2-tailed)		.023
	N	81	81
It is easy to transfer from other modes of transport (car, bus, etc.) to the train (enough time / good walking distance)	Pearson Correlation	.252[*]	1
	Sig. (2-tailed)	.023	
	N	81	81

*. Correlation is significant at the 0.05 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - It is easy to transfer from other modes of transport (car, bus, etc.) to the train (enough time / good walking distance)	.252	.023	.036	.446

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q10
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The train station is safe to use
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.465**
	Sig. (2-tailed)		.000
	N	81	81
The train station is safe to use	Pearson Correlation	.465**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The train station is safe to use	.465	.000	.275	.620

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
  /VARIABLES=Q23_1 Q11
  /PRINT=TWOTAIL NOSIG FULL
  /CI CILEVEL(95)
  /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The train station is clean and maintained
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.392**
	Sig. (2-tailed)		.000
	N	81	81
The train station is clean and maintained	Pearson Correlation	.392**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The train station is clean and maintained	.392	.000	.190	.562

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q29
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The train station and its surroundings are an attractive place
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.351**
	Sig. (2-tailed)		.001
	N	81	81
The train station and its surroundings are an attractive place	Pearson Correlation	.351**	1
	Sig. (2-tailed)	.001	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The train station and its surroundings are an attractive place	.351	.001	.144	.529

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q14
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Trains generally arrive on time
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.611**
	Sig. (2-tailed)		.000
	N	81	81
Trains generally arrive on time	Pearson Correlation	.611**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Trains generally arrive on time	.611	.000	.453	.731

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q15
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The speed of the travel by train is satisfactory
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.459**
	Sig. (2-tailed)		.000
	N	81	81
The speed of the travel by train is satisfactory	Pearson Correlation	.459**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The speed of the travel by train is satisfactory	.459	.000	.268	.616

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q16
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Buying a ticket and/or checking in is easy
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.507**
	Sig. (2-tailed)		.000
	N	81	81
Buying a ticket and/or checking in is easy	Pearson Correlation	.507**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Buying a ticket and/or checking in is easy	.507	.000	.324	.653

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q17
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The price of the train is affordable and in correspondence to the trip
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.389[**]
	Sig. (2-tailed)		.000
	N	81	81
The price of the train is affordable and in correspondence to the trip	Pearson Correlation	.389[**]	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The price of the train is affordable and in correspondence to the trip	.389	.000	.187	.560

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q18
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The public transport system in The Netherlands is satisfactory
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.526**
	Sig. (2-tailed)		.000
	N	81	81
The public transport system in The Netherlands is satisfactory	Pearson Correlation	.526**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The public transport system in The Netherlands is satisfactory	.526	.000	.347	.667

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q13
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The amount of trains per hour is sufficient for the number of travellers
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.223[*]
	Sig. (2-tailed)		.046
	N	81	81
The amount of trains per hour is sufficient for the number of travellers	Pearson Correlation	.223[*]	1
	Sig. (2-tailed)	.046	
	N	81	81

*. Correlation is significant at the 0.05 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The amount of trains per hour is sufficient for the number of travellers	.223	.046	.005	.421

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q12
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Information in the train vehicles is easy to find and understand
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.548**
	Sig. (2-tailed)		.000
	N	81	81
Information in the train vehicles is easy to find and understand	Pearson Correlation	.548**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Information in the train vehicles is easy to find and understand	.548	.000	.374	.684

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q19
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The insides of trains are clean and maintained
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.518**
	Sig. (2-tailed)		.000
	N	81	81
The insides of trains are clean and maintained	Pearson Correlation	.518**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The insides of trains are clean and maintained	.518	.000	.338	.662

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q20
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Travelling in the train is comfortable with enough seating capacity
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.501[**]
	Sig. (2-tailed)		.000
	N	81	81
Travelling in the train is comfortable with enough seating capacity	Pearson Correlation	.501[**]	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Travelling in the train is comfortable with enough seating capacity	.501	.000	.317	.648

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q21
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	The train is quiet enough
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.338**
	Sig. (2-tailed)		.002
	N	81	81
The train is quiet enough	Pearson Correlation	.338**	1
	Sig. (2-tailed)	.002	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - The train is quiet enough	.338	.002	.129	.518

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
 /VARIABLES=Q23_1 Q22
 /PRINT=TWOTAIL NOSIG FULL
 /CI CILEVEL(95)
 /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Travelling in the train feels safe
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.470**
	Sig. (2-tailed)		.000
	N	81	81
Travelling in the train feels safe	Pearson Correlation	.470**	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Travelling in the train feels safe	.470	.000	.281	.625

a. Estimation is based on Fisher's r-to-z transformation.

```
CORRELATIONS
  /VARIABLES=Q23_1 Q6
  /PRINT=TWOTAIL NOSIG FULL
  /CI CILEVEL(95)
  /MISSING=PAIRWISE.
```

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Train personnel is kind, patient and understanding
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.540[**]
	Sig. (2-tailed)		.000
	N	81	81
Train personnel is kind, patient and understanding	Pearson Correlation	.540[**]	1
	Sig. (2-tailed)	.000	
	N	81	81

**. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - Train personnel is kind, patient and understanding	.540	.000	.365	.678

a. Estimation is based on Fisher's r-to-z transformation.

Appendix 6: Statistical output Sub3

Descriptive analysis travel satisfaction

Frequencies

Statistics

Overall I grade my travel satisfaction in the train with the following mark: - Grade:

N	Valid	81
	Missing	0
Mean		7.2469
Median		7.0000
Mode		7.00
Std. Deviation		1.07855
Skewness		-1.554
Std. Error of Skewness		.267
Minimum		2.00
Maximum		10.00

Overall I grade my travel satisfaction in the train with the following mark: - Grade:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.00	1	1.2	1.2	1.2
	4.00	1	1.2	1.2	2.5
	5.00	1	1.2	1.2	3.7
	6.00	8	9.9	9.9	13.6
	7.00	38	46.9	46.9	60.5
	8.00	27	33.3	33.3	93.8
	9.00	4	4.9	4.9	98.8
	10.00	1	1.2	1.2	100.0
	Total	81	100.0	100.0	

Histogram

Mean = 7.25
Std. Dev. = 1.079
N = 81

Overall I grade my travel satisfaction in the train with the following mark: - Grade:

One Sample T-Test

T-Test

[DataSet1] /Users/Frank/Desktop/Scriptie/Data scriptie.sav

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	110	7.2091	1.20470	.11486

One-Sample Test

Test Value = 7.7

	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence ... Lower
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	-4.274	109	.000	-.49091	-.7186

One-Sample Test

	Test Value = ... 95% Confidence Interval of the... Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	-.2633

One-Sample Effect Sizes

		Standardizer[a]	Point Estimate	95% ... Lower
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Cohen's d	1.20470	-.407	-.601
	Hedges' correction	1.21307	-.405	-.597

One-Sample Effect Sizes

		95% ... Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Cohen's d	-.212
	Hedges' correction	-.211

a. The denominator used in estimating the effect sizes.
Cohen's d uses the sample standard deviation.
Hedges' correction uses the sample standard deviation, plus a correction factor.

T-Test

[DataSet1] /Users/Frank/Desktop/Scriptie/Data scriptie.sav

Group Statistics

	What gender do you identify as?	N	Mean	Std. Deviation
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Male	51	7.4510	.80781
	Female	54	7.2037	.89821

Group Statistics

	What gender do you identify as?	Std. Error Mean
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Male	.11312
	Female	.12223

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality ..
		F	Sig.	t
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Equal variances assumed	.009	.925	1.480
	Equal variances not assumed			1.485

Independent Samples Test

		t-test for Equality of Means		
		df	Sig. (2-tailed)	Mean Difference
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Equal variances assumed	103	.142	.24728
	Equal variances not assumed	102.761	.141	.24728

Page 1

Appendix 7: Statistical output Sub4

Correlations

Correlations

		Overall I grade my travel satisfaction in the train with the following mark: - Grade:	I will keep using the train as my mode of transport
Overall I grade my travel satisfaction in the train with the following mark: - Grade:	Pearson Correlation	1	.299[**]
	Sig. (2-tailed)		.007
	N	81	81
I will keep using the train as my mode of transport	Pearson Correlation	.299[**]	1
	Sig. (2-tailed)	.007	
	N	81	81

[**]. Correlation is significant at the 0.01 level (2-tailed).

Confidence Intervals

	Pearson Correlation	Sig. (2-tailed)	95% Confidence Intervals (2-tailed)[a]	
			Lower	Upper
Overall I grade my travel satisfaction in the train with the following mark: - Grade: - I will keep using the train as my mode of transport	.299	.007	.086	.486

a. Estimation is based on Fisher's r-to-z transformation.

Frequencies

Statistics

I will keep using the train as my mode of transport

N	Valid	3
	Missing	0

I will keep using the train as my mode of transport

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Neither agree nor disagree	1	33.3	33.3	33.3
	Moderately agree	1	33.3	33.3	66.7
	Very much agree	1	33.3	33.3	100.0
	Total	3	100.0	100.0	
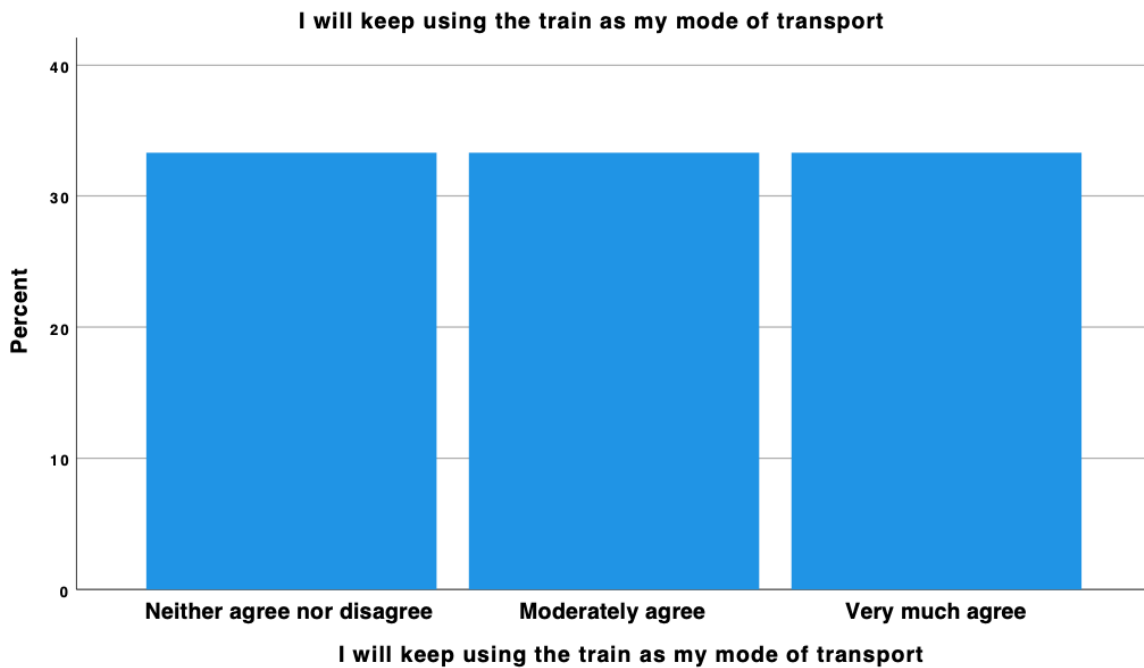
	Q31
1	Geen benen
2	Bier
3	
4	Dat er minder storingen zijn of andere redenen om vertraging op te lopen
5	If i have car
6	Benzine prijs
7	
8	Gratis
9	In het bezit zijn van een auto
10	
11	
12	Benzineprijs
13	De treinen van Winschoten naar Zuidbroek rijden om het uur en dat is zeer naar
14	
15	Er zit geen treinstation in de buurt en als ik niet eerst een uur met de bus en daa...
16	Betrouwbaarheid en prijs in verhouding tot de auto
17	
18	Reistijd, afstand, ticketprijzen, aanschaf en ondehoudings kosten auto
19	Andere mogelijkheden van vervoer, werkzaamheden,
20	Student compensation
21	Woonplaats
22	Vooral hoe duur het is is belangrijk, dat het beter is voor het milieu/klimaat dan ...
23	Kosten, is best duur..
24	Dure benzine
25	Ik mag m'n treinkosten dan wel declareren, maar het is veel te duur. Daarom ga i...
26	
27	
28	School vooral
29	Vrouwen
30	
31	
32	De vragen hebben alleen betrekking op de kwaliteit van de treinreis. Natuurlijk m...
33	
34	Benzine is duur
35	Of ik mijn rijbewijs haal, mij zelf in een auto in het verkeer vertrouw en of ik een a...
36	
37	Studenten ov
38	
39	Betrouwbaarheid verbinding
	Minder vertragingen door problemen
	Heb niet echt een keuze

	Q31
43	Drukte, kosten
44	Prijs
45	
46	De tijd waar aan je vast zit.
47	
48	Drukte Julianaplein
49	Geen rijbewijs.
50	Bus vetragingen die wel vaak rampzalig zijn
51	Ik heb geen andere optie.
52	Kosten benzine
53	
54	
55	
56	Geen rijbewijs, bus is trager
57	Beter voor het milieu
58	Een autorijbewijs
59	Betaalbaarheid
60	Je Hebt ze allemaal al genoemd :)
61	Sustainability
62	Dit is de snelste en goedkoopste optie. Graag zou ik een station op zernike zien
63	
64	
65	Reiskostenvergoeding werkgever
66	
67	Multi tasken, zoals werken in de trein of slapen, beter voor milieu, geen auto ter …
68	
69	
70	Werk op fietsafstand
71	a stations proximity to my destination
72	Dure benzineprijzen, vergoeding vanuit werkgever
73	
74	If I get a car I won't be using the trains as often
75	None, all points were covered in the questionnaire
76	Beschikbaarheid gedeelde auto met partner; prijs van bezine; prijs van treinkaart…
77	De lijn tussen groningen en delfzijl, roodeschool zijn perfect omdat je vanaf elk s…
78	
79	
80	Station dicht bij eindbestemming
81	Medicatiegebruik. Met mijn medicatie mag ik niet autorijden dus pak ik nu vaker …
82	Ik heb een zakelijke ov kaart via werk, en daarnaast vind ik het ook prettig om zel…
83	Naar een afspraak

	Q31
85	Milieu
86	
87	Ik werk bij Arriva :-)
88	Duurzaam
89	
90	
91	Kosten
92	Benzineprijzen, weersomstandigheden (alternatief is elektrische fiets)
93	To visit other places
94	Ik heb geen auto
95	Nu 4-6 keer voor stage na stage gewoon weer school in gro
96	Frequentie en prijs
97	Price.
98	Vlakbij station wonen
99	More frequent evening bus options to connect to/from trains
100	Frequentie van treinen
101	
102	
103	Weersomstandigheden, wegwerkzaamheden Groningen Julianaplein
104	
105	
106	Milieuvriendelijke reiswijzer, zo kan ik onderweg werken op op de weg te moeten ...
107	Betaalbaarheid van een auto en parkeerplek
108	
109	Als de werkplek in eigen plaats is.
110	None: the question is 'what factors would influence my decision to stop using th...