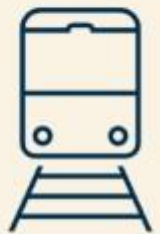


# Not Just a Stop: Understanding Safety at Small Train Stations

A qualitative study on perceived safety and coping behavior at small Dutch railway stations



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## Preface

This research “*Not Just a Stop: Understanding Safety at Small Train Stations*” is the product of my long-term interest in experienced safety and transport poverty. Throughout my life, I have occasionally felt insecure about my personal safety while traveling. These moments caused me to often plan routes based on where I feel the safest and most comfortable. They made me think about how these precautionary thoughts and actions influence my mobility options and those of others. As someone who has often relied on my social network while traveling, I also realize that my experiences only represent one perspective. Not everyone has equal access to support systems or has the financial means to use a taxi for instance. Individuals with disabilities or other vulnerabilities may face more challenges that influence their mobility options in different ways, which is why further research is needed on these issues.

Moreover, I also believe that public transport can only offer a valuable alternative to the comfort of car travel when station environments become places where travelers enjoy being. With this research, I hope to provide a different perspective on station environments, which may seem insignificant but are used daily by many travelers. Station environments hold the potential to be meaningful places where the paths of different individuals briefly come together, something that I consider important in a world that is also shaped by misunderstanding.

I want to sincerely thank my colleagues at Haskoning, specifically Wilco Bos, for supervising this research and for taking the time to give feedback and exchange ideas each week. I am also grateful to Jan Anne Annema and Niels van Oort from TU Delft for their academic supervision and for helping me navigate the research process.

This research would not have been possible without the travelers who were open about their experiences and experts who shared their insights on this topic. Finally, I would like to thank my family, friends and roommates, for their patience with me during challenging moments of this research process, and for ensuring that life stayed enjoyable outside of this research.

I hope you enjoy reading this thesis and find it both useful and inspiring!

Pip Kupers

## Summary

Small railway stations serve as essential nodes in the daily mobility of travelers in the Dutch mobility system, yet they are overrepresented among the lowest-scoring stations in research on travelers' experiences over the last five years. Building on the Capabilities Approach, this research considers perceived safety as a condition that influences whether the presence of small railway stations ensures equal accessibility for all travelers. Therefore, this research examines how travelers experience safety at small Dutch railway stations and explores how these insights can inform the design and development of these stations. By using an exploratory and descriptive qualitative research design, interviews were conducted with travelers at four small stations associated with the lowest scores in the Station Experience Monitor of the NS in 2024. Additionally, in-depth interviews with experts in station design, safety, and public transport, were held to gain insight into governance structures, design principles, and safety interventions. The findings reveal how perceived safety is shaped by multidimensional and overlapping dynamics between temporal, spatial, social and personal factors. Temporal conditions, particularly evening and nighttime travel, as well as gender identity, act as an amplifying lens through which the other factors are interpreted and experienced. Moreover, travelers identifying as women frequently adopted coping behavior, such as arranging pick-ups or calling someone, thereby relying on their social network. Travelers identifying as men often described their gender as a protective factor. Moreover, the interviews with experts indicated that institutional dynamics, including fragmented responsibilities and difficulties regarding data-sharing, further complicated the specific contexts of small railway stations that influence perceived safety. At the same time, current monitoring tools do not include the complex nature of experienced safety and the related dynamics between the different factors influencing experienced safety. This study suggests that small railway stations deserve more attention in governance and monitoring frameworks. Creating station environments where travelers feel comfortable contributes to positive travel experiences and highlights perceived safety as a crucial condition for realizing equal mobility and accessibility.

## Samenvatting

Kleine treinstations functioneren als belangrijke knooppunten in de dagelijkse mobiliteit van Nederlandse reizigers, maar zijn tegelijkertijd oververtegenwoordigd onder de laagst scorende stations in onderzoeken naar reizigerservaringen over de afgelopen vijf jaar. Dit onderzoek bouwt voort op de Capabilities Approach, en beschouwt ervaren veiligheid als een voorwaardelijke factor voor het realiseren van gelijkwaardige mobiliteit en toegankelijkheid voor alle reizigers. Dit onderzoek focust zich op hoe reizigers veiligheid ervaren op kleine Nederlandse treinstations en hoe deze inzichten kunnen bijdragen aan het ontwerp en de ontwikkeling van deze stations. Aan de hand van een exploratief en beschrijvend kwalitatief onderzoeksdesign zijn interviews gehouden met reizigers op vier kleine treinstations in Nederland die in 2024 het laagst scoorden in de Stationsbelevingsmonitor van de NS. Daarnaast zijn diepte-interviews gehouden met experts op het gebied van stationsontwerp, veiligheid en openbaar vervoer om inzicht te krijgen in relevante bestuurlijke structuren, ontwerpprincipes en veiligheidsinterventies. De resultaten laten zien dat ervaren veiligheid wordt gevormd door een multidimensionale en overlappende dynamiek tussen temporele, ruimtelijke, sociale en individuele factoren. Temporele omstandigheden, specifiek het reizen tijdens avond- en nachturen, en genderidentiteit, functioneren als een versterkende lens waardoor de andere factoren worden geïnterpreteerd en ervaren. Reizigers die zich identificeren als vrouw passen regelmatig copinggedrag toe, zoals het regelen van iemand die ze ophaalt of bellen onderweg, en maken daarbij gebruik van hun sociale netwerk. Reizigers die zich identificeren als man beschrijven hun gender vaak als beschermende factor. Verder lieten de interviews met experts zien hoe institutionele dynamieken, waaronder versnipperde verantwoordelijkheden en uitdagingen rondom het delen van (incident)data, de specifieke contexten van de kleine treinstations, en daarmee de ervaren veiligheid, verder compliceren. Tegelijkertijd doet de huidige monitoring geen recht aan de complexiteit van ervaren veiligheid en de onderlinge relaties tussen de verschillende factoren. Dit onderzoek benadrukt dat

kleine treinstations meer aandacht verdienen in bestuurlijke structuren en monitoring. Het creëren van stationsomgevingen waar reizigers zich comfortabel voelen, draagt bij aan positieve reizigerservaringen en maakt duidelijk dat ervaren veiligheid een essentiële voorwaarde is voor het realiseren van gelijkwaardige mobiliteit en toegankelijkheid.

## Glossary

### BOA

Boa is the abbreviation for Dutch municipal enforcement officers (Buitengewoon Opsporingsambtenaar). Every BOA works in their own assigned domain and holds specific legal authority to enforce laws within their domain (Justis, n.d.). Public transport BOAs are responsible for managing social safety and supporting the police when necessary (NS, A. n.d.). Every railway operator has their own BOAs.

### Experienced safety / Feelings of (un)safety / Perceived safety / Safety perception / Subjective safety

Throughout this research different terms are used to describe how travelers perceive safety. Even though (academic) literature uses different terms, in this research they are treated as equivalent and refer to the safety perceptions of travelers. Therefore, 'objective' safety-related incidents are not included in these definitions.

### Formal and informal surveillance

Formal surveillance refers to intentional methods with the goal of enhancing safety, such as the placement of cameras and gates, and the presence of security personnel. Informal surveillance refers to unintentional or natural forms of observation (natural surveillance) by the presence of other people, such as travelers, passengers, and staff of commercial establishments. It thereby contributes to (experienced) safety by increasing visibility and social presence. The term is similar to the concept of 'eyes on the street' as proposed by Jane Jacobs in 1961 (Jacobs, 1972), but does not specifically emphasize the lively, continuous and street-level activity that she considered crucial for effective natural surveillance. Small railway stations typically have a different function than streets, as their purpose is to serve travelers during their journeys, and therefore only be used briefly before or after leaving the train.

### Gender identity

In this research, gender is referred to as gender identity to allow the respondents to identify themselves. This avoids miscommunication and aims to reduce the exclusion of sexual and gender minority groups, such as transgender people and non-binary individuals (Suen et al., 2020). When gender is simply described as 'gender' or limited to the category's 'man' or 'woman', the gender identity was either unclear or not explicitly asked. For example, when existing literature does not distinguish between gender and gender identity, it is not possible to mention the precise gender identity of participants included in these studies.

### NS

NS is the abbreviation for Dutch National Railways (Nederlandse Spoorwegen), the main operator of passenger rail services in the Netherlands. The Dutch State is the only shareholder of the NS (NS, B. & C. n.d.).

### Objective safety

Objective safety usually refers to the factual safety of a certain environment, which is generally assessed by measurable and quantitative indicators, such as the number of incidents. Therefore, it is focused on risks, rather than experienced safety.

### ProRail

ProRail is responsible for the management of the Dutch rail network. The Dutch government is the sole shareholder of ProRail (ProRail, A. n.d.).

### **Regional railway operators**

Regional railway operators are railway companies other than the NS that serve regional lines in the Netherlands. They use the rail of ProRail and often pass by small railway stations. They are usually focused more on local and regional connectivity. Examples include Arriva, Keolis, and Qbuzz (ProRail, 2025). Regional railway operators are important in this research, since they often serve small train stations and can offer an additional perspective on safety, besides the perspective of the NS.

### **Social safety**

Social safety considers the social aspects of experienced safety. This means that it usually concerns feelings of safety in relation to how protected travelers feel from unwanted social behavior, such as intimidation, harassment and aggression. Therefore, it combines objective and subjective safety, as it relates to social risks (objective safety), as well as the perception of safety as experienced by travelers (subjective safety).

### **Station Experience Monitor (SBM)**

The Station Experience Monitor (Stationsbelevingsmonitor) of the NS and ProRail provides a yearly overview of how travelers experience Dutch train stations. On-site surveys are used to question travelers at the stations. Larger train stations are investigated once a quarter and smaller train stations are examined once a year. The scores of the stations are published yearly and are used to provide a focus for improvements (Stations.nl, 2026).

### **Transit-Oriented Development (TOD)**

Transit-Oriented Development essentially is an urban planning approach that organizes planning area development around transit nodes, such as train stations, to contribute to a sustainable and efficient way of traveling. Densification and diversification (e.g. mixed-use of functions), combined with a walking environment, are considered crucial for successful implementation of the concept. The ideas and underlying reasoning behind TOD emerged in the 1980s, as proposed by urban planner Peter Calthorpe (Ibraeva et al., 2020).

# 1 Introduction

Recently, multiple cases of assault, rape, and even murder of women, have dominated Dutch news headlines (Simons, 2025; Stoker, 2025). Public and political discussions concerning the (experienced) safety of women in public space have gained increasing attention in the Netherlands (Renfurm, 2025; Tweede Kamer der Staten-Generaal, 2025). According to research by Pointer, a journalistic research platform of KRO-NCRV, and AD, a Dutch daily newspaper, women feel the most unsafe at public transport stations (nine out of ten women). To handle these feelings of unsafety, women often take precautionary measures, such as avoiding certain locations or routes, or by sharing their live location with friends or family (Pointer & AD, 2024).

These precautionary measures can be understood through the lens of coping strategies from Durand et al. (2023), who focused on digital inequality in public transport. They found that handling difficulties can result in hidden work or costs, such as relying on social networks and longer travel time. Similarly, measures to improve (perceived) safety can restrict participation in essential activities, such as work, education and social activities, and create hidden burdens, like organizing pick-up or taxi costs. Additionally, it is also simply problematic that there are places where people feel unsafe and where their safety cannot be guaranteed.

Moreover, the conditions that are necessary to access and participate in society can also be related to the well-known concept of transport poverty. According to scholars Lucas (2012) and Lucas et al. (2016) a traveler can be described as 'transport poor', if they suffer from dangerous, unsafe, or unhealthy travel conditions. Hence, experienced safety can be understood as an essential element in the travel conditions. Although travelers formally have access to mobility, they may hesitate or even avoid using the available options because of fear. Certain groups, such as women, may be affected disproportionately by these feelings of unsafety, thereby undermining their possibilities to fully participate in society.

Furthermore, existing research consistently shows that gender has a large influence on feelings of safety (Hille, 1999; Johansson & Haandrikman, 2023; Loukaitou-Sideris, 2012). Nevertheless, transport evaluations in the Netherlands generally do not differentiate between men and women. For instance, the Dutch Station Experience Monitor (SBM) of the NS (Dutch national railways), which is a yearly monitoring of how travelers experience and value stations, does not account for different gendered experiences (Pointer & AD, 2024). Remarkably, the SBM shows that small railway stations (specifically, the 'Basis' type stations) are consistently overrepresented among the lowest-scoring stations (see Appendix A). These stations are one of the smallest station types and are characterized by the low number of passengers and limited facilities (ProRail, B., n.d.), which may contribute to feelings of discomfort or unsafety.

This research strives to contribute to a more inclusive public transport system by examining how travelers experience safety at small Dutch railway stations. It builds on the Capabilities Approach and connects the concepts transport poverty and perceived safety, thereby offering a nuanced perspective on measured accessibility. As Vecchio and Martens (2021) explain, bottom-up analytical approaches (e.g. focused on the daily mobility experiences of people) to assess accessibility are essential to understand the experienced mobility difficulties. They emphasize how, from a top-down perspective, at-risk groups that may seem to be well served by the mobility system can encounter important barriers, such as concerns over safety. This research also responds to the literature gap proposed by Friman et al. (2020), who emphasize the need for research into perceived safety and accessibility in non-metropolitan areas and specific transport environments. By exploring the perceived safety of travelers at small railway stations in the Netherlands, this research extends their work to a different spatial and functional context.

It does so by using the following research question:

*How can insights into travelers' experienced safety at small railway stations in the Netherlands inform the design and development of these stations?*

The research question is supported by the following sub-questions:

1. *Which spatial and environmental factors influence travelers' experienced safety at small railway stations in the Netherlands?*
2. *How does gender influence travelers' experienced safety at small railway stations in the Netherlands?*
3. *What coping strategies do travelers use to handle perceived safety concerns at small railway stations in the Netherlands?*

## **1.1 Scope**

This research focuses on the experienced safety of small Dutch railway stations, specifically, the 'Basis' type stations. These stations are overrepresented among the lowest scores in the SBM of the last five years (see Appendix A) and are characterized by a low number of passengers and facilities (ProRail B., n.d.), which makes them distinct environments to research feelings of unsafety. The other categories, Stop, Plus, Mega and Cathedral (see Table 2), are not included in this research. This study investigates perceived safety, rather than objectively measured incident data or crime rates. Additionally, although gender is an important element in travelers' safety perceptions, this research does not exclude men, to ensure a broad perspective on travel experiences and coping strategies. Geographically, the scope concerns only railway stations in the Netherlands, which also means that other public transport modes, such as the metro, tram and bus, are excluded. At the same time, historical analysis and international comparisons are also excluded. The focus lies on how travelers experience safety at small railway stations of the 'Basis' type and on the implications of these insights, supported by perspectives from experts involved in station design, management and safety, for the design and development of these stations.

## **1.2 Outline**

This remainder of this research is organized as follows. Chapter 2. presents the theoretical framework, thereby introducing the Capabilities Approach, as well as the concepts transport poverty and perceived safety. The relationships between these theories and concepts are visualized in the Conceptual framework. Chapter 3. outlines the research methodology, including the research design, the selection of stations, and the analysis. Chapter 4. provides contextual information regarding the stations that were visited, based on NS traveler distribution data, and describes their main characteristics. Chapter 5. and 6. present the results and insights from interviews with travelers and experts. Chapter 7. discusses the implications of this research for small railway stations and offers possible improvements. Chapter 8. summarizes the main conclusions of this research, and Chapter 9. integrates the findings into a broader discussion, thereby connecting the results with the theoretical framework.

## 2 Theoretical Framework

As mentioned in the outline, this chapter presents the theoretical framework that is used to look at the perceived safety of travelers at small railway stations in the Netherlands. It places the theoretical framework in the current context of academic literature and connects it to the concept of transport poverty. It follows with the explanation of the Customer Wish Pyramid and different dimensions of perceived safety in academic literature concerning transit environments and finishes with the conceptual framework of this research.

### 2.1 Capabilities Approach

This research draws on the theoretical framework *Capabilities Approach* of Amartya Sen and Martha Nussbaum. The Capabilities Approach offers a lens through which to consider mobility and justice. By concentrating on the individual and their mobility, the framework contributes to a better understanding of personal choices and barriers, as well as individual use of mobility, and the potential opportunities that may otherwise be out of reach for certain individuals (Vecchio, 2020). Therefore, this framework is relevant for analyzing the concept perceived safety in transit environments, as it highlights individual access to opportunities for participation in society.

#### The definition of the Capabilities Approach

The Capabilities Approach concentrates on the difference between *resources (or means)* (public goods and resources that are accessible) and *functionings* (the states of being and doing that a person achieves). The combination of different functionings together refer to *capabilities*, which are the freedoms that are available to an individual to live a certain type of life. The achievement of these capabilities is dependent on *conversion factors*, which refer to individual, social and environmental features that determine whether resources can be converted into capabilities. For instance, an individual may live next to a train station (a resource), but if they feel too unsafe to use the station (a personal and environmental conversion factor), they may lack the capability to access and participate in activities which are important to them, such as attending a dancing class. Consequently, the individual is unable to achieve the functioning of participating in a dancing class. Hence, two different people can have the same resources, such as access to public transport, but may not be able to achieve the same functionings and enjoy the same capabilities. In this sense, a person experiences real freedom when their necessary resources can be converted into what they want (Vecchio & Martens, 2021).

The Capabilities Approach prioritizes genuine opportunities, instead of solely focusing on the means that people may or may not have, such as a high income (Stanford Encyclopedia of Philosophy, 2025). Recently, the Capabilities Approach has been widely adopted in academic literature concerning transport and mobility (Bantis & Haworth, 2020; Luz & Portugal, 2022; Vecchio & Martens, 2021). Nevertheless, as Vecchio and Martens (2021) explain, in academic literature there are different perspectives on whether mobility can be considered as a capability. According to Nussbaum, mobility refers to *'the ability to move freely from place to place'* (Nussbaum, pp. 78, 2000).

### 2.2 Approaches to Capabilities in transport literature

Vecchio and Martens (2021) distinguish three different approaches in literature. The first considers *mobility as a capability*. This means that related literature questions whether individuals can be mobile. The second considers *accessibility as a capability* and questions whether individuals can reach places and participate in activities by using mobility. This approach is mostly used. The last approach emphasizes the role of transport policy in reaching multiple capabilities. By providing sufficient transportation, individuals should be able to convert resources into capabilities, thereby enabling

capabilities, such as education, employment and demographic participation (Vecchio & Martens, 2021).

In this research, the second and last approach are adopted to examine perceived safety of small train stations. As described earlier, the focus is not only on whether people are able to travel, but also whether they feel safe enough to use the mode of transport. This also concerns the possibilities enabled by the transport system to participate in activities that are important to the individual.

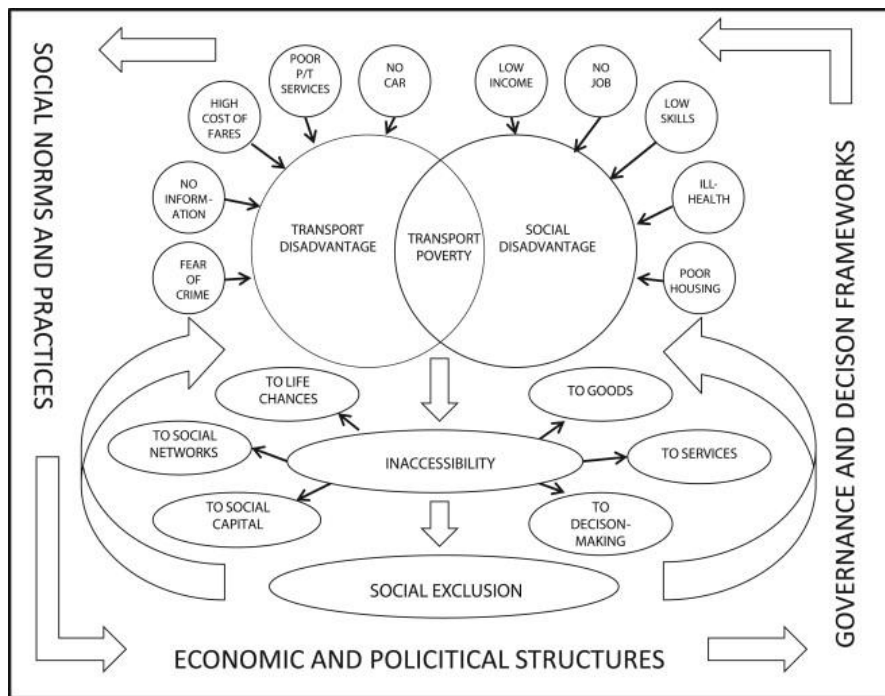
### **2.3 Transport poverty and accessibility**

Building on this perspective, the concept transport poverty provides a useful lens for understanding how perceived safety can affect mobility opportunities. Scholars have shown that safety concerns, especially among women, can lead to restrained travel behavior, such as the avoidance of certain transport modes during certain times of the day, and coping behavior, such as carrying protective items like pepper spray (Loukaitou-Sideris, 2012, 2014; Stark & Meschik, 2018). Therefore, they may be restricted in participating in essential activities, like work, education, or social activities (Hille, 1999). These restrictions align with the last condition, 'travel conditions', of the concept '*Transport poverty*' of Lucas (2012) and Lucas et al. (2016).

Transport poverty is a broad and overarching term that encompasses many different aspects of mobility. The concept is usually associated with work of Professor Karen Lucas, who was the first to use and define the term systematically in her research (Lucas, 2012; Lucas et al., 2016). In 2012 Lucas argued that transport poverty stems from a combination of experiencing social and transport disadvantages, which can further result in experiencing social exclusion (Lucas, 2012). The overarching definition of Lucas et al. (2016) aims to make a difference between transport affordability, mobility poverty, accessibility poverty, and exposure to transport externalities. They describe five different conditions that may apply to someone's basic daily activity needs. These conditions refer to 1) the individual's physical condition and capabilities 2) the existing transport options 3) the transportation costs 4) the travel time, and 5) the travel conditions. If a person meets at least one of these conditions, they can be described as transport poor, according to Lucas et al. (2016).

As shown in Figure 1, fear of crime is considered as one of many factors that may contribute to the experience of transport poverty. In other words, even if the transport options are available, this does not mean that they are accessible for everyone. Nevertheless, traditional transport planning often concentrates on quantitative measures of mobility, such as travel time or distance (Lättman et al., 2018; Lättman, Friman, et al., 2016; Lättman, Olsson, et al., 2016; Pot et al., 2021). Therefore, the subjective feelings of unsafety add to a form of transport poverty that is often not included in planning of transport systems (see for example: (Cheng & Chen, 2015; Jamei et al., 2022; van Wee, 2016).

Figure 1. The relationship between transport disadvantage, social disadvantage and social exclusion



Source: Lucas (2012) (pp. 107).

## 2.4 Perceived safety in transit environments

Given that perceived safety forms an essential component of travel conditions, this section illustrates how experienced safety is conceptualized within transit environments. The Customer Wish Pyramid (see Figure 2) is introduced to position experienced safety as a necessary component for travel experience.

### Customer Wish Pyramid

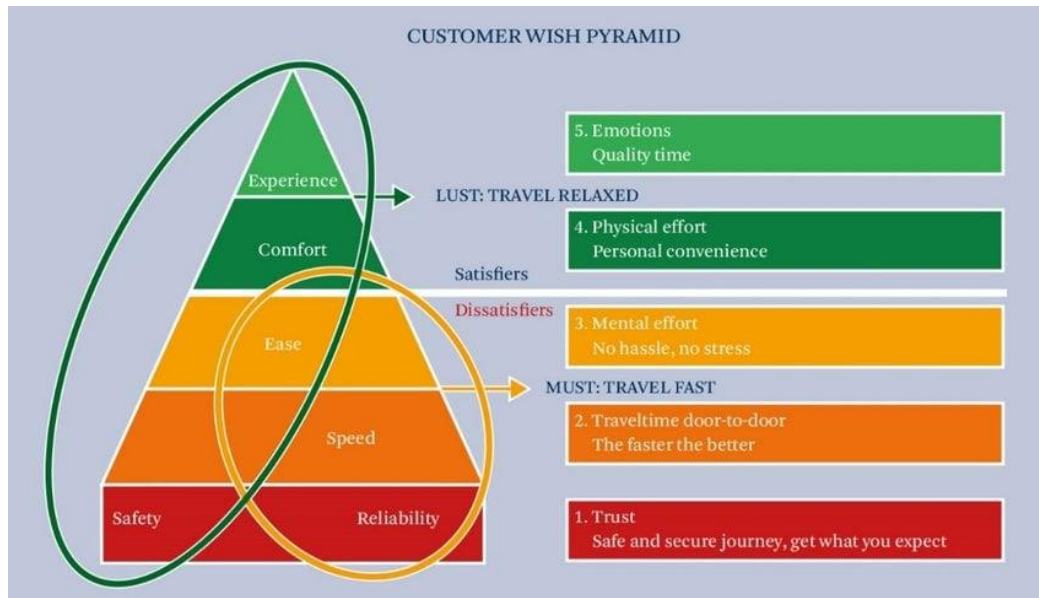
This pyramid shows the hierarchy of needs of travelers, in which the bottom layers refer to *dissatisfiers*, which can be experienced negatively when the needs are not met and the top layers show *satisfiers*, which can be experienced positively and enhance the travel experience of travelers (Van Hagen & Van Oort, 2019). The dissatisfiers influence all travelers, while the satisfiers can be experienced and appreciated differently by each traveler. One traveler might enjoy the presence of more extensive facilities, such as restaurants and shops, while another might be satisfied with more minimal facilities, like a vending machine (Van Hagen, 2011). Travelers will experience the train station as positive, when all the layers of the pyramid are addressed (Van Hagen, 2015).

However, the foundation of the pyramid, *Safety* (specifically social safety) and *Reliability*, is considered as the most important aspect of the traveler's experience. Potential travelers may avoid the station when they consider it to be unsafe. Therefore, the foundation layers need to be complied with first, before the other layers can be improved (Van Hagen, 2015).

Additionally, Van Hagen and Bron (2014) make a distinction between *Must travelers*, who usually use public transport during rush hours to commute to school or work, and *Lust travelers*, who use public transport to travel during off-peak hours with a recreational or social motive. Must travelers are predominantly influenced by dissatisfiers, as their travel is non-optional, which means that shortcomings in safety and reliability directly affect their journeys. While Lust travelers are influenced by both dissatisfiers and satisfiers and are therefore more sensitive to factors like ambience and comfort, but only once the foundations of the Pyramid are addressed.

Particularly the distinction between Must and Lust travelers is relevant for small Dutch railway stations, as these stations are characterized by less travelers and less facilities. These conditions mean that satisfiers may be limited or even absent, resulting in a dependence on the quality of the dissatisfiers, such as social safety. Lust travelers may simply avoid the stations when the foundation layers are not complied with, whereas Must travelers, who rely on these stations in their everyday travel journeys, are more likely to be influenced negatively by the dissatisfiers.

Figure 2. Customer Wish Pyramid



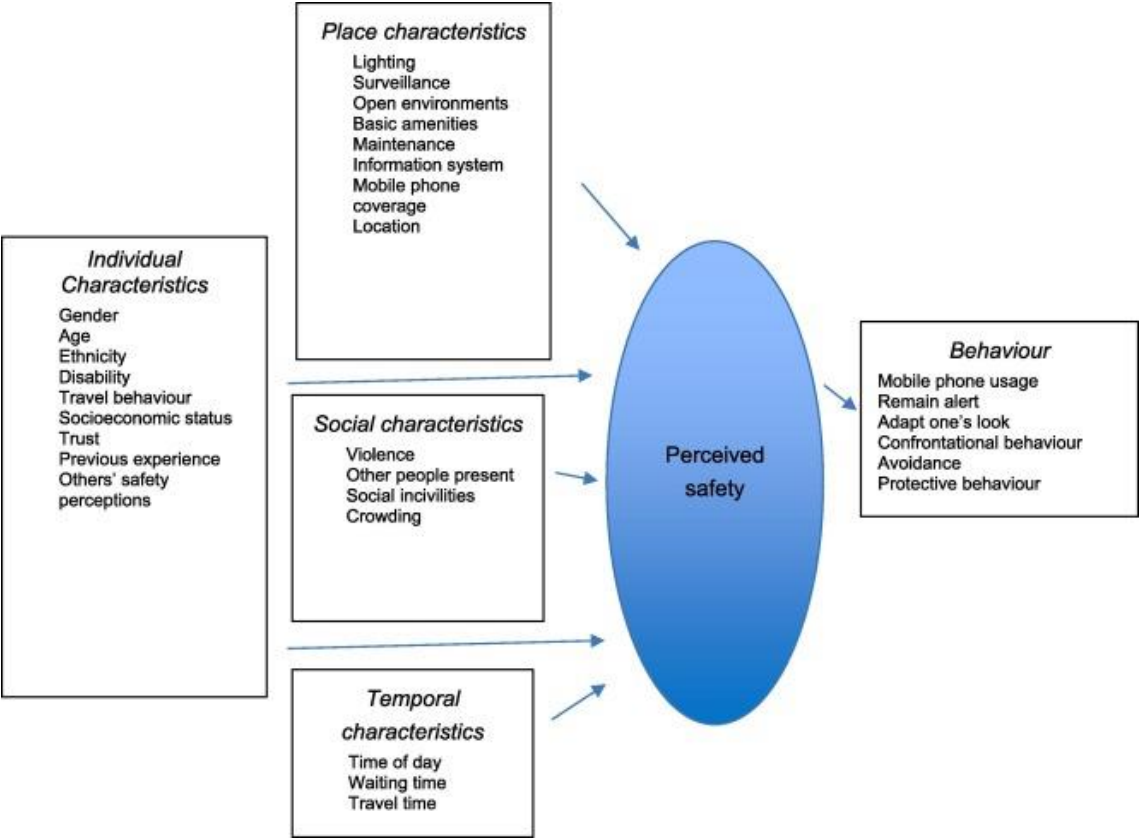
Source: Van Hagen and Van Oort (2019) (pp. 99).

### Factors that influence perceived safety in station environments

While the Customer Wish Pyramid emphasizes perceived safety as a crucial element within the overall travel experience, a broader body of academic literature offers a detailed insight into which factors specifically influence experienced safety in station environments.

Scholars who are often associated with research regarding safety perceptions in public space, and specifically mobility-related environments, are Vania Ceccato, Anastasia Loukaitou-Sideris and Catherine Sundling. In earlier work of Sundling and Ceccato (2022), the authors provided a conceptual framework to categorize perceived safety in station environments (see Figure 3). Thereby, they classified: individual characteristics (e.g. age and gender), place characteristics (e.g. lighting and surveillance), social characteristics (e.g. violence and the presence of others), and temporal characteristics (e.g. time of the day and waiting time), of the station environments. The different sizes of the figures show the relative number of findings.

Figure 3. Conceptual framework for categorizing perceived safety in station environments of Sundling and Ceccato (2022)



Source: Sundling and Ceccato (2022) (pp. 109).

Moreover, based on international literature of the last five decades, Ceccato et al. (2024) more recently identified three factors that influence passengers’ victimization and safety perceptions in transit environments, specifically focusing on rail-bound systems (Ceccato et al., pp. 3, 2024). For the safety perceptions, these factors are 1) the individual characteristics of travelers, such as gender and age, 2) the environmental design of the station, with regard to, for instance, surveillance and lighting, but also how other travelers use the station, and 3) the location of the station and the characteristics of the area, such as emptiness of the surrounding streets and criminogenic character (Ceccato et al., 2024).

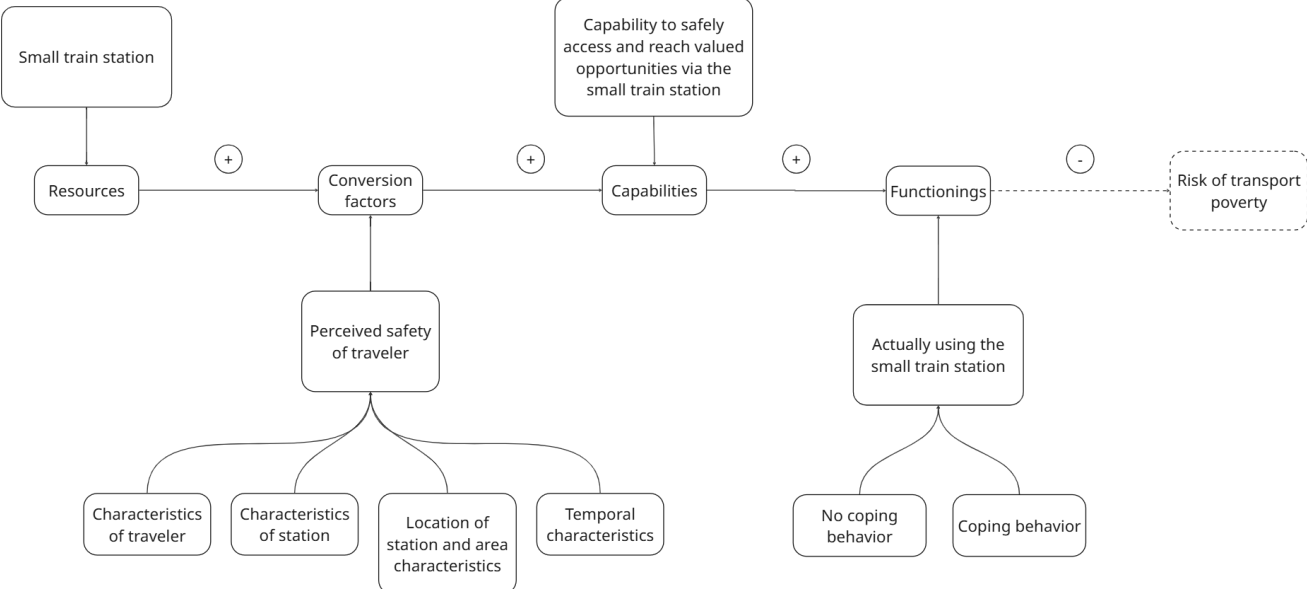
### 2.5 Conceptual framework

For the conceptual framework of this research (see Figure 4) the elements of the Capabilities Approach of Amartya Sen and Martha Nussbaum served as the foundation. This means that the conceptual framework should be understood from left to right and considers the ‘journey’ of one traveler, or individual. The plus sign indicates a positive relationship and the minus sign a negative relationship. For instance, when the traveler feels safe, this contributes to the possibility of converting the resource (small train station) into a capability (capability to safely access and reach valued opportunities via the small train station). Consequently, when the resources cannot be converted into capabilities and functionings (a negative relationship), the traveler might be at risk of experiencing transport poverty.

The dimensions of perceived safety of the traveler are based upon the conceptual framework of Sundling and Ceccato (2022) and similar factors of Ceccato et al. (2024). The social characteristics,

as shown in Figure 3, are included in the dimension Characteristics of stations, since Ceccato et al (2024) also combine these in their research. Moreover, the temporal characteristics from Sundling and Ceccato (2022) have been added, as differences between, for instance day and night, can strongly influence feelings of safety (Te Braak & Van Tienoven, 2025).

Figure 4. Conceptual framework



Source: Author (2026) Adapted from Ceccato et al. (2024), Nussbaum (2000), Sundling & Ceccato (2022), and Te Braak & Van Tienoven (2025).

### 3 Research Methodology

In this chapter, the methods used to conduct the research are described. The chapter begins by outlining the research design, focusing on the exploratory and descriptive approach used in this research. Then the data collection methods are explained in the sub-section on qualitative research. At the same time, the selection and characteristics of the small Dutch train stations visited during the interviews with travelers are explained, as well as the additional quantitative data for the contextualization of the stations. Then the data analysis methods are described. Finally, the ethical considerations that were adopted for this research are explained.

#### 3.1 Research design

This research aimed to gain a better understanding of the lived experiences of travelers using small railway stations in the Netherlands. Therefore, a combination of an exploratory and descriptive qualitative design was used. The goal of combining these approaches was to grasp travelers' experience of safety and coping mechanisms at these stations (exploratory), while also illustrating relevant patterns in perceived safety (descriptive).

As mentioned earlier, the NS investigates the experience of travelers using small railway stations yearly using a questionnaire for the Station Experience Monitor (Stations.nl, 2026). However, this monitor results in average scores per station, thereby excluding the influence of gender (Pointer & AD, 2024). At the same time, existing research has also shown that, especially female travelers, adopt coping behavior in public transport to feel safer (d'Arbois de Jubainville & Vanier, 2017; Sarker et al., 2026). Therefore, the qualitative research methods of this study were used to gain a more in-depth insight into the experiences of travelers.

#### 3.2 Qualitative research methods

To gain a comprehensive understanding of experienced safety, interviews were conducted with travelers at four small railway stations in the Netherlands, and experts working in fields related to public transport, station design, safety and area development. In this way, the interviews with the travelers could be placed in a broader perspective and additional context could be provided by the experts. Table 1 shows the sub-questions and corresponding research methods.

Table 1. Sub-questions and research methods

Sub-questions	Questions	Research methods
1.	Which spatial and environmental factors influence travelers' experienced safety at small railway stations in the Netherlands?	Interviews with travelers at small railway stations in the Netherlands Interviews with experts
2.	How does gender influence travelers' experienced safety at small railway stations in the Netherlands?	Interviews with travelers at small railway stations in the Netherlands
3.	What coping strategies do travelers use to handle perceived safety concerns at small railway stations in the Netherlands?	Interviews with travelers at small railway stations in the Netherlands

The interview questions were derived from relevant literature, as described in Chapter 2. As illustrated in the conceptual framework (see Figure 4), the different dimensions of the concepts were

operationalized using the described literature. Therefore, the interview questions (see Appendix B and Appendix C) were based on the different concepts and dimensions from the conceptual framework, as well as inspired by relevant indicators and questions from academic sources, such as Chowdhury and Van Wee (2020) and Friman et al. (2020).

### **Interviews with travelers**

For the interviews with travelers, four different small train stations in the Netherlands were visited. The semi-structured interviews aimed to get a better understanding of how travelers use the station, how they feel when using the station, what they do to feel more comfortable (coping strategies), and what they would like to improve about the station to feel safer. The format of the interview questions allowed for certain questions to be more structured, concerning for instance the goal of the journey, and frequency of use. While other questions regarding the experience were more open and aimed to understand the personal experience of the travelers.

When possible, micro-stories regarding the personal, social and spatial factors that shape the respondents' mobility were also gathered. Micro-stories are short and personal stories about daily travel experiences (Vecchio, 2020). As Vecchio (2020) described, micro-stories can be useful to identify the capabilities of travelers in a just way. Due to the sensitive nature of the topic (perceived safety), these micro-stories were only conducted if the respondent and moment of the interview allowed for this type of conversation.

In addition, the interviews (see Appendix B) were kept short (a maximum of five minutes) to ensure that the travelers would not be delayed catching their train, and they were held during daytime between the morning and right after rush hour (around 9:00 AM), and the afternoon (around 14:00 PM), to add to the feeling of safety for the respondents and interviewer. The interviews were conducted with a diverse range of travelers of different ages (ranging from ages below 18 years old to ages above 65 years old) and gender identities.

### **Selection of stations**

The interviews with travelers were conducted at four different small railway stations in the Netherlands, Nieuwerkerk a/d IJssel Station, Den Helder Zuid Station, Rijswijk Station, and Overveen Station. The four stations are categorized as the 'Basis' type by NS and ProRail. This means that there are roughly between 1000 and 10.000 passengers per day (see Table 2). The analysis focused specifically on the 'Basis' station type, as they are consistently overrepresented among the ten lowest-scoring stations in the SBM between 2021 and 2025 (see Appendix A). This pattern suggests that travelers are more likely to experience the 'Basis' station type negatively.

As shown in Table 3, Nieuwerkerk a/d IJssel Station, Den Helder Zuid Station, and Rijswijk Station, are classified among the stations with the lowest SBM scores in the year 2024. The year 2024 was chosen, as the results of the SBM of 2025 were not available yet, meaning that the year 2024 was the most recent dataset of the SBM. Additionally, only the SBM scores of the years 2021 to 2025 are included in this research. Before 2021, the NS used another measurement method, publishing only the percentages of respondents giving a score of 7 or higher (I&O Research, NS & ProRail, 2020). Since this method differs from the method used from 2021, where the NS provided the average station scores, the results from before 2021 are not included, as they are not directly comparable.

Furthermore, interviews with travelers were also conducted at Overveen Station. Overveen Station scored the highest SBM score of the 'Basis' type stations in 2024 (see Table 3). Therefore, the interviews held at this station functioned to validate the interview data from Nieuwerkerk a/d IJssel Station, Den Helder Zuid Station, and Rijswijk Station. If, for example, travelers mentioned they felt unsafe, due to the isolated characteristics of Den Helder Zuid Station, then the travelers at Overveen Station could feel safer, due to the connectedness between Overveen Station and the surrounding area.

Table 2. Classification of stations

Type of station	Passengers per day	Optional other criteria
Stop ('Halte')	Maximum 1000	No elevators or escalators, or if the available transfer area is less than 2,000 m <sup>2</sup> , of which less than 20% is covered.
'Basis'	1000 – 10.000	Elevators and/or escalators are present.
Plus	10.000 – 25.000	Comfort facilities, such as retail facilities
Mega	25.000 – 75.000	Comfort facilities, such as retail facilities
Cathedral	More than 75.000	Comfort facilities, such as retail facilities

Source: ProRail B. (n.d.) and Spoorbeeld (n.d.).

Table 3. The ten lowest- and highest-rated stations in the SBM (2024)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Lage Zwaluwe	4,81	Stop	Klimmen-Ransdaal	8,3	Stop
2	<b>Den Helder Zuid</b>	<b>5,13</b>	<b>Basis</b>	<b>Overveen</b>	<b>8,25</b>	<b>Basis</b>
3	<b>Nieuwerkerk a/d IJssel</b>	<b>5,31</b>	<b>Basis</b>	Schin op Geul	8,17	Stop
4	<b>Rijswijk</b>	<b>5,66</b>	<b>Basis</b>	Mantgum	8,11	Stop
5	Arnhemuiden	5,82	Stop	Dalfsen	8,11	Basis
6	Eindhoven Strijp-S	5,82	Basis	Valkenburg	8,02	Basis
7	Rotterdam Zuid	5,9	Basis	Daarlerveen	8,02	Stop
8	Blerick	5,9	Basis	Houthem-St.Gerlach	8,01	Stop
9	Middelburg	5,9	Basis	Santpoort Zuid	8	Stop
10	Nijmegen Dukenburg	5,93	Basis	Barneveld Zuid	7,97	Stop

Source: Spoorbeeld (n.d.) and Stations B. (2024).

### Contextual insights with quantitative data

To be able to gain a better understanding of the different contexts, the distribution of travelers per station and per time slot from the NS (2024) is incorporated into the analysis in Chapter 4. This distribution offers insights into how intensively the stations are used throughout the day. This information is important to understand the experienced safety of travelers, as factors like the presence of others and liveliness of the station environment, can influence feelings of (un)safety. At the same time, this distribution allows for a comparison of the different stations that were visited.

### Interviews with experts

Additionally, in-depth semi-structured interviews of roughly an hour per expert were conducted with thirteen experts found through (the connections of) Haskoning. The expertise of the experts was gathered to gain better insight into the design of small railway stations, how safety is included in this design, and the general design and development of small railway stations within the Dutch context.

Table 4. Overview of the experts

Number	Organization	Function	Gender identity
1.	Consultancy firm	Sr. Consultant station development and design	Man
2.	Consultancy firm	Sr. Consultant working on the improvement of safety at train stations	Man
3.	Consultancy firm	Architect with expertise in station design	Woman
4.	Dutch railway company	Market researcher SBM	Woman
5.	Dutch railway company	Consultant with expertise in traveler experience	Man
6.	Consultancy firm	Researcher and Consultant mobility and behavior	Woman
7.	Provincial government	Consultant public transport	Man
8.	Provincial government	Consultant public transport, policy and rail working on the Vechtdallijnen	Woman
9.	University of Applied Sciences	Researcher safety and trust	Woman
10.	Consultancy firm	Socially safe design and maintenance, and certified CPTED expert	Man
11.	Technical University	PHD researcher and Junior lecturer train station area development	Woman
12.	Dutch railway company	QHSE manager	Man
13.	Dutch railway company	Safety manager social safety	Woman

As shown in Table 4, most of the experts work in the public domain, private domain, or at a knowledge institution. They were selected based on their expertise regarding safety in public transport environments, or their experience with planning, design, or operational management of (small) railway stations. To gain a better understanding of (the perception of) safety, a variation in backgrounds was sought to include a wide range of different perspectives. Additionally, the gender identity of the experts was collected. As experienced safety is a subjective topic, the experts were also expected to be partly informed by their own personal experiences.

The same interview script was used for every expert (see Appendix C), however the questions were adjusted to their specific knowledge. This for instance means that if the expert was an architect, the questions were focused on their expertise as an architect and social safety in station design.

Twelve out of thirteen interviews were held in Dutch, one in English. These languages were chosen to ensure the researcher and respondents could communicate in a comfortable way and ensure a flow in the interview. The interview script was translated from Dutch to English for this report. Twelve out of thirteen interviews were held online through Teams, one was held at a location in Amsterdam West.

### 3.3 Thematic analysis

The data collected through semi-structured interviews with travelers was analyzed using Atlas TI. Atlas TI is a software program provided by Wageningen University, which allows the identification of different themes in interviews through inductive and deductive coding (Friese, 2014).

The deductive coding is based on the literature as described in Chapter 2, to inform the research by scholarly insights. The inductive coding provides the opportunity for themes to emerge more organically from the data, as this research also contains an exploratory approach. The codes were created in Dutch, as the interview transcripts were also in Dutch. A list of the codes with the corresponding translation can be found in Appendix D.

The interviews with experts were not coded, due to the length of the interviews. Important themes in the interviews were identified by the notes that were taken by the researcher during the interview, as well as Artificial Intelligence Software Copilot from Teams.

### **3.4 Ethical considerations**

To ensure the integrity and reliability of this research, ethical considerations were discussed before execution of the research in the HREC form from TU Delft. As this research concerns a sensitive nature and perceived safety is a vulnerable topic, specific attention was paid to anonymity, informed consent and secure data management, for the traveler and expert interviews.

#### **Anonymity and informed consent**

All interviews were kept anonymous and informed consent was obtained before every interview took place, thereby informing the respondents about the topic and aim of the research, as well as their right to withdraw at any moment.

For the interviews with experts this means that only their roles were mentioned. To prevent the possibility of being traced back to a specific individual, their functions and the organizations they work for were generalized and categorized. This for instance means that all consultancy firms are grouped under the general label 'Consultancy firm'. Moreover, function titles were also broadened to reflect their expertise and relevant experiences, instead of their formal job titles. In addition, experts were provided with the opportunity to check their quotes before they were used in the research. If they did not agree with the way that the quotes were translated, they could be altered.

Regarding the interviews with travelers, the only personal information that was collected concerned the gender identity and age of the respondents. As explained by Suen et al. (2020), the respondents were asked about their gender identity, instead of solely gender. This avoids miscommunication and allows the respondent to answer this question according to how they identify themselves. Additionally, this aims to reduce the exclusion of sexual and gender minority people, like transgender and queer communities (Suen et al., 2020). Nonetheless, if the respondent did not want to mention their gender identity (or age), this was excluded. Furthermore, due to the short duration of the interviews, respondents were offered a Participant ID card with a QR code and unique number (see Appendix E).

## 4 Characteristics of the stations visited

In this chapter, the characteristics of the stations that were visited are presented. Even though the stations all have a low score, the characteristics, such as type of environment, number of travelers, and design of the stations, are very diverse. Therefore, every station that is visited is described below, thereby focusing on the surroundings and design. The chapter finishes with analyzing the distribution of travelers per station and time slot.

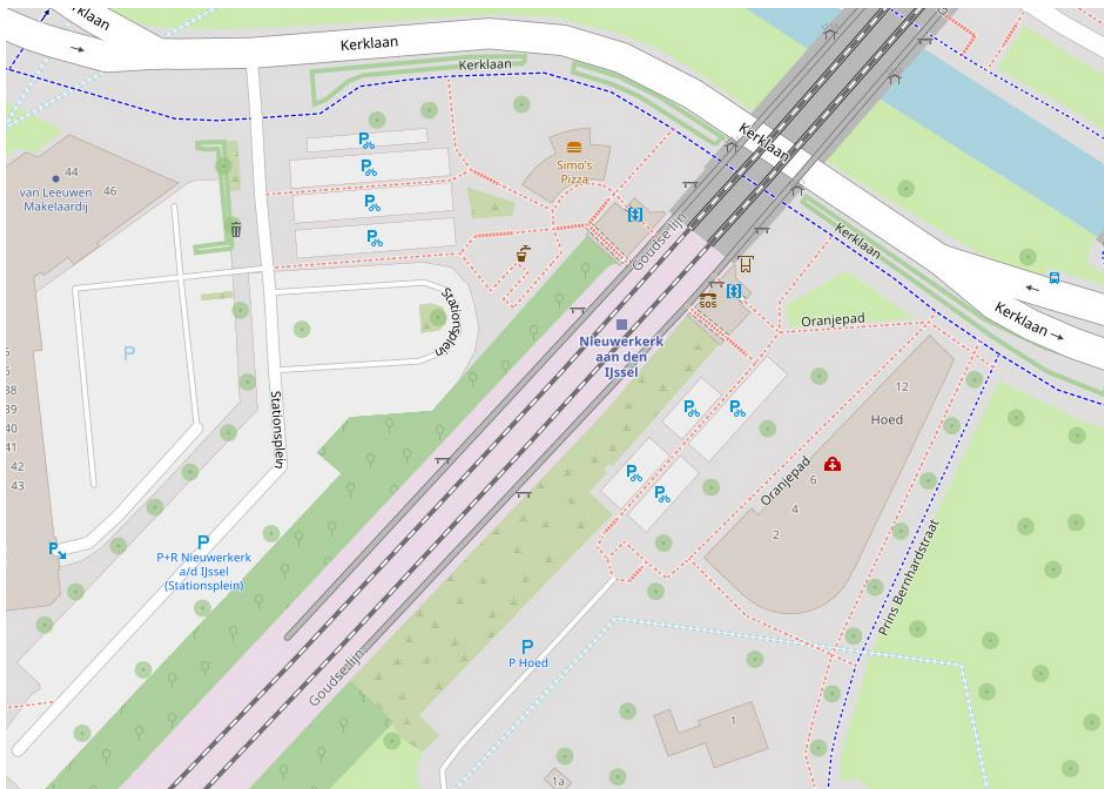
### Nieuwerkerk a/d IJssel Station

The first station that was visited, Nieuwerkerk a/d IJssel Station, is in the Province of South Holland, within the Municipality Zuidplas. The Municipality Zuidplas lies between Gouda and Rotterdam. The station itself is situated close to the center of Nieuwerkerk aan den IJssel. The viaduct station is centered above one of the main roads of Nieuwerkerk aan den IJssel, which is the Kerklaan (see Figure 5).

Nieuwerkerk a/d IJssel Station has two tracks and two platforms, serving 3.009 travelers on an average workday in 2024. Travelers can exit the station on both sides of the station with the (open) stairs. Furthermore, most travelers use the station during off-peak hours and walk to and from the station. The travel directions are Capelle Schollevaar and Gouda (NS Dashboard, B. 2024).

The immediate surroundings of the station consist of a suburban and residential neighborhood. Amenities, such as supermarkets and diverse takeaway places, are in a small shopping mall (Reigerhof), within walking distance of five minutes. On one side of the station is a car park, with a Park and Ride facility. This side also has a small pizza restaurant. The other side of the station has a bicycle parking place next to a general practitioner.

Figure 5. Map of Nieuwerkerk a/d IJssel Station



Source: OpenStreetMap contributors B. (2026), licensed under the Open Database License (ODbL).

Figure 6. Pictures of Nieuwerkerk a/d IJssel Station



Source: Author (2025).

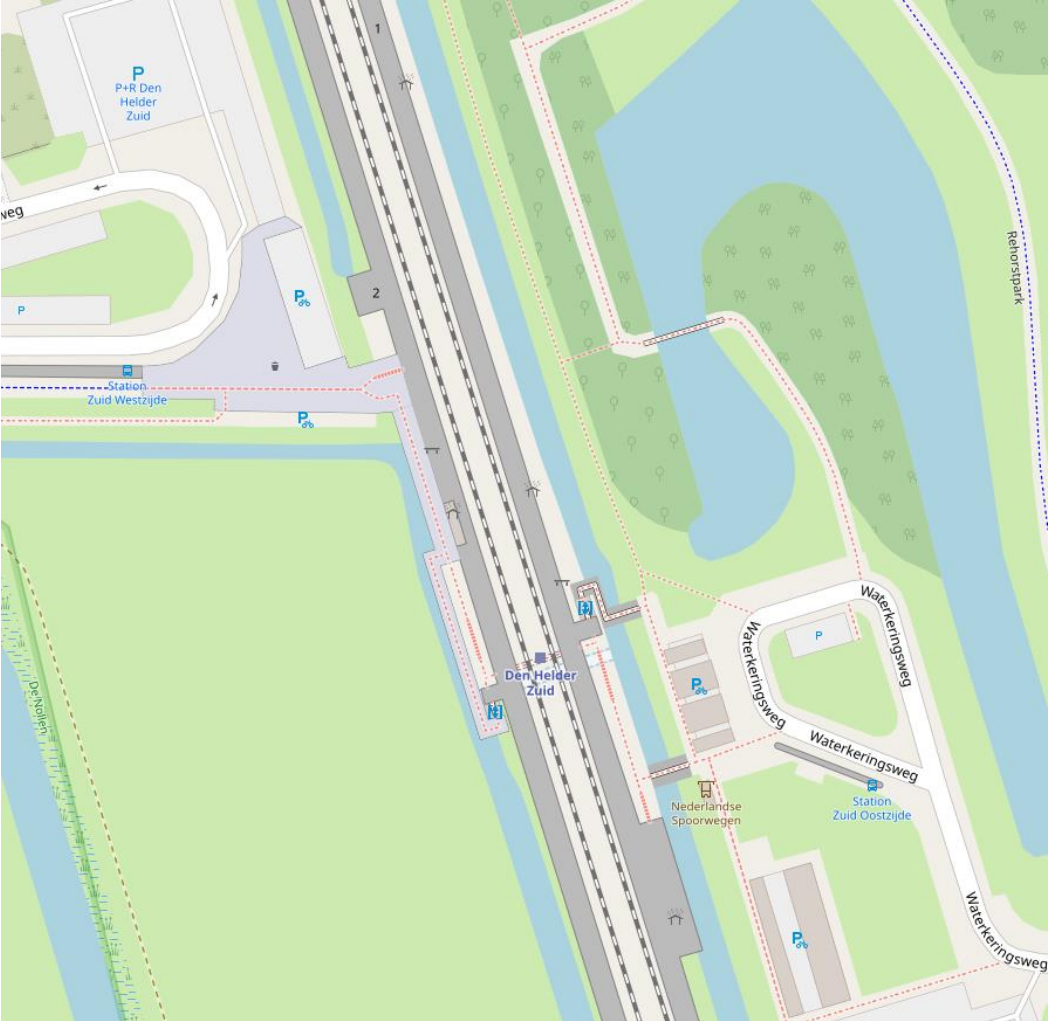
### Den Helder Zuid Station

The second station that was visited, Den Helder Zuid Station, is in the Province of the North of Holland, within the Municipality Den Helder. Den Helder is almost surrounded by the Wadden Sea and is close to Municipality Hollands Kroon. The Den Helder Zuid Station itself is on the edge of Den Helder. The center of Den Helder is connected with the main station of Den Helder, Den Helder Station.

Den Helder Zuid Station has two tracks and two platforms, serving 1.582 travelers on an average workday in 2024. Travelers can walk to the other platform by using the pedestrian tunnel. Moreover, most travelers use the station during off-peak hours and walk to and from the station. The travel directions are Anna Paulowna and Den Helder (NS Dashboard, A. 2024).

The west side of the station is in between two parts of De Nollen, separated by the Burgemeester Ritmeester road (see Figure 7). De Nollen is a nature preserved area that used to consist of bulb-growing land. Nowadays, the north side of De Nollen has multiple art installations, thereby functioning as a modern art museum. The south side of De Nollen is open to the public and is part of a NS hike (LandschapNoordHolland, n.d.). Additionally, the west side of the station also has a bicycle parking and Park and Ride facility. Within ten minutes of walking, an industrial terrain, with facilities like a thrift store, storage space and hardware store, can be reached from this side of the station. The east side of the station is next to the Rehorst Park, a car park, and a bus stop. Within five minutes of walking, travelers using the station reach residential neighborhood De Schooten through this side of the station.

Figure 7. Map of Den Helder Zuid Station



Source: OpenStreetMap contributors A. (2026), licensed under the Open Database License (ODbL).

Figure 8. Pictures of Den Helder Zuid Station





Source: Author (2025).

### **Rijswijk Station**

The third station that was visited, Rijswijk Station, is in the Province of South Holland, within the Municipality Rijswijk. Rijswijk is close to The Hague and Rotterdam. The underground Rijswijk Station itself is in the center of the Municipality in railway tunnel Rijswijk.

Rijswijk Station has four tracks and two platforms, serving 5.430 travelers on an average workday in 2024. Moreover, most travelers use the station during off-peak hours and walk to and from the station. The travel directions are Delft and Den Haag Moerwijk (NS Dashboard, D. 2024).

The station has two different entrances connected through the tunnel, one of which is located at the Piramideplein (see the left map of Figure 9), which is a small, glass pyramid-shaped building. The Piramideplein is connected to a nature playground for children, and is close to different facilities, such as a lunchroom and gym. It also had a bicycle and car parking place. The other entrance is located at the Generaal Eisenhowerplein next to one of the main roads of Rijswijk, which is the Sir Winston Churchillaan. At this square there is a bus station, tram stop and taxi place. Above the entrance of this side of the station are an office and an apartment building. Moreover, within the station is a small fast-food facility and mini supermarket on this side of the station. At the same time, it also has a bicycle parking place.

Figure 9. Map of Rijswijk Station (two entrances)



Source: OpenStreetMap contributors D. (2026), licensed under the Open Database License (ODbL).

Figure 10. Pictures of Rijswijk Station



Source: Author (2025).

## Overveen Station

The last station that was visited, Overveen Station, is in the Province North Holland, within the Municipality of Bloemendaal. Overveen is a small village close to the city Haarlem and town Zandvoort. The Overveen Station itself is connected to the urban fabric of Overveen, and is close to facilities, such as the supermarket and different shops and eating facilities

Overveen Station has two tracks and one main elongated platform, serving 1.849 travelers on an average workday in 2024. Moreover, most travelers use the station during off-peak hours and walk to and from the station. The travel directions are Haarlem and Zandvoort aan Zee (NS Dashboard, C. 2024).

The station is parallel to the road Tetterodeweg and next to the Brouwerskolkpark (see Figure 11). In the station building next to the entrance is a small restaurant, Klein Centraal, which is open six days a week from 10 A.M. to midnight. Next to the entrance there is also a small bicycle parking place. Moreover, within one minute walking distance travelers reach the main shopping area of the village.

Figure 11. Map of Overveen Station



Source: OpenStreetMap contributors C. (2026), licensed under the Open Database License (ODbL).

Figure 12. Pictures of Overveen Station



Source: Author (2025).

## 4.1 Distribution of travelers

The distribution of travelers per station and time slot provides essential context for interpreting the interview findings. This data shows when each station is most frequently used throughout the day and helps to explain why certain safety-related factors, such as insufficient lighting, and the low number of other travelers, were often mentioned by travelers. Peaks during daytime can be related to a more recreational character, while peaks during rush hours may point to the importance of these stations in daily commuting.

Table 5. Distribution of travelers per station and per time slot

Time slot	Den Helder Zuid Station	Nieuwerkerk a/d Ijssel Station	Rijswijk Station	Overveen Station
00:00-07:00	14.22%	13.02%	10.64%	4.58%
07:00-09:00	14.01%	14.23%	17.30%	15.07%
09:00-16:00	43.51%	40.29%	40.22%	55.90%
16:00-18:00	13.90%	17.28%	18.33%	12.88%
18:00-00:00	14.35%	15.18%	13.50%	11.56%

Source: NS (2024) (received from NS in 2025).

### **Temporal patterns**

As shown in Table 5, all four stations encounter a significant peak in travelers during daytime, especially between 09:00 and 16:00, while the early morning and evening hours consistently show a lower usage. Therefore, all four stations have similar patterns regarding the peaks in the time slots, despite differences in perceived safety. Overveen Station scores significantly higher in the SBM, and respondents generally reported feeling safe at this station.

This information also suggests that, despite lower SBM scores of the Den Helder Zuid Station, Nieuwerkerk a/d IJssel Station, and Rijswijk Station, these stations still attract travelers during evening and nighttime. Interview results, however, indicate that travelers mostly adopt coping behavior and avoidance strategies during these hours. The percentages do not represent high absolute numbers but do show that there is still evening and nighttime usage. The Overveen Station does show an even higher percentage of travelers during daytime, and significantly lower percentage of travelers during nighttime (between 00:00 and 07:00), compared to the other stations. This pattern could partly contribute to the more positive safety experiences of travelers using this station.

Overall, these patterns highlight how temporal usage alone does not completely explain the different safety experiences of travelers using these stations. Rather, spatial and social factors may play a decisive role.

## 5 Results interviews with travelers

Building on the usage patterns that were outlined, this chapter presents the findings of the interviews with travelers. A total of 64 travelers were interviewed for this research (see Appendix F). The overall experiences, as well as the relevant factors influencing experienced safety are examined. Then the coping behaviors adopted by the travelers are described. Finally, the chapter investigates the individual characteristics of the travelers and their previous experiences with safety in public transport.

### 5.1 Overall safety experiences

To get an insight into the general experienced safety of travelers, participants were asked to score the station on a scale from one to ten, where ten referred to feeling safe and zero feeling unsafe. Several travelers considered their experience of safety as positive during the use of the small railway stations. However, there was a division between travelers who always felt safe and travelers who explained that they only felt safe during daytime. Additionally, there were also travelers who felt unsafe during every moment of the day.

#### Travelers who always felt safe or unsafe

The travelers who always felt safe often connected their feelings of safety to the likelihood of incidents happening at that station. Stations were described as places where nothing really happens, which reduced their concerns with regard to safety. *“Nothing too crazy really happens here, luckily.”* (Nieuwerkerk a/d IJssel Station, man, 54 years old). And *“There is never anyone hanging around here and there is no trouble.”* (Overveen Station, woman, 65 years old). Moreover, they also mentioned how they only use the stations during daytime; therefore, they do not feel unsafe. *“Yeah, I do not really come here very late or at times outside regular working hours.”* (Nieuwerkerk a/d IJssel Station, man, 51 years old). And *“Yes, but I always come in the morning and then I go back around 5 PM.”* (Rijswijk Station, man, 21 years old).

There were also travelers who always felt unsafe during the use of the stations. They immediately ranked the station with a score below five. *“In terms of social safety? A 2,5.”* (Den Helder Zuid Station, man, 57 years old). And *“I would rate it with a 3.”* (Rijswijk Station, woman, 28 years old).

#### Differences between day- and nighttime

Multiple travelers expressed how they still use the station during evening and nighttime, despite feeling more unsafe. *“During the day I would rank this station with a seven, but when I am here in the evening, that score drops to a four.”* (Nieuwerkerk a/d IJssel Station, woman, 17 years old). And *“Sometimes around like late times, when it is dark, there is nobody here, especially the Overveen Station. So yeah, that is a bit of a bad situation when you are alone.”* (Overveen Station, man, 21 years old). And *“I have used the station in the evening and nighttime, but I do not feel comfortable here, no I really do not feel comfortable.”* (Rijswijk Station, woman, 60 years old)

Overall, these insights show the different experiences of travelers. While there are many travelers who always feel safe, the experiences do vary significantly, especially between day and nighttime use.

### 5.2 Factors influencing experienced safety

Besides the effect of the time of day at which the station is used, other factors, like the spatial and environmental factors, also influence the perceived safety. These factors will be discussed in the following sub-sections.

## **Spatial and Environmental Factors**

Travelers often illustrated diverse spatial and environmental factors that influenced their feelings of safety. These factors range from aspects of the built environment, like the darkness of the stations, to the design and maintenance of the stations.

In relation to the time of day at which the station is used, respondents regularly expressed how the lack of adequate lighting made them feel more unsafe. *"It gets a bit grim here in the evening. There are lights, but a bit more lighting would be nice."* (Den Helder Zuid Station, woman, 24 years old). And *"It is mostly very quiet and dark, and the lighting is not particularly pleasant."* (Rijswijk Station, woman, 40 years old).

Concerning other design aspects of the stations, travelers for instance mentioned the pedestrian tunnel of Den Helder Zuid Station. *"I just do not really like that little tunnel; it just remains unpleasant. They did place mirrors, but I do not really get the feeling that there are many cameras or anything like that and things do happen here from time to time."* (Den Helder Zuid Station, woman, 22 years old). And *"In the evenings it does feel more frightening, especially when you have to go through the tunnel, which can be a bit tense."* (Den Helder Zuid Station, woman, 17 years old). Another respondent also explained how the design of the tunnel of Rijswijk Station gives an enclosed feeling. *"It is mainly because it is a long corridor, which makes you feel enclosed."* (Rijswijk Station, woman, 18 years old).

Not only does the design of the station affect the feelings of safety, but it was also connected to the overall appearance of the stations. *"It just does not feel inviting. The design itself does not invite you in with the viaducts and everything else, it is not a good business card for Nieuwerkerk, let me put it that way."* (Nieuwerkerk aan den IJssel, man, 23 years old). And *"It is just a bit of a depressing station, not really beautiful or anything."* (Den Helder Zuid, man, 21 years old).

Moreover, respondents also pointed out that the state and the maintenance of the station matter. At Rijswijk Station, travelers mentioned how the station feels old and facilities, like the escalators, are often broken and not being fixed. *"Well, things break down very often, and they are not repaired. The escalators have not been working for ages. There is also usually a lot of dirt, which creates a neglected impression. It does not really feel like the kind of entrance you would expect for a city, I think."* (Rijswijk Station, woman, 44 years old). And *"Well, just the interior, it could be a bit neater. It all looks kind of old, you know? And that gives you a bit of an uncomfortable feeling."* (Rijswijk Station, woman, 21 years old).

Additionally, concerning the immediate surroundings of the stations, feelings of unsafety were also connected to a lack of liveliness in the neighborhood next to the stations. *"It is just an empty, exposed place with no one around. I can imagine that arriving here late at night wouldn't feel very safe."* (Den Helder Zuid Station, man, 54 years old). And *"It is very empty and deserted, which contributes to a feeling of insecurity."* (Rijswijk Station, woman, 44 years old).

## **Social factors**

Besides the spatial and environmental factors, the presence, or lack, of others also influences the experienced safety of travelers. When the presence of others decreased the feeling of safety, the other people were often described as 'hanging around'. A respondent described: *"There is quite a lot of noise and disturbance here, especially in the evenings. A lot of groups of young people hang around downstairs, especially near the bicycle parking. And a lot of bikes get stolen as well."* (Nieuwerkerk a/d IJssel Station, woman, 17 years old). And *"There are quite a lot of people hanging around here in the evenings, so you would rather not be here in the dark."* (Den Helder Zuid Station, woman, 19 years old). Moreover, some respondents also mentioned the presence of homeless people gave them an unpleasant feeling. *"Sometimes there are homeless people sleeping here. And then you occasionally see urine or things like that. Yeah, that does not feel pleasant."* (Rijswijk Station, woman, 28 years old). And *"Because it is open, and there are no gates or anything, anyone can just walk*

*downstairs. So, when it rains upstairs, all the homeless people come here to eat and they leave everything behind. You run into strange people here.*" (Rijswijk Station, woman, 24 years old).

On the other hand, multiple respondents also explained how the lack of social surveillance made them feel more unsafe. *"It does not feel very comfortable to be here without any form of 'protection,' so to speak."* (Den Helder Zuid Station, woman, 24 years old). And *"When I am on my way back in the evening, there is often really no one around."* (Nieuwerkerk a/d IJssel Station, man, 23 years old). Other respondents pointed out how they lack visibility from others. *"From down below you cannot see anything at all. I think that is an issue. It is nice that you can look down from here, but from the outside looking up there should also be some visibility of the people standing here. Whether someone has good or bad intentions, you should at least be able to see that something is happening."* (Nieuwerkerk a/d IJssel Station, man, 54 years old). And *"You must take the stairs up. I just have the feeling that you are not very visible if something happens."* (Nieuwerkerk a/d IJssel Station, woman, 17 years old). And *"There is no kiosk or anything next to it where someone would keep an eye on things. And yeah, you can see there are not many cameras, so it does not really feel like it is being monitored. It is not a very pleasant area."* (Den Helder Zuid Station, man, 21 years old).

In addition, positive safety experiences were also related to the presence of social surveillance. Especially at Overveen Station, where a small restaurant is situated in the former station building, travelers explained how they always felt safe due to the presence of the restaurant. *"Because there are always people on the platform. You are never alone. Maybe also because of the platform café that is attached to it, that gives a sort of safe feeling."* (Overveen Station, woman, 60 years old). *"There are also always a lot of people in the little café there, so it feels safe. It is not completely unmonitored or anything."* (Overveen Station, man, 24 years old).

These insights make clear that the experiences of travelers are shaped by multiple elements concerning the built environment and design of the stations, as well as the social dynamics surrounding their journeys.

### **5.3 Coping behavior**

To deal with feelings of unsafety, travelers sometimes adopt coping strategies. These coping strategies differ from more casual strategies where travelers continue to use the station, despite feeling unsafe at times, to more extreme strategies to avoid the station. In the following sub-section, the different coping mechanisms are described, from coping strategies that are adopted while still using the station, to strategies that are adopted to avoid the station.

#### **Individual coping strategies**

Some travelers mentioned how they manage feelings of unsafety through small individual adjustments while still using the station. For example, this included paying more attention to their surroundings. *"I just stand under the glass canopy and keep an eye on my surroundings."* (Rijswijk Station, woman, 20 years old). Another traveler explained how she uses her phone to mentally distance herself from her surroundings. *"I usually listen to music or whatever to shut myself off."* (Rijswijk Station, woman, 21 years old).

#### **Using a social network**

Many respondents who still use the stations, despite (sometimes) feeling unsafe or uncomfortable, communicate with their social network to decrease their feelings of unsafety. Respondents for example use apps that share their live location with friends or family members so their location can be tracked. *"In the evenings, someone usually picks me up, and I always share my live location."* (Den Helder Zuid Station, woman, 19 years old). And *"I have some location sharing options that I use for my*

*friends and my family. So, they could know where I am if they wanted to. So yeah, I use that.*" (Overveen Station, man, 21 years old).

Other respondents explained how they usually call someone to feel safer. *"I usually call my boyfriend. It is only about a six minute walk from here to the bus station, which is manageable, and I call him while I am walking."* (Rijswijk Station, woman, 25 years old). And *"And sometimes I do have to walk, but then I always call someone, so I am not completely alone."* (Nieuwerkerk aan den IJssel, woman, 17 years old). The same respondent also mentioned how she dresses differently when she must use the station at night. *"When I go to a party, I do think, 'Yeah, I will just put on another shirt or a sweater over my clothes, so you cannot see them'"*.

Some travelers felt so unsafe and uncomfortable using the stations in the evening or at night, that they asked someone from their social network to pick them up when they arrived at the station. *"Yeah, my dad often comes to pick me up with the car in the evening."* (Den Helder Zuid Station, woman, 17 years old). And *"I usually just have someone pick me up."* (Nieuwerkerk aan den IJssel, woman, 17 years old).

### **Taking different routes**

There were also travelers who pointed out how they leave the station as fast as possible using the shortest possible route. At Rijswijk Station, which can be described as a long corridor with an entrance on both sides, multiple respondents try to leave the station as fast as possible by getting in at the front of the train. A respondent described: *"And if I am coming by train from the other direction, then I know I will get in at the front, because that way I can get out as quickly as possible."* (Rijswijk, woman, 28 years old). And *"I do not avoid the station, but I deliberately choose the shortest exit, even if it is slightly less convenient for me. That is not a problem, but I find the exits themselves quite uncomfortable."* (Rijswijk, woman, 60 years old). Another respondent also explained how she walks a different route when she encounters young people hanging around. *"And if I see that there are a lot of youths hanging around, I take a detour."* (Den Helder Zuid, woman, 29 years old).

### **Avoidance strategies**

Multiple different avoidance strategies were adopted. Some travelers make sure to never travel alone during evening and nighttime. A respondent described: *"Yeah, in the evening I usually ask my parents to take me if I am going somewhere, and otherwise I always make sure I travel with someone. But going alone... yeah, I avoid that."* (Nieuwerkerk aan den IJssel, woman, 17 years old). And *"I normally do not really need to come here in the evenings, but if I had to, I would make sure to be with someone."* (Rijswijk Station, woman, 18 years old). And *"During the day I would not really have much of an issue being here, but in the evening, I would not want to be standing here."* (Den Helder Zuid Station, woman, 48 years old).

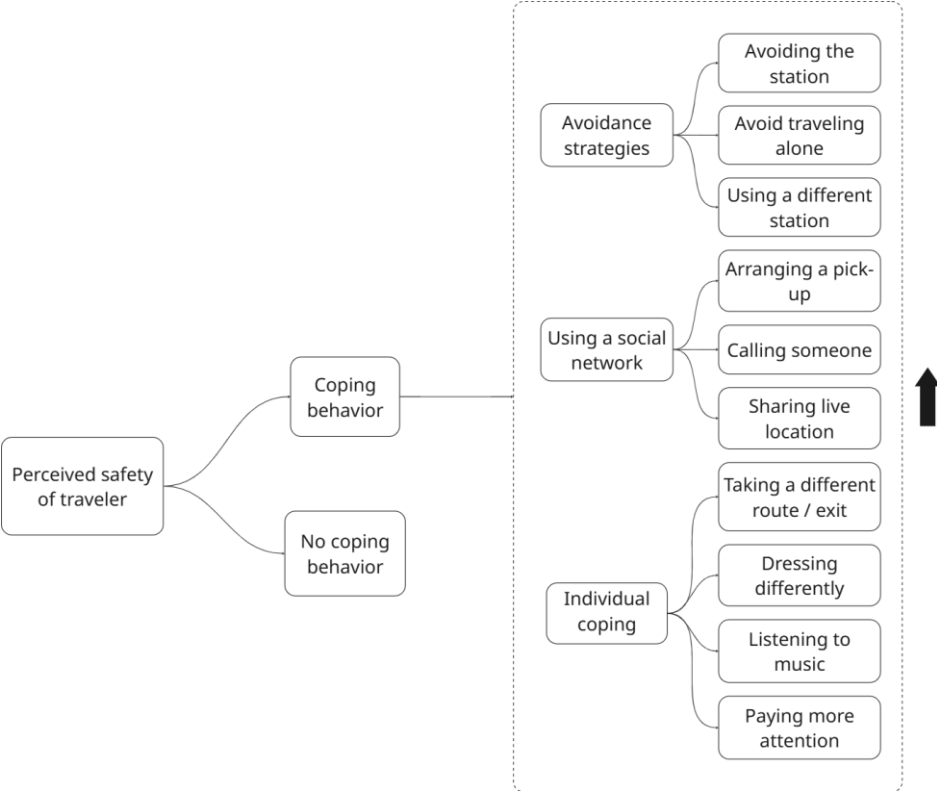
Other respondents explain how they try to avoid the station during evening and nighttime by using another station. *"I try to avoid it (...) I usually just take Delft station instead. It is a bit further, but it feels very different."* (Rijswijk Station, man, 16 years old). And *"I would take a different route, to a station that feels safer, one that is more open or a bit lower, where everyone can see you."* (Nieuwerkerk a/d IJssel Station, woman, 17 years old).

### **No other options**

Multiple respondents also explained how they would prefer to avoid the station, but they do not have better alternatives. *"Yeah, I have to. This is the only station near me. And if I wanted to avoid it... well, in the evening there are strangely enough not as many weird people as in the morning, but I would prefer to avoid it, I just cannot."* (Rijswijk Station, woman, 26 years old). And *"I do not really have any alternatives."* (Nieuwerkerk a/d IJssel Station, man, 23 years old).

Together, these findings show that the behavior of travelers is influenced in diverse ways, ranging from more subtle adjustments to fully avoiding certain stations altogether. Figure 13 shows the coping strategies discussed, organized from smaller adjustments (bottom) to more extreme measures (top). These coping strategies show how safety perceptions affect travel choices and the daily life of travelers. At the same time, the experiences of travelers who lack sufficient alternatives highlight how these stations can leave them no choice but to accept feeling uncomfortable and unsafe, thereby limiting their autonomy in daily travel.

Figure 13. Visualization of coping strategies



Source: Author (2026).

### 5.4 The role of personal characteristics in safety experiences

To discover possible patterns within the characteristics of travelers, personal data regarding the gender identity and age of the respondents was collected. Moreover, travelers were also asked about earlier experiences in public transport in general, to get an insight into which possible experiences have shaped their perspective on the use of public transport.

#### Gender identity of travelers

Regarding gender identity, usually, the travelers who always felt safe connected their feelings of safety to their male gender identity. For instance: *“While it is extremely unfair, I am also a male so that helps as well.”* (Nieuwerkerk a/d IJssel Station, man, 31 years old). And: *“Not for me, and I always use this station at the end of the day as well. I do feel safe here, but like I said, as a man, I do not have a problem.”* (Rijswijk Station, man, 23 years old).

At the same time, they sometimes also mentioned how they know, or could imagine, how women would probably feel unsafe at that specific station. *“I mean as a man, I would probably feel safer here than a woman walking around would, even though it sounds stupid.”* (Den Helder Zuid Station, man, 21 years old). And *“I can imagine that a young girl standing here alone would not feel very comfortable.”* (Nieuwerkerk a/d IJssel Station, man, 54 years old). Some respondents thereby also specifically explained how they know that their girlfriends do feel unsafe: *“I do feel safe here, because I am a man, but my girlfriend does text me when she uses this station.”* (Rijswijk, man, 22 years old). Or that they think that their girlfriends would probably feel unsafe. *“So, for example, my girlfriend, I think she would feel quite unsafe.”* (Nieuwerkerk a/d IJssel Station, man, 31 years old).

### **Earlier negative experiences in public transport**

When asked about earlier negative experiences during the use of public transport, men were often mentioned as causing nuisance by the respondents. This nuisance ranged from men being under influence of drugs and/or alcohol, to men looking for interaction with the respondents. A traveler illustrated: *“Yes, I have sometimes experienced it, mostly men who had been drinking or using drugs, who were behaving in an antisocial way or shouting.”* (Overveen Station, woman, 18 years old). And: *“Well, it is the usual. Yeah, the drunk people and football supporters. Yeah, just usually drunk, obnoxious men are the culprits.”* (Nieuwerkerk aan den IJssel, man, 31 years old). This traveler specifically explained how experiences like these shaped his perception of public transport. *“It did influence me a little, in the sense that I just do not feel very happy taking late-night trains or travelling late at night. But at the same time, as I said, it is kind of a given, you know to some extent, it is public transport.”* In addition, another traveler even explained how he got hit during a fight where he was not involved in. *“There was once a fight on the train where I got hit in the nose. I had nothing to do with it; they did not pay for their tickets and disagreed with the conductor.”* (Nieuwerkerk aan den IJssel, man, 23 years old). This experience did influence his perspective on public transport; however, he also explained how he does not have a better alternative for his daily travel.

Moreover, several travelers who identified as women, described experiences in which men tried to initiate unwanted interactions. *“Yes, well, often men sit down next to you and try to start some kind of conversation. It is not really asked for. Then they start asking very personal questions, or when you are just standing somewhere, they say things like ‘come on, you could at least smile.’”* (Nieuwerkerk a/d IJssel Station, woman, 17 years old). And *“At Den Helder Central I experienced something uncomfortable once, on a Saturday evening when someone was coming to pick me up. Someone cycled past and made a comment about my ‘beautiful legs’ or the outfit I was wearing.”* (Den Helder Zuid Station, woman, 24 years old).

These insights illustrate how personal characteristics, especially gender identity and past experiences, sometimes influence the perceived safety of travelers. They also point out that earlier negative experiences, concerning for instance feeling uncomfortable or experiencing harassment, mean that travelers interpret and navigate public transport environments differently.

## **5.5 Conclusions**

This chapter described the overall experience regarding feelings of safety of travelers. Perceived safety proves to depend on the interplay between different temporal, personal, spatial, environmental, and social factors.

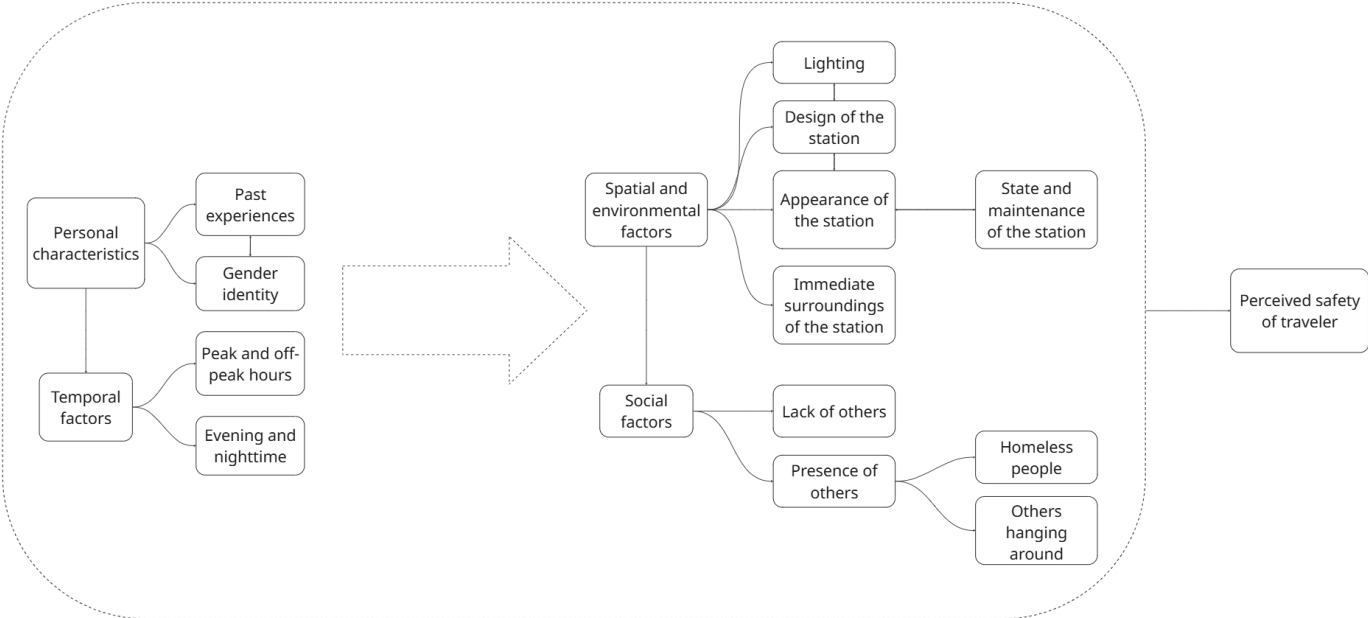
Even though the stations visited show similar traveler distributions, the results from the interviews indicate that personal characteristics and temporal factors strongly affect how the other spatial, environmental, and social factors are experienced. This means that traveling in the evening or at night, for instance, often negatively impacts the other factors. Social factors like the presence of others can be considered negatively during daytime, referring to others causing nuisance, while the lack of others

can also be pointed out as decreasing informal surveillance and related experienced safety during evening or nighttime.

At the same time, personal factors also have an impact on how the temporal factors are experienced, as the gender identity of a traveler for example influences how the traveler experiences traveling during off-peak hours. Moreover, personal characteristics, like past experiences, further shape how travelers interpret and interact with spatial and social contexts, which affects how the stations are experienced. Figure 14 shows how personal characteristics and temporal factors have an amplifying effect on the other factors.

Furthermore, feelings of unsafety can result in travelers adopting coping behavior. These strategies range from calling someone to avoiding stations (at certain times of the day). Some travelers also expressed how they feel like they have no other alternative, so they have to use the stations, despite feeling uncomfortable or unsafe. The following chapter will place the experiences of the travelers in a broader context, by discussing the results from the expert interviews.

Figure 14. Visualization of factors influencing the perceived safety of the traveler



Source: Author (2026).

## 6 Results interviews with experts

In this chapter, the different themes and topics that were discussed during the interviews with experts are presented using quotes. The chapter begins with a broader perspective on the small train stations by looking at their surrounding environment and design approaches. After, the chapter discusses more robust measures, thereby considering technological interventions, as well as the general division of roles and responsibilities of the different parties involved. The role of data in (perceived) safety is also debated. Then the chapter narrows down to the individual experience of travelers, by addressing the influence of gender on perceived safety and comparing the lived experience of travelers with the expertise of the experts.

Regarding the experts, it is important to note that they remain anonymous, however, they were selected based on their expertise and relevant experience with projects concerning the (perceived) safety of railway stations. Therefore, their roles range from consultant positions to academic specializations. In Table 4. Overview of the experts a brief description of their functions and responsibilities is provided in a way that ensures that they are kept anonymous.

### 6.1 Spatial and environmental factors

During the conversations with diverse experts, they often discussed the spatial and environmental factors of railway stations. They emphasized how the small scale of the stations and low number of travelers ensure that they are often characterized with a unique context.

#### **Influence of the urban environment**

Regarding the locations of small railway stations, experts expressed how the surrounding environments of the stations generally affect the experienced safety of the station more than the station itself. An expert described: *“Differences in perceived safety after 7 p.m. are largely driven by the surrounding environment of the station, rather than by the station itself.”* Another expert adds: *“Fundamentally, there is often nothing wrong with the station itself; the underlying issues almost always originate in the surrounding urban environment.”* He explained that some cities, like Rotterdam Zuid, already encounter safety related issues, therefore he considered the Rotterdam Zuid Station not as the main problem. Rather, the difficult dynamics of the city were reflected in the low score of the station. Furthermore, he mentioned that functions such as coffee shops near small stations can result in a concentration of issues on the stations. *“There is nothing wrong with the station itself, but because a coffeeshop is located nearby, it attracts drug couriers. People get off international trains, deal on the platform, and disappear again.”*

Additionally, multiple experts emphasized how the routes to and from the stations can also play a larger role in experienced safety, than the stations themselves. An expert specifically illustrated the subjective experience of safety: *“It’s not only the route to the station, but also the route back. In the afternoon you park your car and everything feels fine, but in the evening, you must walk back to a parking area that may have very little lighting. That’s when people start thinking; maybe I should have parked closer, or maybe I should call someone while I walk. Another person might say, ‘Well, there are some cameras, it’s fine.’ So, it’s very much a matter of perception.”*

#### **Position of the station within the municipality**

Regarding the positions of the stations within the cities or villages, several experts expressed a similar view concerning the locations. The stations are generally either embedded in the urban fabric of the surrounding neighborhoods or distanced from the village or city they belong to.

An expert illustrated: *“The creation of an attractive station environment depends not only on clear sightlines and spatial coherence, but also on the degree to which the surrounding community adopts the station as an integrated part of the neighborhood and comes to perceive it as ‘our station.’”*

The experts also emphasized that when the stations are located further away from the village or city they belong to, they can be more vulnerable, due to their desolate character. When there is a lack of social surveillance, travelers may feel like there is no support from others if something happens. An expert shared a personal story of how he got robbed at a small train station. *“The offender and I were the only two people there for half an hour. I was late for my train, and he was just walking around; there were no social eyes at all. It shows how vulnerable such isolated stations can be.”*

Other experts pointed out that commercial functions, like a kiosk or small supermarket, can benefit these stations tremendously by bringing energy and commotion. However, the NS often does not exploit these functions at these stations, due to the low number of passengers. At the same time, private operators are usually also not interested for the same reason. Many experts underscored the importance of informal social surveillance. An expert for instance explained how movement and flows of people affect social safety. *“Movement is the driver. There is a reason why you get attacked when there are not many people.”*

### **Rural and peripheral station typologies**

Moreover, she also defined the difference between small rural train stations and small peripheral train stations. She pointed out how at small rural train stations, perpetrators must come to the station. *“In a rural train station, you’re literally looking at cows from the tracks. They’re dangerous in a different way, because if someone is waiting to harm you there, they’ve put work into that.”* While at small peripheral train stations there are more ‘opportunities’ to commit a crime. *“Someone can just be there by chance because of the density of population, which makes them unsafe in a very different way.”* She argued that, even though there is a higher population density around these peripheral stations, the flow of travelers and passengers is inconsequential. Therefore, the level of social surveillance also differs per moment, making these stations vulnerable in terms of social safety.

Experts consistently mention informal surveillance as a key factor in experienced safety, which is a well-known concept in theories from criminology. This indicates that experts often reproduce this concept and its principles, meaning that informal surveillance, or ‘social eyes’ has become a dominant lens through which experienced safety is understood.

## **6.2 Design of small railway stations**

Besides the spatial and environmental factors, the design of the small railway stations was also frequently pointed out as important for the experience of safety. Due to their specific characteristics, such as less facilities and travelers, the design of small railway stations is considered as even more valuable than at larger railway stations.

### **Design approaches**

An expert illustrated: *“At small stations you simply have fewer people and fewer facilities. That is precisely why you must work even more carefully with scale, sightlines and a sense of choice. People only feel safe when they can oversee the situation and feel they have control.”* She added how she feels like small stations require a different design approach, due to their specific context. *“I see large and small stations as essentially the same. You go through the same design process. People make similar journeys, but the context is different, and that makes a difference in how you approach the design.”* According to her, experienced safety depends on a feeling of control, predictability and overview. This means that travelers need to feel like they have control over the situation by being able to choose from different seating options and routes, the surroundings need to feel logical, and travelers need to feel like they have an overview over the location.

Another expert referred to reversal theory to explain how travelers’ experiences are shaped by the design of the stations. *“Most small stations consist of monotonous grey structures that leave travelers*

*understimulated. According to reversal theory, understimulation leads to boredom, heightened time awareness and discomfort. To counter this, stations require added stimuli, such as warm color, music, art or small amenities, to create a more positive emotional state.*” This perspective highlights how the emotional experience of small train stations is influenced by the often minimalistic and empty character of the environment. He also discussed how these design outcomes are usually the result of structural underinvestment. *“Large stations attract commercial activity, retail and real estate development, which justifies substantial investment. In contrast, small stations see only a handful of travelers in the morning and evening, making every euro spent appear excessive. As a result, these stations often remain grey, dull and underdesigned: precisely the color and atmospheres people dislike most.”* Hence, even small design choices, such as warm color, can meaningfully improve the experiences of travelers.

### **Crime Prevention Through Environmental Design**

One expert specialized in socially safe design and maintenance and was certified as a Crime Prevention Through Environmental Design (CPTED) expert, which is a design philosophy. He discussed the four principles of CPTED: informal social surveillance, logical and clear accessibility, clearly defined territorial boundaries, and quality and maintenance of the environment. He illustrated how CPTED related issues concentrate at small railway stations. *“At a small train station everything comes together. The visibility is not right, it becomes an attractive place to hang around, there may be potential victims, you can get away easily with a fatbike, and some young people simply enjoy vandalizing things. Once something is damaged, it invites even more of that behavior. And of course, it also becomes an ideal spot for graffiti.”*

He argued that CPTED principles can help to integrate safety naturally in the design of the stations. Nevertheless, he made a difference between the American CPTED, which is focused on reducing threats and terrorism, and the Dutch context, which concentrates on contextual and human-scale design to benefit both objective and subjective safety. *“A place that looks as if it were made with care, almost as if your mother made it, creates a stronger sense of safety, than a space that is visibly designed to be robust or defensive.”*

### **Station buildings**

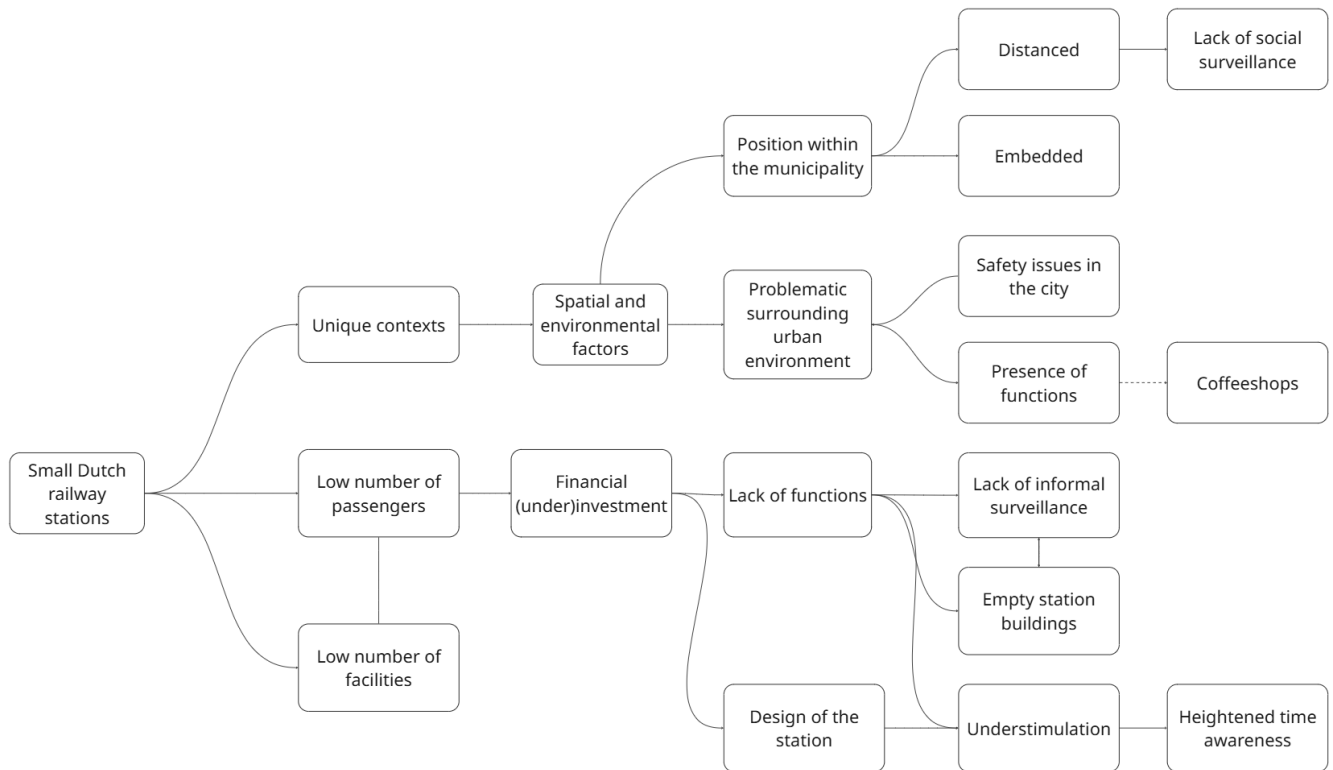
A specific example of an element that influences sightlines, overview and liveliness at small railway stations, are station buildings. An expert explained how there are often old and historic buildings at these small stations, as these stations were developed in an earlier period. However, the presence of these older station buildings does not necessarily add value to these locations, they can block sightlines, and if they do not have the right function, they may even decrease experienced safety. Closed functions, such as artist’s ateliers, do not necessarily add liveliness during evening and nighttime. He also noted that many of these buildings are not aligned with contemporary standards, making them expensive to maintain or renovate for the NS. Consequently, the buildings can get a neglected appearance, which can further decrease experienced safety.

### **Objective and subjective safety**

Overall, conversations with experts show the tension between objective safety, which is often associated with factors such as visibility and maintenance, and subjective safety, which depends on how travelers emotionally experience and interpret their surroundings. Even when incidents do not occur that often, travelers may still feel uncomfortable. Therefore, design interventions cannot only focus on reducing safety risks but must also add to a pleasant environment where travelers feel comfortable, at ease, and in control. Experts emphasized that design choices are shaped by organizational priorities, as well as financial constraints, which frequently result in practical and minimal environments. These understimulating environments offer few reasons and functions to stay, which can result in heightened time awareness and feelings of discomfort. Additionally, spatial and environmental factors, regarding the location and position of the station, strongly influence both

objective and subjective safety. Figure 15 summarizes the topics discussed by the experts and visualizes the relationships between the different factors.

Figure 15. Visualization of contextual conditions identified by experts



Source: Author (2026).

### 6.3 Technological interventions

While design principles often aim to find a balance between objective and subjective safety, the interviews with experts also show how these spatial measures are not always seen as sufficient, especially at railway stations where incidents often occur or travelers persistently feel unsafe. Therefore, experts also use more ‘hard’ technological interventions, such as cameras and gates, to increase objective safety.

#### Formal surveillance

One expert illustrated the struggles the experts experience: *“Look, as NS and ProRail we genuinely try to take measures. We install cameras, we trim the greenery to improve the visibility from the street. We really do a lot. But in the end, you remain dependent on the behavior of unwanted individuals hanging around. If they do not have bad intentions, or if a few people are just gathering without causing trouble, then there is little or no problem.”*

Hence, cameras were often mentioned as one of the many different measures taken to realize formal surveillance. They are generally placed after incidents occurring at small stations. One expert described: *“If people feel unsafe, then you need to make sure there is more activity. Either people being present, or at least camera surveillance.”* In addition, the cameras are also placed to prevent unwanted behavior. *“Especially at small stations, it is not about who provides oversight, staff, bystanders, or even cameras, but about the idea that you cannot just demolish the station without being noticed. That perception is crucial for people’s sense of safety.”*

Nonetheless, experts also critically reflected on the placement of cameras as a substitute for human presence. One academic expert argued for example: *“It seems that many of these measures are intended to replace human eyes, for example through cameras. There is a lot of trust in that approach, but our research shows that women have much less trust in cameras and in police presence.”* Additionally, several experts also questioned the effectiveness of cameras if they are not monitored in real time. *“I am personally not a supporter of cameras. You must question whether anyone is monitoring the footage when you are there.”* One expert stated that the placement of cameras may even decrease experienced safety, when they are placed where travelers do not expect them. *“If there are suddenly cameras at a station where nothing ever happens, then you think, oh my, there must be a reason.”*

**Boundaries between public and private space**

Another technological intervention to decrease unwanted behavior, such as sleeping or hanging around, is the placement of closed gates. An expert described: *“Gates do seem to help. For example, at stations like Schiedam, we see that inside the gates there is less nuisance and the area is generally cleaner, whereas outside the gates, where everyone can enter, there tends to be more disorder.”*

However, another expert argued that the use of gates can appear as a defensive safety measure. Therefore, he highlighted a softer approach of station design. *“The idea is to integrate safety so well that it is not visibly ‘designed in’. By avoiding defensive measures such as fences and cameras, and instead creating a high-quality environment, safety becomes stronger and more natural.”* Moreover, another expert mentioned how the use of gates mostly benefits men. *“There was also a study in Limburg that looked at different measures and showed that gates might help with feelings of safety, especially for men, whereas women tend to need more supervision. I think that is a real challenge.”*

Figure 16. Visualization of formal and informal surveillance at stations



Source: Author (2026).

As can be noted from the interviews, technological interventions represent a broader development in society, as personal contact is being replaced more often with technology. Figure 16 shows how experts distinguish between formal and informal surveillance at small railway stations.

## 6.4 Responsibilities and the use of data

Across interviews with representatives from transport operators, provincial authorities and safety and design experts, multiple issues regarding fragmented responsibilities, limited data sharing and privacy legislation, came to the surface. These findings show how structural governance challenges affect safety issues and thereby the experience of safety, and how these issues are prioritized and addressed.

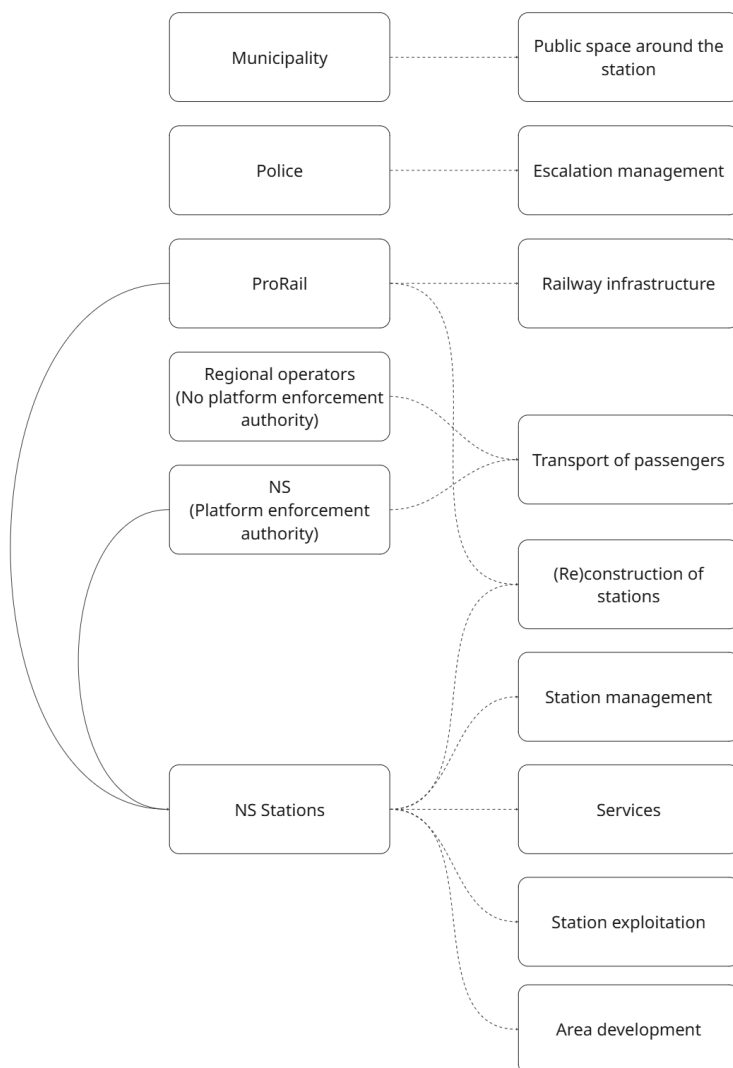
### Fragmented responsibilities

Experts consistently described how fragmented responsibilities resulted in uncertainty about who owns which parts of the stations and which parties are responsible for which priorities.

Regarding the different elements of the stations, ProRail is responsible for the transfer areas and platforms of the stations but outsources responsibilities to NS Stations. The municipalities are responsible for the area around the stations. However, in practice these divisions are not separated as clearly. An expert explained: *“I once conducted research on several stations in Amsterdam, examining questions such as: who owns which spaces, and who is responsible for their management? In some cases, such as at Lelylaan station, this was completely unclear. Responsibilities were passed back and forth. In complex station layouts, where one actor’s floor is another actor’s ceiling, this lack of clarity results in many issues falling outside everyone’s responsibility.”*

Another expert also discussed organizational ambiguity. *“An ongoing challenge is the fragmentation of contracts, which makes it unclear who is responsible for what. It also raises the question of whether each party assumes that responsibility. This issue extends across multiple operators, as it is often uncertain who is expected to act in which situation.”* Figure 17 visualizes the different responsibilities among the key stakeholders involved in station development, management and railway infrastructure.

Figure 17. Visualization of stakeholders and responsibilities



Source: Author (2026) Adapted from NS Stations (n.d.) and ProRail A. (n.d.).

Moreover, specifically regarding the responsibilities concerning safety, tensions sometimes arise between the NS and other Dutch railway operators. Particularly small railway stations are generally not (or only partly) served by trains of the NS. Nonetheless, the NS is still responsible for safeguarding the safety at these small railway stations, where other Dutch transport companies, like Arriva and Keolis, operate. Multiple experts expressed how there is less presence of service and safety staff of NS at the stations where they do not operate. *“Safety investments are primarily directed at stations where NS operates. For example, a colleague of mine in the province of Limburg explained that almost all regional train services there are operated by Arriva, while only the intercity services are run by NS. As a result, there is very limited presence of NS service and safety teams at regional stations, simply because they are not part of NS’s regular operations. Consequently, social safety at these stations tends to be rated more negatively. We observe similar patterns in our own region.”*

She also explained how the NS sometimes decides to let their intercity trains pass through certain stations without stopping. For instance, during important football matches at Enschede Kennispark Station, NS may decide not to stop their intercity trains at this station, even though their trains previously did stop there to support large passenger flows. *“As a result, no NS service and safety staff are present at the station, while the platform becomes extremely crowded. Keolis, the operator that*

*does serve the station, does not have platform enforcement authority and is therefore not allowed to intervene. NS then effectively states: 'We are no longer stopping here, so you should solve the problem yourselves.' In practice, this reflects a strategic interaction between parties."*

Furthermore, the use of small railway stations during events proved to be a recurring challenge, as they are officially not meant to accommodate large passenger flows, while that does happen in practice. *"We see that some stations are regularly used for events without having an official event status, which creates significant safety challenges. A small station can suddenly receive around 20,000 passengers within ninety minutes, with risks such as crowding, people being pushed toward the tracks, or vandalism when large groups board a train at once. This demonstrates the need for event related permit procedures at both small and large stations, while also considering the impact on regular passengers."*

### **Enforcement by BOA's**

As previously noted, only NS BOAs (Dutch municipal enforcement officers) have platform enforcement authority, since the NS is formally responsible for safeguarding the safety at stations. The BOAs of the other railway companies are therefore only allowed to enforce within their own trains. This means that if an incident occurs at a platform of a small railway station where the NS does not operate, the service and safety staff of the NS are often not present and need to travel to the station. In practice, the enforcement thereby delays or is shifted to the police. *"That is why, on the Vechtdal line, the police are often called in. They simply have more authority, and in many cases, it is also more practical, but mainly because there is no formal enforcement authority."*

Another expert explained how the BOAs of their railway company regularly face situations where they must wait for the police, for instance when an individual cannot show identification or refuses to do so. This can result in unsafe situations, where the staff must decide whether to wait or let the individual go if their own safety is at risk. The expert stated: *"There is a clear withdrawal of police involvement, mainly due to capacity constraints. Therefore, it is not uncommon for staff to wait up to half an hour with an individual before the police arrive."*

### **Data sharing and privacy legislation**

Another consequence of the dynamics between different parties and responsibilities is the lack of transparency in data sharing. Dutch transport companies are accountable for the safety in their own trains; therefore, personal information of travelers who cause nuisance is collected. However, multiple experts emphasized how cases cannot be built of these travelers, due to General Data Protection Regulation. *"If a traveler repeatedly fails to pay or causes damage with one organization, it is likely that similar behavior occurs with other organizations as well. In that case, it is important to be able to see that this behavior has occurred across multiple actors, including, for example, the police. Has this person committed a burglary before? These are crucial elements that help characterize an individual at a given moment and make clear that the behavior does not concern a single isolated incident."*

Hence, crucial information concerning which travelers are involved in incidents that cause safety issues, is not shared between different parties, such as the Dutch train companies and the police. *"This is problematic, because we would like to enforce more effectively, or rather, to build a case so that individuals can eventually be denied access. In practice, however, this is very difficult due because of existing laws and regulations."*

### **Incomplete datasets**

At the same time, other experts pointed out how policy decisions are sometimes built upon an incomplete overview of data. Smaller stations that are not served by trains of the NS, but by trains of other Dutch railway companies, like Arriva and Keolis, can become a blind spot for the formal owner, ProRail. As incident data is not shared between the railway companies. As a result, the policy decisions are based upon incident registrations and the SBM collected by the NS, while incidents registered by other railway companies are not incorporated in the NS datasets. This can lead to an

underrepresentation of smaller stations in the data that is being used to develop policy, while, especially at smaller stations, more incidents occur. *“Policy is based on the SBM and incident registrations. But if you know that you do not have all the data, how can you properly allocate funding for safety improvements in public transport? That means decisions are made without a fully informed ‘Basis’.”*

Experts also expressed that the SBM does not serve as their primary tool for identifying safety related issues in practice. Regional train companies and provincial authorities use their own registrations to discover patterns in internal data. An expert explained: *“If a station scores low in the SBM, we have probably already seen that reflected in our own data.”* Another expert pointed out how the province of Utrecht created their own monitor and dashboard. *“We have our own transport hub experience monitor and dashboard. We developed this specifically to enrich public data from other parties.”*

### **The Station Experience Monitor of the NS**

Experts also made certain substantive remarks regarding the SBM of the NS. These concerns ranged from the methodology used in the research, as well as the representation of small railway stations in the SBM.

First, one remark concerned the limited number of questions addressing experienced safety in the SBM questionnaire. The expert involved in the development of the SBM mentioned the two questions currently used: *“The first is: ‘I experience pleasant lighting at this station.’ And the second is: ‘I feel safe at this station in the evening after 7 p.m.’”* She explained that these questions effectively distinguish the different stations. However, other experts argued how they felt like these questions are not sufficient to measure the experienced safety. *“It would be beneficial if more questions were asked, and also more specific ones about social safety.”*

Moreover, regarding the analysis of the results, it was pointed out that gender is not incorporated in the results of the SBM, while age is. *“This really comes down to the way they ask their questions and the way they analyze them. (...) They did include age, which does get highlighted. While, if you look at literature or the theory on perceptions of safety, then you know that certain characteristics play a role, age, health, and gender. An expert involved in developing the SBM clarified that the NS does analyze differences in gender and age, but that these results are only shared internally. “They stay behind the scenes. Look, our audience is mixed, so the assessment we publish represents that mix. We survey more than 80,000 people a year, so it is a representative reflection. The score we publish is also representative of the travelers at those stations.”* The figures per station from the SBM that are published, therefore solely consist of the general ratings that travelers give a station at the end of the questionnaire. *“And that last figure, the standalone overall rating of the station, that is what we publish.”*

From the interviews it became clear that fragmented responsibilities, unbalanced enforcement authorities, and limited data sharing, add to structural governance gaps that affect the management and policy decisions regarding safety at small railway stations. These institutional frictions may result in an underrepresentation of small railway stations in data and decision making.

## **6.5 The influence of gender identity on experienced safety**

The influence of gender (identity) on the experience of safety came to the surface during multiple interviews. It became clear that several experts considered gender an important factor in the experience of safety. Experts pointed out how women structurally feel less safe during the use of public transport. An expert involved in research focused on increasing the number of travelers using public transport explained: *“We asked people whether they felt safe at the stop, during the journey,*

*and on their way home from the stop. Across all these questions, women consistently reported feeling significantly less safe than men. Even in situations where control staff was present on public.”* One of the findings of their research was that more women would travel if they would feel safer.

Another academic expert emphasized how especially young women are more dependent on the use of public transport hubs. *“Public transport hubs play an essential role in the daily lives of many girls and women in cities. These hubs are where women do the things they simply must do, going to school, commuting to work, doing groceries, managing everyday responsibilities. Because these hubs are so central, women also accumulate many experiences there, including negative ones. A park or a square can be avoided if it feels unsafe. But you cannot avoid a public transport hub in the same way, not when you depend on it. Especially when you are young, you do not have many alternatives”* She argued how it is of great importance to understand the daily movements, routines and tasks of women, as these responsibilities shape how they experience public transport hubs, and what they need from these places. Another expert also mentioned a specific example of how public transport environments often do not accommodate women in their needs. *“There are very clear things that happen in a train station that are completely non-political. Just look at the number of toilets. It tells you this place was not made for women.”*

### **Gender identity of the experts**

Additionally, at the end of each interview, every expert was asked about their gender identity to identify potential patterns between experts' gender identities and the ways in which they perceive and talk about safety in public transport contexts. Expertise and experience are never truly neutral. Therefore, gender affects both the lived experience of experts, as well as their professional sensitivity towards certain topics, themes and issues related to safety.

The collection of their gender identities showed how female experts often concentrate on the perceived safety at small railway stations, thereby emphasizing the importance of informal surveillance, softer design measures, and alternative routes. They also illustrated examples frequently with their own experiences as travelers. Male experts often approached safety from an operational or structural perspective. This means that they discussed themes and topics such as data gaps, enforcement responsibilities and bureaucratic structures. Nonetheless, they did acknowledge gender as an important factor, but they discussed it with less detail and recognized how they are unable to truly understand the lived experience of unsafety in the same way as women. This pattern suggests that female expert experiences can be considered as crucial for understanding the gender-specific safety risks of small railway stations.

## **6.6 Conclusions**

This chapter presented the key findings from the interviews with experts. It showed how experts conceptualize safety at small railway stations. Experts highlighted how perceived safety is not only determined by the station itself but by the interaction between the wider surroundings, design quality, personal and social dynamics, as well as governance structures. Consequently, improvements require measures that take the design and specific contexts of these stations into account, while incorporating a gender-aware approach.

## Implications, Conclusion and Discussion

The following chapters discuss the results of this research, by firstly describing the implications of the findings and providing recommendations to improve the experienced safety at small railway stations in the Netherlands. Then, the conclusion summarizes the main insights of the research by answering the main research question. Finally, the discussion reflects on the findings with regard to existing literature, methodological limitations and potential bias, and offers opportunities for further research.

### 7 Implications

This chapter discusses the implications of this research by providing recommendations to improve the experienced safety of travelers using small railway stations in the Netherlands. These recommendations are predominantly derived from the expert interviews. It begins with explaining the guiding principles that serve as a base for the recommended improvements. After, the proposed improvements are organized by increasing levels of required effort and investment. Perceived safety can often already be improved by using simpler measures, while deeper governance issues require more long-term efforts.

#### 7.1 Guiding principles informing the recommendations

Firstly, perceived safety is considered as an accessibility condition, rather than a secondary concern. When a small railway station is experienced as unsafe, this can mean that individuals feel restricted in their mobility options and thereby possibly contribute to transport poverty. Hence, experienced safety is treated as a crucial factor in the design, development, and management of small railway stations.

Moreover, a human-centric approach that prioritizes not only feeling safe, but also feeling comfortable, is thereby considered as essential. The focus shifts from focusing on the prevention of incidents to creating public transport environments where travelers feel at ease and in control of the situation. Furthermore, the recommendations consider experienced safety to be time-sensitive, rather than solely spatial or social. Environmental and social factors are not experienced in the same ways across the day; therefore, they also require different measures. Evening and nighttime particularly emphasize the existing vulnerabilities and increase feelings of unsafety.

Finally, it is recognized and acknowledged that perceived safety is experienced differently per individual. Gender identity and past experiences play an important role in perceived safety, yet they are not the only relevant personal characteristics affecting safety perceptions. Although intersectionality was not specifically studied in this research, it also influences the ways travelers use and navigate the stations and thus should not be overlooked in improving the perceived safety of small railway stations.

#### 7.2 Improving small railway stations

To improve the experienced safety of small railway stations, it is important that travelers feel at ease and comfortable at the stations. This means that the stations not only meet basic functional standards but must also feel like they are taken care of, receive attention and are maintained well. When the environments appear maintained, lively and thoughtfully designed, travelers are more likely to feel seen and appreciate the stations, which contributes to perceived safety.

More traditional design guidelines usually focus on lighting, sightlines and spatial overview. Although these guidelines provide useful and practical ways of assessing stations, they are mostly concentrating on preventing risks and facilitating visibility. Therefore, they may pay less attention to

the emotional and symbolic dimensions that shape how travelers interpret their surroundings subconsciously.

Improving the appearance of the stations can be considered as relatively 'low-hanging fruit', as they usually do not require a radical change of the existing station. Below, a few recommendations and relevant examples are discussed to provide some inspiration for ways to improve travelers' experiences.

### The use of colors

Subtler aspects of station design, such as color, can be powerful. Warm and coherent color schemes can ensure travelers feel welcome at the stations, reduce possible tensions, and prevent vandalism. Cold color schemes, such as grey tones, on the other hand, can appear anonymous and indifferent.

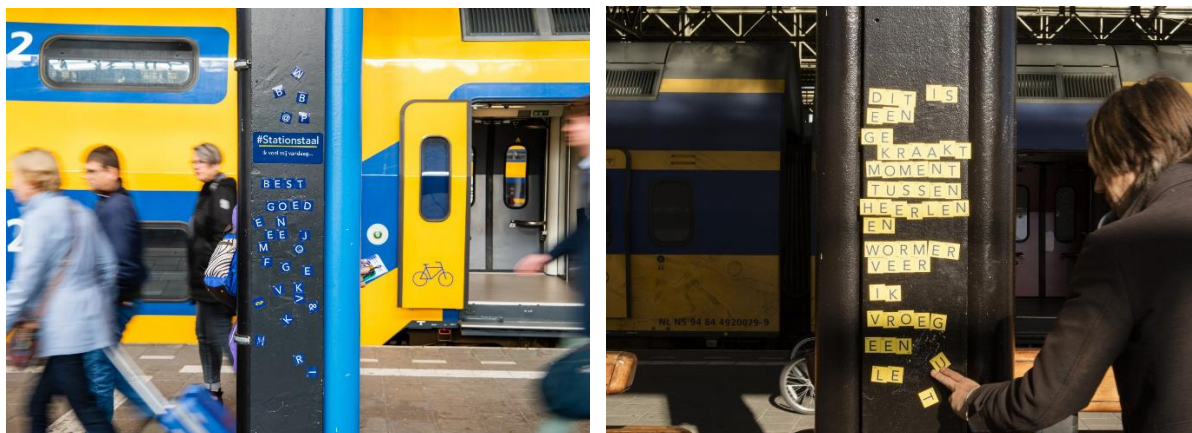
Moreover, research on waiting experience (Van Hagen, 2011) demonstrates that environments that lack environmental stimuli can benefit from the use of colors. As boredom often results in a more intensive focus on waiting time and thereby higher waiting time experience. Consequently, when travelers concentrate more on the waiting time, feelings of discomfort and vulnerability can be amplified, thereby indirectly affecting perceived safety.

At the same time, Van Hagen's distinction between Must and Lust travelers illustrates that there are different preferences per user group. Must travelers prefer a cooler color scheme, as they use the station efficiently and do not want to be distracted from their journey, while Lust travelers are not primarily occupied with the functional aspects of their journey, and thereby appreciate warmer color schemes (Van Hagen, 2011). Small railway stations, which are often characterized by a low flow of passengers and a limited number of facilities, can especially benefit from more environmental stimuli, including a warmer color scheme. Adjusting the color scheme of a station is a relatively low-cost measure, compared to more structural or technological measures.

### Station Language

Another example of a relatively low-cost intervention is Station Language, which was invented by designers Wouter Corvers and Bouke Bruins and won the Design Challenge of NS in 2018 (Studio Corvers, 2024). Station Language is the name of a project that placed magnetic letters in the Eindhoven Centraal Station. These letters could be used by travelers to form words and sentences on metal surfaces, like bins, while waiting for their train, thereby low-key communicating with other travelers (see Figure 18) (Bruins & Corvers, n.d.; Poelen, 2018). At the same time, social media served as a platform to share the creations with the letters of travelers.

Figure 18. Station Language



Source: Poelen (2018) (left) and Bruins & Corvers (n.d.) (right).

These types of initiatives show that travelers are open to creative engagement and sometimes even stay longer at the station, due to the placement of Station Language. Moreover, travelers collectively removed inappropriate words and almost no letters were taken home (Van Hagen & Ten Elsen, 2019), showing feelings of shared responsibility and ownership, which generally positively influence perceived safety. This initiative requires simple materials and maintenance, while efficiently contributing to a more pleasant waiting experience and stimulating social connection.

### **The placement of vulnerable objects**

Additionally, experts explained how the placement of vulnerable objects, such as pianos, art, and domestic-quality seating, can also ensure a positive effect regarding the comfort level of travelers. Even though these objects are vulnerable, experience in larger stations and public spaces suggests that these objects are often not vandalized, precisely because they are vulnerable, and show care and value. This also ensures that travelers using these stations, are more likely to consider these spaces as looked after and taken care of, which enhances both comfort and perceived safety.

Therefore, these objects can soften the environment of the stations, create a positive emotional trigger, and show that the station is a socially meaningful place. One expert also pointed out how the placement of a (secondhand) piano is as a relatively low-cost investment, with high social value. In the rare cases where a piano was damaged, replacements were often donated quickly, demonstrating the attachment and responsibility of the community.

### **Community-involvement**

Furthermore, multiple experts pointed out how involving the surrounding community and neighborhoods of small railway stations can enhance experienced safety. Activities, such as maintaining the greenery around the station, creating a local art piece, and connecting local initiatives to unused station buildings, contribute to a sense of responsibility. When the local identity is represented in (parts of) the station, travelers who use the station daily are more likely to recognize the station as 'their station' and feel more comfortable.

In addition to these forms of community involvement, small stations also benefit from the presence of everyday functions that attract users at different times during the day. By looking through a temporal lens, moments where travelers feel unsafe and uncomfortable can be limited. Therefore, a specific focus on evening programming and targeted presence of staff can be helpful. Facilities, such as the gym, bakery, parcel points, and musical and theater rehearsal rooms, usually have off-peak opening and user times and support informal surveillance during different moments of the day. Moreover, flexible spaces which can be used by the local community for events or activities, can also be valuable for increasing community involvement and informal surveillance.

An example of a small Dutch railway station of the 'Basis' type that has transformed through community-led initiatives, is Deurne Station. Cooperation Stationspark Deurne, is a collaboration between volunteers, the municipality, residents, NS and ProRail, that improved the station by placing different facilities, such as a free water tap, community garden, and greenery (see Figure 19). This initiative even resulted in a station environment that repeatedly won the British Community Rail Awards (Boudewijns, 2025).

Figure 19. Deurne Station

**Please note that the images have been removed to comply with the copyright regulations of TU Delft.**

Source: StationsparkDeurne.nl (n.d.) (left) & StationsparkDeurne.nl (2018) (right).

In short, improving small railway stations requires not only functional adjustments, but also a broader shift in the perspective of these stations. They should be seen as important places for the everyday lives of travelers, that deserve care and attention.

### 7.3 Institutional improvements

Improving the experienced safety of small railway stations also depends on the institutional structures that shape how these stations are monitored and managed. The governance of these stations involves multiple actors, such as municipalities, regional railway operators, and infrastructure managers. This division of responsibilities can create practical issues regarding the management of these stations and data-sharing. Therefore, several institutional adjustments could benefit a coherent and effective approach to increase perceived safety. These improvements can be considered as more 'high-hanging fruit', as they require more effort and sometimes a different way of collaborating. Especially during the first phase of these measures, effort from all stakeholders is necessary. Once the measures have started, they aim to improve efficiency and might even be applied to other stations.

#### Ownership and responsibilities

A first institutional improvement concerns the clarification and formalization of the responsibilities regarding safety of the small railway stations. While these roles and responsibilities are formally defined, in practice, they are not always experienced as distinct and working sufficiently. Experts expressed how the management of the station, formal surveillance, and incident management, often fall under different organizations, such as the BOAs of different railway operators, while the traveler experiences the journey as a single, continuous chain.

Hence, it could be beneficial if the stakeholders develop a dedicated collaboration framework for the actors involved in and connected to small railway stations. This framework should promote accountability and collaboration and include (1) the division of roles and responsibilities; (2) protocols regarding information; (3) procedures for handling issues and escalation; and (4) arrangements to make decisions.

#### Data sharing and monitoring systems

Another barrier concerns the limited data sharing between the different stakeholders. For example, safety-related incidents are not always shared between the different railway operators. At the same time, due to privacy legislation, data of travelers who are involved in incidents cannot be used to build cases. Together, these challenges concerning data sharing can result in an incomplete overview of risks. An integrated data system shared between municipalities, railway operators, and infrastructure

managers, could benefit the possibility to identify patterns, develop accurate policy and maintain the stations efficiently. Additionally, a central monitoring system could ensure that small railway stations are assessed consistently throughout the Netherlands. As currently small railway stations are examined by different stakeholders, and they are monitored less often than larger railway stations. This monitoring system could include quantitative data concerning incidents, as well as qualitative insights of traveler's experiences.

At the same time, to support transparency and research, it would also be beneficial if other relevant information concerning perceived safety were publicly shared. For example, the methodological details of the examination of stations in the SBM. This would make these stations more visible in policy discussions and ensure that measures benefit the users of these stations.

Even though these measures require initial coordination efforts from the stakeholders involved and investments in organizing the frameworks and data and monitoring systems, the financial costs should be relatively low. As the stations themselves do not need to be adjusted, but rather the digital infrastructure and ways of working together. In the long term, these improvements could possibly result in more targeted interventions and increased station use.

## **7.4 Area development around small railway stations**

Finally, this research demonstrated how the specific (environmental) characteristics of small railway stations in the Netherlands, also including the low number of passengers and facilities, often result in unique challenges concerning experienced safety. A lack of informal surveillance generally decreases perceived safety. Hence, experts often pointed out how area development specifically around small railway stations could contribute to more informal surveillance, thereby enhancing the way travelers experience the stations and the surrounding environments.

This aligns with the core ideas behind Transit-Oriented Development (TOD), which relate to a high-density and mixed-use urban environment around transportation services, in combination with a walking environment to decrease car-use (Carlton, 2009; Loo et al., 2010). Moreover, existing research also shows that TOD enhances perceived safety at stations (Başaran et al., 2025), thereby supporting the idea that denser and mixed-use station environments positively influence the experiences of travelers. However, the relationship between TOD and experienced safety remains relatively understudied (Başaran et al., 2025), which is why further research is needed, specifically in the context of small railway stations.

Area development can be considered as 'high-hanging fruit', as it requires long-term commitment and drastically transforming the station environment. Nevertheless, area development around small railway stations not only adds to experienced safety but also provides space for new housing. According to research of design agency KuiperCompagnons, there is a development potential for 80.000 to 120.000 new homes around 60 small railway stations in the Netherlands (KuiperCompagnons, 2024). These types of developments not only boost the housing supply but would also increase passenger flow and activity, thereby increasing social presence.

Moreover, KuiperCompagnons also emphasizes how investments in these smaller railway surroundings have more (societal) value, than comparable development around larger railway stations. As the costs of urbanization around larger railway stations are higher, thereby reducing the financial returns. Additionally, densification around smaller railway stations can contribute to less car-dependency for the future residents and provide more financial support for higher-quality station environments, facilities and functions (Bassant, 2025; KuiperCompagnons, 2024).

Therefore, area development around small railway stations can possibly offer a long-term opportunity to improve experienced safety and integrate housing and mobility. This approach illustrates the

different perspective that is necessary to improve the experiences of travelers. To achieve this, these stations and their surrounding environments need to be designed, managed, developed and institutionally supported, in ways that ensure travelers experience these places as comfortable, safe and meaningful.

## 8 Conclusion

This research examined travelers' experienced safety at small railway stations in the Netherlands and explored how these insights can inform the design and development of these small railway stations. Using the Capabilities Approach, experienced safety was conceptualized as a conversion factor shaping the available mobility options into capabilities and functionings, or actual mobility options. Interviews with travelers and experts highlighted the different dynamics between the factors influencing experienced safety.

The temporal aspect of traveling proved to be an essential factor. Temporal conditions act as an amplifying lens through which the environmental and social factors are interpreted. For example, emptiness during nighttime can evoke feelings of comfort in familiar and well-integrated surroundings but also trigger fear in isolated environments. This demonstrates that social and environmental factors do not necessarily result in the same effects regarding experienced safety but rather interact with temporal conditions.

Personal factors, concerning gender identity and earlier experiences, also play a crucial role in experienced safety and coping behavior. Respondents identifying as women often adopted coping strategies, such as organizing to be picked up, thereby usually relying on their social networks. Women therefore casually take on additional measures to feel safe, which shows the hidden burdens that shape their daily travel. Moreover, they also described gendered experiences, like unwanted interactions with men and sexualizing comments. Respondents identifying as men, on the other hand, often considered their gender as a protective factor and described more general nuisance, though some also expressed feeling uncomfortable and unsafe at times. Concerns of travelers identifying as women are often focused on the anticipation towards sexual violence, while travelers identifying as men usually think about non-sexual nuisance. Expert interviews further illustrated these gendered differences, as experts identifying as women underscored subjective experiences, informal surveillance and station design, while experts identifying as men concentrated more on the structural and operational aspects of safety, concerning for instance the monitoring of incidents.

Additionally, institutional structures regarding small railway stations also influence safety. Fragmented responsibilities between ProRail, NS, municipalities and regional operators, lead to uncertainty about ownership, management, and enforcement authority, which can result in gaps in surveillance and delayed responses to incidents.

Data-related limitations further prevent structural insights into safety issues, as incident data is not structurally shared between operators, and privacy legislation restricts building cases around recurring offenders. Therefore, policy decisions and investments may rely on incomplete information. Furthermore, regarding the monitoring of perceived safety, the SBM provides a yearly overview of the general experiences, but small railway stations are less often examined than larger stations, only the aggregated scores are publicly shared, and experts questioned whether the current questions sufficiently capture the complexity of perceived safety. This suggests that existing monitoring tools risk overlooking the different factors and corresponding dynamics that influence travelers' experienced safety at small railway stations.

Taken together, these findings show that improving experienced safety at small railway stations requires recognizing the essentially complex nature of experienced safety, as well as the

consequences of feelings of unsafety. Reconsidering feelings of unsafety as contributing to transport poverty shows how constrained mobility can limit the freedom of individuals (Capabilities) to participate in society. At the same time, travelers identifying as women often rely on hidden work to ensure their personal (experienced) safety, which illustrates how these hidden burdens are unevenly distributed.

Travelers' experiences are shaped by the dynamics between temporal, spatial, social, and personal factors, as well as institutional structures. This highlights the importance of creating station environments that are not only functional, but also comfortable for all travelers, while improving institutional structures and promoting area development, that benefits the quality and safety of small railway stations.

Additionally, despite their small scale, these stations serve as essential nodes in the daily mobility of travelers and therefore require more attention in monitoring and policy. Recognizing their unique context and challenges, including specific characteristics like the low number of passengers and limited facilities, is crucial for understanding how experienced safety enables or restricts travelers in access to opportunities. This research thereby emphasizes how insights into travelers' experienced safety can inform the design and development of small Dutch railway stations by supporting context-specific, time-sensitive and gender-aware approaches. Specific attention should be paid to the environment and design of the station, as well as institutional conditions that influence specifically the experienced safety at small Dutch railway stations.

## **9 Discussion**

In this chapter, the findings of the interviews with travelers and experts are discussed and placed in the broader perspective of safety experiences in public transport. The described literature of the theoretical framework is used to interpret the results. Additionally, specific attention is paid to the unique position of small Dutch railway stations. Then the methodological strengths and limitations are reviewed and opportunities for further research are provided.

### **9.1 The Capabilities Approach and transport poverty**

The findings show that safety at small railway stations in the Netherlands is perceived differently per individual. For some travelers, their experiences of safety proved to be a significant barrier to converting available transport modes into actual mobility. By adopting coping behavior, such as asking friends or family members to pick them up from the station or even avoiding the stations at certain times of the day, the independent mobility options of the travelers are limited. Therefore, these findings correspond to the differences between access to resources, the use of the small railway station, and personal and environmental conversion factors, feeling safe enough to use the station, which are needed to transform them into actual mobility opportunities, as emphasized in the Capabilities Approach (Vecchio & Martens, 2021).

Moreover, these findings also correspond with one of the features of the transport system contributing to exclusion: fear-based exclusion (Church et al., 2000), which focuses on how fears of personal safety prevent travelers from using transport modes, such as public transport. The coping strategies discussed in this research, like calling someone and arranging pick-ups, can result in hidden work or burdens, as described by Durand et al. (2023), since they require additional effort, or financial costs to travel. Furthermore, some travelers also expressed how they do not have access to better alternatives for their daily travel journeys, which forces them to use small railway stations while feeling unsafe or uncomfortable.

## 9.2 Decisive factors influencing perceived safety at small railway stations

This research emphasizes the importance of understanding the different and overlapping layers of perceived safety. Temporal, environmental, social and personal factors all simultaneously influence how travelers experience the stations, which largely aligns with research concerning perceived safety in (railway) station environments (Ceccato et al., 2024; Sundling & Ceccato, 2022). While these results do not provide entirely new factors, they do show how persistent these factors are for experienced safety of travelers and accentuate the crucial role of temporal factors and gendered experiences.

### Temporal factors

Feelings of unsafety were often related to evening and nighttime and the other factors of Sundling and Ceccato (2022) (place, social and individual characteristics). For instance, standing alone (a social characteristic), was described as a reason for feeling unsafe primarily when it happened during evening or nighttime hours (a temporal characteristic). Coping behavior was also mostly associated with evening and nighttime hours.

### Gendered experiences and earlier negative experiences

The findings also correspond with literature from feminist scholars, like Hille (1999), Johansson and Haandrikman (2023), and Loukaitou-Sideris (2012), showing that gender has a strong influence on feelings of safety. Some scholars additionally argue that the avoidance of certain places by women, may even contribute to a male spatial dominance. By avoiding these places, gendered inequalities in access to urban spaces, may be reproduced (Cag & Ozkazanc, 2025; Hille, 1999).

Travelers identifying as women frequently feared sexual harassment, while travelers identifying as men described more general non-sexual nuisance. Past negative experiences thereby sometimes also shaped travelers' interpretations and experiences of station environments. Their experiences served as an interpretative frame that emphasized the sensitivity and vulnerability to potential risks. While travelers who identified as men also expressed that nuisance was often being caused by other men, gender identity proved to add a different layer to these experiences. Since travelers identifying as women frequently described inappropriate ways in which men aimed to interact and get attention from them, which made them feel uncomfortable and unsafe, while travelers identifying as men described more general nuisance caused by intoxicated or drunk men for instance.

This demonstrates that gender identity and temporal characteristics together function as magnifying factors and contribute to the use of coping behavior. Nonetheless, the experiences of travelers identifying as men should not be overlooked, but it is important to acknowledge the different nature of these experiences.

### Integration of the Customer Wish Pyramid

The findings also align with the Customer Wish Pyramid, which considers experienced safety as essential for travelers experiences (Van Hagen & Van Oort, 2019). The safety concerns of travelers at small railway stations show how other qualities of the environment and facilities (satisfiers) are not considered, as the needs of the foundational layer (dissatisfiers) are not addressed, thereby negatively influencing travelers' experienced journeys. Hence, perceived safety proves to be a precondition for travel.

## 9.3 The lived experiences of travelers and the expertise of experts

When comparing the lived experiences to the perspectives of experts, it becomes clear that both groups approach safety in different ways. Reasonably, travelers illustrate everyday experiences

influenced by places, interactions and encounters. Experts, on the other hand, generally approached safety in public transport from a more overarching perspective, thereby taking broader patterns into account. They discussed structural, operational and design-related elements, such as enforcement authorities, data sharing, and technological interventions.

Experts identifying as women generally paid more attention to 'softer' measures, such as informal surveillance, while experts who identified as men focused more on operational and structural issues, concerning the use of data for instance. This shows that expertise and experience are not neutral, but rather informed by the gender identity and lived experiences of the experts.

While both groups focus on similar factors from different angles and levels, the interviews with the travelers added additional insights regarding their lived experiences and the consequences of feelings of unsafety. Coping behavior that is considered necessary for some travelers, such as dressing differently, or making use of a social network, emphasize what is needed for reaching daily activities. Some travelers also argued how they feel like they have no other or better alternatives. This dimension was touched upon by some (mostly female) experts, however, remains crucial for understanding the everyday experiences of travelers and the corresponding consequences of feeling unsafe.

## **9.4 The unique position of small Dutch railway stations**

The interviews also illustrated that small railway stations in the Netherlands hold a unique position in the Dutch rail system. They serve as essential everyday mobility nodes but are also characterized by specific challenges. One of these challenges concerns the inconsistent busyness. At certain moments, such as during local events or football matches, they can become unexpectedly crowded, while at other moments, they may seem deserted, due to the low number of passengers. This dynamic shows the tension between the importance of these stations for the everyday mobility and accessibility of travelers.

### **Spatial vulnerability and the role of station design**

At the same time, the spatial positions of small railway stations in suburban or semi-rural locations increases their vulnerability. They are often located near residential areas, green spaces or industrial areas with limited commercial activity. These characteristics do not contribute to liveliness, which is crucial at these small railway stations. Nevertheless, even stations that are in more densely populated residential areas, such as Rijswijk Station, can be experienced as unpleasant, due to certain design features, such as the tunnel design. These spatial and environmental characteristics help explain why travelers stated that they felt unsafe, especially during evening and nighttime travel.

### **Fragmented responsibilities and datasets**

Shared and fragmented responsibilities regarding the management of small railway stations contribute to these existing challenges. The NS is formally responsible for ensuring (social) safety at all stations, however small railway stations are also served by other regional operators. These regional operators lack enforcement authority, which can result in unpractical and uncomfortable situations.

### **The layered nature of perceived safety**

Besides the objective data of incidents, it is also important to pay more attention to the qualitative and subjective experiences of safety. The overlapping factors are only scarcely captured in current monitoring tools, like the SBM. Moreover, the limited public transparency regarding the SBM data concerning the inaccessibility of data sets and methodological information, decreases the opportunity to improve the deeper understanding of experienced safety in public transport environments. Combined with fragmented responsibilities and data, the visibility of safety issues at these small railway stations is limited, which complicates the improvement of these stations.

## 9.5 Limitations and bias

Several methodological decisions and limitations are discussed, providing an overview of how this research is interpreted and influenced.

### Qualitative approach

The aim of this study is to gain a better understanding of the lived experience of travelers. Therefore, the qualitative approach has the intention to collect rich information regarding the feelings of safety of the travelers, rather than creating a statistical body of information. This means that the results of this study are not statistically generalizable. Hence, the results of this study should be interpreted to analyze recurring patterns and dynamics. Certain findings, concerning for instance the amplifying effect of temporal and individual factors, can possibly be applied to other public transport environments as well, thereby aiming to add to the body of information concerning perceived safety in public transport environments. Nevertheless, particularly the bureaucratic structure and specific role division between the different involved parties are characteristic of the Dutch railway management. These findings are therefore only relevant in the Dutch context.

### Sampling bias and selection of respondents

Another limitation concerns the sampling bias during the selection of travelers to interview. As the researcher is a young woman herself, staying safe during the data collection was a priority. Despite the random selection of travelers, more travelers who identify as women (39) than travelers who identify as men (25) were interviewed (see Appendix F). A reason for this could be that approaching a strange woman can feel more comfortable than approaching a strange man. However, the higher number of female public transport users (7,4 percent of women and 6,6 percent of men in 2023 (CBS, n.d.)), may also play a role in the selection procedure.

With regard to the selection of travelers to interview, another aspect that is also important to consider is the fact that only people who feel safe enough to use the stations have been interviewed. Hence, residents who always avoid the station have not been included in this research. This limitation has been mitigated by conducting interviews during daytimes, thereby asking if travelers (would) also use the station at nighttime. The interviews were also held during daytime to contribute to the feelings of safety of the researcher. Nonetheless, questions concerning the experienced safety of the stations could result in different answers when asked during nighttime instead of daytime.

### Intersectionality

Another limitation relates to intersectionality. In this research, regarding personal data, only gender and age were collected from the travelers. Nevertheless, other personal information, such as parental status, migration background, and sexual orientation, are also factors that can influence how travelers experience these environments (Geliş & Meinherz, 2025). These factors are also multidimensional and intersecting, meaning that their combination determines how people interpret the world and interact with their environments. Intersectionality therefore not only affects the travelers, but also how the researcher considers these experiences. For instance, the answers of travelers who identify as a woman, may be taken more seriously, due to the mutual feeling of understanding.

Moreover, while the age of the respondents was collected, it was not included in the analysis of this research, due to the small sample size. To be able to get an even deeper understanding of perceived safety, intersectionality research methods and analysis should be incorporated.

To mitigate this potential bias, deductive and inductive coding was combined to combine existing knowledge, as well as keep the opportunity to discover new codes and themes.

Despite these limitations, the methodological decisions of this research were made using the descriptive and exploratory research design. Therefore, the in-depth interviews with experts combined with the personal experiences of travelers ensure relevant and useful insights into travelers' use of

public transport. Additionally, the experienced safety of travelers at small railway stations has received limited attention in existing academic research. This research therefore contributes to the academic body of knowledge by addressing this specific context.

## 9.6 Further research

This research emphasizes the need for a renewed perspective on experienced safety, by reframing structural feelings of unsafety as contributing to exclusion within the transport system and therefore as a part of transport poverty. Although respondents formally had access to public transport, many stated that they adopted coping strategies, and some felt like they did not have alternative options. Based on these findings, several opportunities for further research are proposed.

### “Stop” type stations

Firstly, this research specifically focused on the ‘Basis’ type of small railway stations. However, as shown in Appendix A, the smallest station type “Stop” (or Halte) stations, has been overrepresented among the highest-scoring stations in the SBM between 2022 and 2025. Therefore, it could be interesting to explore the factors that contribute to these positive evaluations, as these stations are characterized by even less passengers and facilities than the ‘Basis’ type railway stations. These insights could provide valuable insights, which could possibly be implemented at other stations.

### Methodological decisions for further research

Furthermore, the findings of this research show that short semi-structured interviews with travelers already provide valuable insights into the lived experiences of travelers. Nevertheless, in-depth interviews with travelers could add a deeper understanding of their perspectives. Focusing on the qualitative nature of these interviews could provide more knowledge on their decision-making process in their daily travel. For this research, specific attention should be paid to incorporating research methods that include intersectionality. Individuals with mobility impairment who identify as women, for instance, may experience safety and accessibility differently, due to their impairment, and thereby also travel differently and rely on distinct coping strategies.

Additionally, further research could also gain better insights into the coping strategies of travelers, when the interviews with travelers would be held during evening and nighttime. The respondents then could directly discuss the barriers they faced during the interview, as well as point out which specific factors cause them to feel unsafe or uncomfortable at that moment.

Moreover, more specific attention could be paid to non-travelers who completely avoid certain small railway stations, or the use of public transport all together. These travelers adopted the most extreme form of coping behavior by complete avoidance of these stations. Hence, it is essential to emphasize how this possible group of non-travelers completely falls within the last condition of travel poverty. The travel behavior of this group could be affected enormously by striving to understand where their behavior stems from.

### Governance and data fragmentation

Finally, this research touched upon the complex dynamics of roles and responsibilities of the different parties involved in the management of small railway stations in the Netherlands. Nevertheless, this proved to be an important aspect of understanding why certain challenges, concerning data monitoring, authority and ownership, emerge specifically at these small railway stations. Therefore, more research specifically concentrated on these dynamics and difficulties could benefit the improvement and management of the stations.

## 10 References

- Bantis, T., & Haworth, J. (2020). Assessing transport related social exclusion using a capabilities approach to accessibility framework: A dynamic Bayesian network approach. *Journal of Transport Geography*, 84, 1-29. <https://doi.org/10.1016/j.jtrangeo.2020.102673>
- Başaran, G. G., Ingvardson, J. B., & Nielsen, O. A. (2025). Does transit-oriented development (TOD) influence perceived safety and mode choice? *Journal Of Transport and Land Use*, 18(1), 237–267. <https://doi.org/10.5198/jtlu.2025.2548>
- Bassant, J. (2025). *Verstedelijking rond kleinere stations: samen sta je sterker*. Stadszaken. <https://stadszaken.nl/artikel/8598/verstedelijking-rond-kleinere-stations-samen-sta-je-sterker>
- Boudewijns, I. (2025). *Deurnes Stationspark valt opnieuw in de prijzen bij Britse Community Rail Awards*. DeurneMediaGroep. <https://dmgdeurne.nl/deurnes-stationspark-valt-opnieuw-in-de-prijzen-bij-britse-community-rail-awards/>
- Bruins, B. & Corvers, W. (n.d.) Stationstaal [Photograph]. <https://studiocorvers.com/portfolio-item/stationstaal/>
- Cag, T. & Ozkazanc, S. (2025). A spatial analysis of urban segregation from a gender perspective: masculine spaces. *Journal of Asian and African Studies*, 61(2), 1498-1521. DOI: [10.1177/00219096251319225](https://doi.org/10.1177/00219096251319225)
- Carlton, I. (2009). Histories of Transit-Oriented Development: Perspectives on the Development of the TOD Concept. *eScholarship (California Digital Library)*, 1-24. <https://escholarship.org/uc/item/7wm9t8r6>
- CBS (n.d.). *Hoeveel wordt er met het openbaar vervoer gereisd?*. Retrieved March 31, 2026, from <https://www.cbs.nl/nl-nl/visualisaties/verkeer-en-vervoer/personen/openbaar-vervoer>
- Ceccato, V., Sundling, C., & Gliori, G. (2024). What makes a railway station safe and for whom? The impact of transit environments on passengers' victimisation and safety perceptions. *European Transport Research Review*, 16(1), 1-16. <https://doi.org/10.1186/s12544-024-00641-5>
- Cheng, Y. H., & Chen, S. Y. (2015). Perceived accessibility, mobility, and connectivity of public transportation systems. *Transportation Research Part A: Policy and Practice*, 77, 386–403. <https://doi.org/10.1016/j.tra.2015.05.003>
- Chowdhury, S., & van Wee, B. (2020). Examining women's perception of safety during waiting times at public transport terminals. *Transport Policy*, 94, 102–108. <https://doi.org/10.1016/j.tranpol.2020.05.009>
- Church, A., Frost, M., & Sullivan, K. (2000). Transport and social exclusion in London. *Transport Policy*, 7(3), 195–205. [https://doi.org/10.1016/S0967-070X\(00\)00024-X](https://doi.org/10.1016/S0967-070X(00)00024-X)
- D'Arbois de Jubainville, H., Vanier, C. (2017). Women's avoidance behaviors in public transport in the Ile-de-France region. *Crime Prevention and Community Safety*, 19, 183–198. <https://doi.org/10.1057/s41300-017-0023-6>
- Durand, A., Zijlstra, T., Hamersma, M., Hoen, A., van Oort, N., Hoogendoorn-Lanser, S., & Hoogendoorn, S. (2023). "Who can I ask for help?": Mechanisms behind digital inequality in public transport. *Cities*, 137, 1-11. <https://doi.org/10.1016/j.cities.2023.104335>
- Friese, S. (2014). *Qualitative data analysis with ATLAS.ti*. (Third edition). SAGE Publications.
- Friman, M., Lättman, K., & Olsson, L. E. (2020). Public transport quality, safety, and perceived accessibility. *Sustainability (Switzerland)*, 12(9), 1-14. <https://doi.org/10.3390/SU12093563>
- Geliş, E. & Meinherz, F. X. (2025). Intersectional (in)securities – multiply marginalised women's experiences of (un)safety on public transport. *Mobilities*, 21(1), 214–231. <https://doi.org/10.1080/17450101.2025.2532404>
- Hille, K. (1999). 'Gendered exclusions': women's fear of violence and changing relations to space. *Geografiska Annaler: Series B, Human Geography*, 81(2), 111–124. <https://doi.org/10.1111/j.0435-3684.1999.00052.x>
- Ibraeva, A., De Almeida Correia, G. H., Silva, C., & Antunes, A. P. (2020). Transit-oriented development: A review of research achievements and challenges. *Transportation Research Part A Policy And Practice*, 132, 110–130. <https://doi.org/10.1016/j.tra.2019.10.018>
- I&O Research, NS & ProRail (2020). *Stationsbelevingsmonitor 2020: Best gewaardeerde stations van Nederland 2020*. Retrieved March 31, 2026, from <https://share.google/3jNoM1qhShvMBi5BB>

- I&O Research, NS & ProRail (2021). *Stationsbelevingsmonitor 2021: Best gewaardeerde stations van Nederland 2021*. Retrieved March 31, 2026, from <https://www.ProRail.nl/siteassets/homepage/series/lijtstjes/stationsbelevingsmonitor-2021.pdf>
- I&O Research, NS & ProRail (2022). *Stationsbelevingsmonitor 2022: Best gewaardeerde stations van Nederland 2022*. Retrieved March 31, 2026, from <https://content.presspage.com/uploads/570/stationsbelevingsmonitor2022nsProRail.pdf?10000>
- I&O Research, NS & ProRail (2023). *Stationsbelevingsmonitor 2023: Best gewaardeerde stations van Nederland 2023*. Retrieved March 31, 2026, from <https://www.ProRail.nl/siteassets/noindex/stationsbelevingsmonitor-2023-.pdf>
- I&O Research, NS & ProRail (2025). *Best gewaardeerde stations van Nederland 2024 & 2025*. Retrieved March 31, 2026, from <https://www.ProRail.nl/siteassets/homepage/series/lijtstjes/sbm-2025/totaaloverzicht-sbm-2025.pdf>
- Jacobs, J. (1972). *The death and life of great American cities* ([1st] Pelican books [ed.], reissued). Penguin.
- Jamei, E., Chan, M., Chau, H. W., Gaisie, E., & Lättman, K. (2022). Perceived Accessibility and Key Influencing Factors in Transportation. *Sustainability*, *14*(17), 1-22. <https://doi.org/10.3390/su141710806>
- Johansson, S., & Haandrikman, K. (2023). Gendered fear of crime in the urban context: A comparative multilevel study of women's and men's fear of crime. *Journal of Urban Affairs*, *45*(7), 1238–1264. <https://doi.org/10.1080/07352166.2021.1923372>
- Justis (n.d.). Ministerie van Justitie en Veiligheid. *Wat is een boa?*. Retrieved March 31, 2026, from <https://www.justis.nl/producten/boa/wat-is-een-boa>
- KuiperCompagnons (2024). *Whitepaper Ontwikkelpotentie rondom kleine en middelgrote stations in Nederland*. <https://www.kuipercompagnons.nl/whitepaper/ontwikkelpotentie-rondom-kleine-en-middelgrote-stations-in-nederland>
- LandschapNoordHolland (n.d.). *De Nollen bij Den Helder – Landschap van verbeelding*. Retrieved March 31, 2026, from <https://www.landschapnoordholland.nl/uitgelicht-gebied/de-nollen-bij-den-helder>
- Lättman, K., Friman, M., & Olsson, L. E. (2016). Perceived Accessibility of Public Transport as a Potential Indicator of Social Inclusion. *Social Inclusion*, *4*(3), 36–45. <https://doi.org/10.17645/si.v4i3.481>
- Lättman, K., Olsson, L. E., & Friman, M. (2016). Development and test of the Perceived Accessibility Scale (PAC) in public transport. *Journal of Transport Geography*, *54*, 257–263. <https://doi.org/10.1016/j.jtrangeo.2016.06.015>
- Lättman, K., Olsson, L. E., & Friman, M. (2018). A new approach to accessibility – Examining perceived accessibility in contrast to objectively measured accessibility in daily travel. *Research in Transportation Economics*, *69*, 501–511. <https://doi.org/10.1016/j.retrec.2018.06.002>
- Loo, B. P., Chen, C., & Chan, E. T. (2010). Rail-based transit-oriented development: Lessons from New York City and Hong Kong. *Landscape And Urban Planning*, *97*(3), 202–212. <https://doi.org/10.1016/j.landurbplan.2010.06.002>
- Loukaitou-Sideris, A. (2012). Safe on the move: The importance of the built environment. *The Urban Fabric of Crime and Fear*, 85–110. Springer Netherlands. [https://doi.org/10.1007/978-94-007-4210-9\\_4](https://doi.org/10.1007/978-94-007-4210-9_4)
- Loukaitou-Sideris, A. (2014). Fear and safety in transit environments from the women's perspective. *Security Journal*, *27*, 242-256. <https://doi.org/10.1057/sj.2014.9>
- Lucas, K. (2012). Transport and social exclusion: Where are we now? *Transport Policy*, *20*, 105–113. <https://doi.org/10.1016/j.tranpol.2012.01.013>
- Lucas, K., Mattioli, G., Verlinghieri, E., & Guzman, A. (2016). Transport poverty and its adverse social consequences. *Proceedings of the Institution of Civil Engineers: Transport*, *169*(6), 353–365. <https://doi.org/10.1680/jtran.15.00073>
- Luz, G., & Portugal, L. (2022). Understanding transport-related social exclusion through the lens of capabilities approach. *Transport Reviews*, *42*(4), 503–525. <https://doi.org/10.1080/01441647.2021.2005183>

- NS (n.d.). A. *Buitengewoon opsporingsambtenaren (Boa's) van NS*. Retrieved March 31, 2026, from <https://www.ns.nl/privacy-statement/wet-politiegegevens>
- NS (n.d.). B. *Corporate Governance*. Retrieved March 31, 2026, from <https://www.ns.nl/en/about-ns/corporate-governance>
- NS (n.d.). C. *Over NS Verantwoordelijkheden*. Retrieved March 31, 2026, from <https://www.ns.nl/over-ns/de-spoorsector/verantwoordelijkheden.html>
- NS Dashboard (2024). A. *Reizigersgedrag 2024 Den Helder Zuid*. Retrieved March 31, 2026, from <https://dashboards.nsjaarverslag.nl/reizigersgedrag/den-helder-zuid>
- NS Dashboard (2024). B. *Reizigersgedrag 2024 Nieuwerkerk a/d IJssel*. Retrieved March 31, 2026, from <https://dashboards.nsjaarverslag.nl/reizigersgedrag/nieuwerkerk-a-d-ijssel?dtYear=2024>
- NS Dashboard (2024). C. *Reizigersgedrag 2024 Overveen*. Retrieved March 31, 2026, from <https://dashboards.nsjaarverslag.nl/reizigersgedrag/overveen>
- NS Dashboard (2024). D. *Reizigersgedrag 2024 Rijswijk*. Retrieved March 31, 2026, from <https://dashboards.nsjaarverslag.nl/reizigersgedrag/rijswijk>
- NS Stations (n.d.). *Welkom bij NS Stations Onze Pijlers*. Retrieved March 31, 2026, from <https://www.nsstations.nl/>
- Nussbaum, M. C. (2000). *Women and human development: the capabilities approach*. Cambridge University Press. <http://edrev.asu.edu/reviews/rev105.htm>
- OpenStreetMap (Cartographer unknown). (2026). A. *Den Helder Zuid Station* [Map]. Retrieved March 31, 2026, from <https://www.openstreetmap.org/node/4555498838>
- OpenStreetMap (Cartographer unknown). (2026). B. *Nieuwerkerk a/d IJssel Station* [Map]. Retrieved March 31, 2026, from <https://www.openstreetmap.org/node/7606556446>
- OpenStreetMap (Cartographer unknown). (2026). C. *Overveen Station* [Map]. Retrieved March 31, 2026, from <https://www.openstreetmap.org/node/7606551881>
- OpenStreetMap (Cartographer unknown). (2026). D. *Rijswijk Station* [Map]. Retrieved March 31, 2026, from <https://www.openstreetmap.org/node/7606551859>
- Poelen, M. (2018). Stationstaal [Photograph]. <https://studiocorvers.com/portfolio-item/stationstaal/>
- Pointer & AD. (2024). *Vrouwen voelen zich het meest onveilig op stations*. Retrieved March 31, 2026, from <https://pointer.kro-ncrv.nl/enquete-pointer-en-ad-vrouwen-voelen-zich-het-meest-onveilig-op-stations>
- Pot, F. J., van Wee, B., & Tillema, T. (2021). Perceived accessibility: What it is and why it differs from calculated accessibility measures based on spatial data. *Journal of Transport Geography*, 94, 1-11. <https://doi.org/10.1016/j.jtrangeo.2021.103090>
- ProRail (n.d.). A. *Over ons Wat wij doen*. Retrieved March 31, 2026, from <https://www.ProRail.nl/over-ons/wat-doet-ProRail>
- ProRail (n.d.). B. *Stationsklasse*. Retrieved March 31, 2026, from <https://stations.nl/over-stations/stationsklasse/>
- ProRail (2025) *Vervoerders Onze klanten*. Retrieved March 31, 2026, from <https://www.ProRail.nl/samenwerken/vervoerders/onze-klanten>
- Renfurm, K. (2025). *Wat is de verantwoordelijkheid van mannen bij gendergeweld? 'Een moord zoals die op Lisa is geen losstaand incident'*. De Volkskrant. <https://www.volkskrant.nl/tag/Gender>
- Sarker, R., Currie, G., & Chowdhury, S. (2026). Women's Perceived Precautionary Safety on public transit — A life course perspective on harassment experiences, anxiety, and coping behavior. *Transportation Research Part F: Traffic Psychology and Behavior*, 116, 1-19. <https://doi.org/10.1016/j.trf.2025.103415>
- Simons, D. (2025). *De dood van Lisa (17) uit Abcoude – dit is wat we nu weten*. Het Parool. [https://www.parool.nl/dossier/de-dood-van-lisa-17-uit-abcoude\\_\[parool.nl\]](https://www.parool.nl/dossier/de-dood-van-lisa-17-uit-abcoude_[parool.nl])
- Spoorbeeld (n.d.). *Handboek Stationsoutillage*. ProRail & Spoorbeeld. <https://www.spoorbeeld.nl/beleid/station/handboek-stations-outillage>
- Stanford Encyclopedia of Philosophy (2025). *The Capability Approach*. Retrieved March 31, 2026, from <https://plato.stanford.edu/entries/capability-approach/#FunCapDoiBei>
- Stark, J., & Meschik, M. (2018). Women's everyday mobility: Frightening situations and their impacts on travel behavior. *Transportation Research Part F: Traffic Psychology and Behavior*, 54, 311–323. <https://doi.org/10.1016/j.trf.2018.02.017>

- Stations.nl (2026). *Reizigerswaardering*. Retrieved March 31, 2026, from <https://stations.nl/over-stations/reizigerswaardering/>
- StationsparkDeurne.nl (n.d.). Fotoboek Zwerfboekenkast [Photograph]. <https://www.stationsparkdeurne.nl/galerie/7/>
- StationsparkDeurne.nl (2018). Fotoboek Whatsapp Image [Photograph]. <https://www.stationsparkdeurne.nl/galerie/13/>
- Stoker, E. (2025). *OM eist 3 jaar cel voor verkrachting op Koningsdag, verdachte bekent schuld maar herinnert zich weinig*. De Volkskrant. <https://www.volkskrant.nl/tag/ethiek>
- Studio Corvers. (2024). *Stationstaal - Vormt de nieuwe norm*. Retrieved March 31, 2026, from <https://studiocorvers.com/portfolio-item/stationstaal/>
- Suen, L. W., Lunn, M. R., Katuzny, K., Finn, S., Duncan, L., Sevelius, J., Flentje, A., Capriotti, M. R., Lubensky, M. E., Hunt, C., Weber, S., Bibbins-Domingo, K., & Obedin-Maliver, J. (2020). What Sexual and Gender Minority People Want Researchers to Know About Sexual Orientation and Gender Identity Questions: A Qualitative Study. *Archives of Sexual Behavior*, 49(7), 2301–2318. <https://doi.org/10.1007/s10508-020-01810-y>
- Sundling, C., & Ceccato, V. (2022). The impact of rail-based stations on passengers' safety perceptions. A systematic review of international evidence. *Transportation Research Part F: Traffic Psychology and Behavior*, 86, 99–120. <https://doi.org/10.1016/j.trf.2022.02.011>
- Te Braak, P., & van Tienoven, T. P. (2025). Navigating the city: A systematic literature review on women's perceived safety in urban public space. *Cities*, 162, 1-11. <https://doi.org/10.1016/j.cities.2025.105907>
- Tweede Kamer der Staten-Generaal (2025). *GroenLinks-PvdA stelt vragen over de veiligheid van vrouwen*. Retrieved October 22, 2025, from [https://www.tweedekamer.nl/kamerstukken/plenaire\\_verslagen/kamer\\_in\\_het\\_kort/groenlinks-pvda-stelt-vragen-over-de-veiligheid](https://www.tweedekamer.nl/kamerstukken/plenaire_verslagen/kamer_in_het_kort/groenlinks-pvda-stelt-vragen-over-de-veiligheid)
- Van Hagen, M. (2015). Effect of Station Improvement Measures on Customer Satisfaction. *Journal of Traffic and Transportation Engineering*, 3(1), 7-18. <https://doi.org/10.17265/2328-2142/2015.01.002>
- Van Hagen, M. (2011). *Waiting experience at train stations*. Eburon Academic Publishers.
- Van Hagen, M. & Bron, P. (2014). Enhancing the Experience of the Train Journey: Changing the Focus from Satisfaction to Emotional Experience of Customers. *Transportation Research Procedia*, 1(1), 253–263. <https://doi.org/10.1016/j.trpro.2014.07.025>
- Van Hagen, M. & Van Oort, N. (2019). Improving Railway Passengers Experience: Two Perspectives. *Journal of Traffic and Transportation Engineering*, 7(3), 97-110. <https://doi.org/10.17265/2328-2142/2019.03.001>
- Van Hagen, M. & Ten Elsen, E. (2019, October 31). *Geef treinreizigers wat te doen!* [Paper presentation for conference]. Nationaal Verkeerskundecongres, Den Haag, Netherlands.
- Van Wee, B. (2016). Accessible accessibility research challenges. *Journal of Transport Geography*, 51, 9–16. <https://doi.org/10.1016/j.jtrangeo.2015.10.018>
- Vecchio, G. (2020). Microstories of everyday mobilities and opportunities in Bogotá: A tool for bringing capabilities into urban mobility planning. *Journal of Transport Geography*, 83, 1-12. <https://doi.org/10.1016/j.jtrangeo.2020.102652>
- Vecchio, G., & Martens, K. (2021). Accessibility and the Capabilities Approach: a review of the literature and proposal for conceptual advancements. *Transport Reviews*, 41(6), 833–854. <https://doi.org/10.1080/01441647.2021.1931551>

## Appendix A. Lowest- and highest-rated stations in the SBM (2021 – 2025)

Table 6. Top and bottom ten stations in the SBM (2021)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Rotterdam Zuid	5,8	Basis	Overveen	8,2	Basis
2	Den Helder Zuid	6	Basis	Driebergen-Zeist	8	Plus
3	Delft Campus	6,1	Basis	Valkenburg	8	Basis
4	Almere Centrum	6,1	Mega	Rotterdam Centraal	8	Cathedral
5	Dordrecht Zuid	6,2	Basis	Santpoort Zuid	7,9	Stop
6	Arnhemuiden	6,2	Stop	Dalfsen	7,9	Basis
7	Kruiningen-Yerseke	6,2	Stop	Zuidhorn	7,9	Basis
8	Nijmegen Dukenburg	6,2	Basis	Kropswolde	7,9	Stop
9	Hoorn Kersenboogerd	6,3	Basis	Utrecht Centraal	7,9	Cathedral
10	Nieuwerkerk a/d IJssel	6,4	Basis	Boskoop Snijdelwijk	7,9	Stop

Source: I&O Research, NS & ProRail (2021)

Table 7. Top and bottom ten stations in the SBM (2022)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Lage Zwaluwe	5,2	Stop	Klimmen-Ransdaal	8,3	Stop
2	Den Helder Zuid	5,7	Basis	Schin op Geul	8,2	Stop
3	Nijmegen Dukenburg	5,9	Basis	Valkenburg	8,1	Basis
4	Rotterdam Zuid	5,9	Basis	Mantgum	8,1	Stop
5	Rijswijk	6,1	Basis	Oosterbeek	8	Stop
6	Nieuwerkerk a/d IJssel	6,1	Basis	Rotterdam Centraal	8	Cathedral
7	Rilland-Bath	6,1	Stop	Gramsbergen	8	Stop
8	Tegelen	6,2	Stop	Santpoort Zuid	8	Stop
9	Blerick	6,3	Basis	Feanwâlden	8	Basis
10	Uitgeest	6,3	Basis	Houthem-St.Gerlach	8	Stop

Source: I&O Research, NS & ProRail (2022)

Table 8. Top and bottom ten stations in the SBM (2023)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Lage Zwaluwe	4,6	Stop	Klimmen-Ransdaal	8,7	Stop
2	Den Helder Zuid	5,4	Basis	Schin op Geul	8,2	Stop
3	Rotterdam Zuid	5,6	Basis	Mantgum	8,2	Stop
4	Nieuwerkerk a/d IJssel	5,7	Basis	Valkenburg	8,1	Basis
5	Nijmegen Dukenburg	5,7	Basis	Overveen	8	Basis
6	Enschede de Eschmarke	5,8	Stop	Zuidhorn	8	Basis
7	Rijswijk	5,8	Basis	Santpoort Zuid	8	Stop
8	Den Haag Moerwijk	6	Basis	Houthem-St.Gerlach	7,9	Stop
9	Den Helder	6	Basis	Driebergen-Zeist	7,9	Plus
10	Blerick	6	Basis	Enkhuizen	7,9	Basis

Source: I&O Research, NS & ProRail (2023)

Table 9. Top and bottom ten stations in the SBM (2024)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Lage Zwaluwe	4,81	Stop	Klimmen-Randsdaal	8,3	Stop
2	<b>Den Helder Zuid</b>	<b>5,13</b>	<b>Basis</b>	<b>Overveen</b>	<b>8,25</b>	<b>Basis</b>
3	<b>Nieuwerkerk a/d IJssel</b>	<b>5,31</b>	<b>Basis</b>	Schin op Geul	8,17	Stop
4	<b>Rijswijk</b>	<b>5,66</b>	<b>Basis</b>	Mantgum	8,11	Stop
5	Arnhem	5,82	Stop	Dalfsen	8,11	Basis
6	Eindhoven Strijp-S	5,82	Basis	Valkenburg	8,02	Basis
7	Rotterdam Zuid	5,9	Basis	Daarlerveen	8,02	Stop
8	Blerick	5,9	Basis	Houthem-St.Gerlach	8,01	Stop
9	Middelburg	5,9	Basis	Santpoort Zuid	8	Stop
10	Nijmegen Dukenburg	5,93	Basis	Barneveld Zuid	7,97	Stop

Source: I&O Research, NS & ProRail (2025)

Table 10. Top and bottom ten stations in the SBM (2025)

The ten lowest-scoring stations				The ten highest-scoring stations		
Rank	Station	Score	Type of station	Station	Score	Type of station
1	Lage Zwaluwe	4,82	Stop	Klimmen-Ransdaal	8,67	Stop
2	Nieuwerkerk a/d IJssel	5,2	Basis	Mantgum	8,26	Stop
3	Enschede de Eschmarke	5,27	Stop	Schin op Geul	8,24	Stop
4	Nijmegen Dukenburg	5,68	Basis	Valkenburg	8,18	Basis
5	Rotterdam Zuid	5,76	Basis	Dalfsen	8,15	Basis
6	Arnhem Velperpoort	5,9	Basis	Barneveld Zuid	8,12	Stop
7	Middelburg	5,93	Basis	Daarlerveen	8,07	Stop
8	Rijswijk	6,03	Basis	Hindeloopen	8	Stop
9	Blerick	6,08	Basis	Overveen	7,98	Basis
10	Tegelen	6,08	Stop	Voerendaal	7,98	Stop

Source: I&O Research, NS & ProRail (2025)

## Appendix B. Interview script travelers

### Introduction to the Study

- Perceived safety at small railway stations
- Master's thesis at TU Delft

### Informed Consent

- The interview is anonymous; only gender identity and age will be collected (with permission from the respondent)
- Permission to use quotes for research purposes
- Duration: approximately 5–10 minutes or until the train arrives
- Permission to audio-record the interview for transcription purposes
- Audio and transcripts will be deleted after the data has been analyzed

### Materials Needed for Interviews

- Printed item list
- Fully charged mobile phone
- Power bank
- Printed participant ID cards

Interview		
Topic	Sub-topic	Questions
Introduction questions	Station use	<p><b>How often do you use this station?</b></p> <ul style="list-style-type: none"> <li>• <i>Daily</i></li> <li>• <i>Weekly</i></li> <li>• <i>Several times a week</i></li> <li>• <i>Monthly</i></li> <li>• <i>Occasionally</i></li> <li>• <i>First time</i></li> </ul> <p><b>At what times of day do you usually use this station?</b></p> <ul style="list-style-type: none"> <li>• <i>Morning peak (06:00–09:00)</i></li> <li>• <i>Daytime (09:00–16:00)</i></li> <li>• <i>Evening peak (16:00–19:00)</i></li> <li>• <i>Evening (19:00–23:00)</i></li> <li>• <i>Night (23:00–06:00)</i></li> <li>• <i>Spread throughout the day</i></li> <li>• <i>Varies</i></li> </ul> <p><b>What is usually the purpose of your trip via this station?</b></p> <ul style="list-style-type: none"> <li>• <i>Work-related</i></li> <li>• <i>Home-related</i></li> <li>• <i>Access to facilities/services</i></li> <li>• <i>Recreational</i></li> <li>• <i>Varies per trip</i></li> </ul>

Experienced safety	Feelings of safety	<p><b>On a scale from 1 to 10, how safe do you feel at this station?</b> (1 = very unsafe, 10 = very safe)</p> <ul style="list-style-type: none"> <li>• 1</li> <li>• 2</li> <li>• 3</li> <li>• 4</li> <li>• 5</li> <li>• 6</li> <li>• 7</li> <li>• 8</li> <li>• 9</li> <li>• 10</li> </ul> <p>► <i>Could you elaborate on your answer?</i></p> <p><b>On a scale from 1 to 10, how safe do you feel in the immediate surroundings of this station?</b> (1 = very unsafe, 10 = very safe)</p> <p>► <i>Could you elaborate on your answer?</i></p> <p><b>Do you perceive a difference between the station itself and its immediate surroundings?</b></p> <p><b>Are there specific places on or around the station where you feel particularly safe or unsafe?</b> ► <i>Which ones?</i></p>
Time	Times and locations	<p><b>Do you feel equally safe during the evening and night as during the daytime?</b> ► <i>Could you elaborate on your answer?</i></p>
Individual impact	Behavior	<p><b>Do you adapt your behavior in order to feel safer, for example when using the station or choosing your route to or from it?</b> ► <i>Could you elaborate on your answer?</i></p> <p><b>Are there activities or destinations you do not reach because you avoid this station (at certain times) due to feelings of unsafety?</b> ► <i>Could you elaborate on your answer?</i></p> <p><b>Have you ever experienced an unpleasant or unsafe incident at this station or while travelling?</b> ► <i>Would you be willing to tell more about this experience?</i></p>
Future	Improvement	<p><b>What would make you feel safer at this station and/or in its immediate surroundings?</b></p>
Closing	Future	<p><b>Is there something else that you would like to add about this station?</b></p>
<b>Closing</b>		
Thank you for your time and effort.		

## Appendix C. Interview script interviews experts

<b>Introduction</b>		
<p>Researcher and research</p> <ul style="list-style-type: none"> <li>- Urban Planning Bachelor</li> <li>- MADE Master</li> <li>- Haskoning</li> </ul> <p>Goal of the research: To gain insight into travelers' perceived safety and how this influences their accessibility. Ultimately, the aim is to improve the design and functionality of railway stations.</p> <ul style="list-style-type: none"> <li>• Explain why the focus is specifically on small stations</li> <li>• Clarify the connection with transport poverty</li> </ul>		
<p>Informed consent:</p> <ul style="list-style-type: none"> <li>- Am I allowed to record and automatically transcribe this interview using Teams? The data will be deleted after it is analyzed.</li> <li>- Participation in this interview is anonymous. If allowed, I will only collect your function and your gender identity. The answers will be categorized.</li> <li>- Am I allowed to use quotes of this interview in the research? (You are allowed to read them before they are used in the research, if preferred).</li> <li>- The interview will take about 30-60 minutes.</li> <li>- Until three weeks after the interview, you can decide to stop your participation in this research (without further consequences).</li> <li>- I will summarize and take notes of your answers.</li> <li>- Your data will not be shared with third parties.</li> </ul>		
<b>Interview</b>		
<b>Topic</b>	<b>Sub-topic</b>	<b>Questions</b>
Introduction	Function	<p>Could you describe your specific role (at Haskoning)?</p> <p>What type of project are you currently working on?</p>
Small Dutch train stations	Challenges	<p>In your view, what are the main challenges associated with small stations (type 'Halte' or 'Basis')?</p> <p>To what extent do small stations differ from larger stations in this regard?</p> <p>And to what extent do small stations differ from one another?                      &gt; What types of small stations exist, and what specific challenges do these characteristics present?</p>
Experienced safety	Small Dutch train stations	<p>In your opinion, what are the challenges concerning perceived social safety at small stations?                      &gt; Are there notable differences among the small stations in this respect?</p>
	Direct surroundings of the small Dutch train stations	<p>What do you consider the main challenges regarding perceived social safety in the immediate surroundings of small stations?                      &gt; Are there particular locations or target groups that require additional attention?</p>
Collaboration	Responsibility	<p>Who holds responsibility for safeguarding social safety at small stations?</p>

		How does the collaboration between NS, municipalities, and ProRail function in this context?
Influence on the individual	Behavior	<p>What influence does perceived safety have on the individual?</p> <p>How does perceived safety affect an individual's travel behavior, particularly in terms of accessibility to destinations or activities that are important to them?</p>
Future	Improvement	<p>What measures could improve the social safety at these small train stations and their immediate surroundings?</p> <p>How are these stations currently being improved? What are the existing measures or policies in place?</p> <p>What kinds of challenges arise when attempting to improve such stations?</p> <p>How can policy better align with travelers' experiences? For example, consider underrepresented groups in planning roles, such as women and older adults.</p>
Closing	Future	<p>Are there any specific developments or trends that you believe may influence social safety at small stations in the future? &gt; If so, which ones?</p> <p>What should be paid more attention to when developing and planning future small-scale railway stations?</p>
<b>Closing</b>		
<p>Do you have any questions?  Would you like to receive the final research?  What is your gender identity?  Am I allowed to contact you if I have any questions?</p> <p>Thank you for your participation!</p>		

## Appendix D. Codes traveler interviews

<b>Theme</b>	<b>Dutch codes</b>	<b>English translation</b>
<b>Cijfer veiligheidsgevoel</b>		Perceived safety score
	Hoog cijfer veiligheidsgevoel	High perceived safety score
	Medium cijfer veiligheidsgevoel	Medium perceived safety score
	Overdag prima, 's avonds lager cijfer veiligheidsgevoel	Safety is fine during the day, but lower in the evening / at night
	Laag cijfer veiligheidsgevoel	Low perceived safety score
<b>Copingstrategie</b>		Coping strategy
	Geen copingstrategie	No copingstrategie
	Ander station gebruiken	Using another station
	Anderen laten weten hoe je reist	Inform others about journey
	Bellen	Call with someone
	Kleding aanpassen	Change clothes / appearance
	Live locatie	Share live location with friends or family
	Muziek luisteren	Listen to music
	Omlopen	Take a different walking route
	Ophalen	Pick up by friends or family
	Opletten	Pay extra attention to surroundings
	Samen reizen	Travel with someone else
	Vermijden	Avoid
	Wachten op een andere plek	Wait at a different location
	Zo snel mogelijk het station verlaten	Leave the station as soon as possible
	Geen alternatieven	No alternatives
<b>Leeftijd</b>		Age
	Onder de 18 jaar	Below 18 years old
	18-24 jaar	18-24 years old
	25-34 jaar	25-34 years old
	35-49 jaar	35-49 years old
	50-64 jaar	50-64 years old
	65+	65+ years old
<b>Onprettige ervaringen</b>		Unpleasant experiences
	Geen onprettige ervaringen	No unpleasant experiences
	Hangjongeren	Presence of hangyouth
	In de trein	Within the train
	Interactie met mannen	Interaction with men
	Vechtpartij	Fight
	Perspectief op OV	Perspective on public transport
<b>Stationsgebied</b>		Station area
	Veilig stationsgebied	Safe station area
	Onveilig stationsgebied	Unsafe station area
	Kaal en leeg stationsgebied	Empty station area
<b>Stationsgebruik</b>		Station use

	Avond en nachturen	Evening and nighttime
	Doel van de reis	Goal of the journey
	Reisfrequentie	Travel frequency
	Tijdstip	Time
<b>Stationsverbetering</b>		Station improvement
	Geen stationsverbetering nodig	No improvements necessary
	Camera's plaatsen	Place cameras
	Comfort verhogen	Improve comfort
	Gebouwde omgeving verbeteren	Improve the built environment / design
	Hygiene verbeteren	Improve the hygiene
	Meer reuring	More liveliness
	Meer overzicht	More overview
	Plaatsen poortjes	Place gates
	Uitstraling verbeteren	Improve the appearance
	Verlichting verbeteren	Improve lighting
<b>Veiligheidservaring negatief</b>		Negative safety experience
	Alleen staan	Being alone
	Daklozen	Presence of homeless people
	Diefstal	Theft
	Donker	Darkness
	Gebouwde omgeving	Built environment
	Geen camera's	No cameras
	Geen poortjes	No gates
	Mensen die rondhangen op station	People hanging around at the station
	Incidenten	Incidents occurring
	Nabijheid treinen	Proximity to passing trains
	Onguur gevoel	Unpleasant feelings
	Veel zelfmoord incidenten	Many suicide incidents
	Vandalisme	Vandalism
	Verwaarloosd	Neglected
	Fietsenstalling	Bicycle parking
<b>Veiligheidservaring positief</b>		Positive safety experience
	Alleen overdag gebruik van het station	Only use the station during daytime
	Ik ben een man, dus ik voel me veilig.	Male gender as protective factor
	Weinig incidenten	Low number of incidents
	Geen vage personen	No vague persons
	Kent het station goed	Familiar with the station
	Toezicht	Surveillance
<b>Gender identity</b>	Vrouw	Woman
	Man	Man
<b>Language</b>	Nederlands	Dutch
	Engels	English

## Appendix E. Information from Participant ID Card

Dear respondent,

Thank you for participating in this research! This form provides more information about the study and its purpose. You can also use this form to contact the researcher, for example if you wish to withdraw your participation. If you choose to withdraw, the information from your interview will not be used in the research.

### **About this research**

This study focuses on the perceived safety of travelers using small train stations. The underlying goal is to understand how people experience their accessibility (can you reach all the locations that are important to you, such as work, school, and amenities?). If travelers are unable to reach certain places because they feel unsafe at or around the station, this is problematic and deserves more attention. Small stations often face different challenges than larger ones. They are often more remote, have fewer travelers, and offer fewer facilities. Moreover, larger stations are studied more frequently. That is why this research focuses on the perceived safety of travelers using small stations. Your participation is therefore very valuable for improving these stations and gaining insights into the experiences of travelers.

This master's thesis is part of the MADE (Metropolitan Analysis, Design and Engineering) program at TU Delft and Wageningen University. This program aims to improve and make cities more sustainable. It develops solutions for urban challenges such as air pollution, congestion, and safety. The research is conducted at Haskoning, an engineering and consultancy firm that works on sustainable solutions for the built environment, infrastructure, water, and mobility. The insights gained from this research may be used by Haskoning.

### **Anonymity and consent**

As explained verbally before the interview, your personal characteristics will not be included in this research. The study is therefore anonymous. However, with your consent, the gender you identify with, and your age will be included. The data will be categorized. The recording of your interview will be deleted immediately after it has been transcribed.

### **Transcript and participation**

If you would like to read back what you said during the interview or if you wish to withdraw your participation. This is possible up to three weeks after the interview. Since this research is anonymous, it is important that you include your Respondent ID (at the bottom of this form) in your email. This way, the correct interview can be matched with the correct request.

## Appendix F. Interviewed travelers

Nieuwerkerk a/d IJssel Station	Gender Identity	Age (in years)
1	Woman	16
2	Woman	17
3	Man	23
4	Man	54
5	Woman	17
6	Woman	21
7	Man	51
8	Man	23
9	Man	31
10	Woman	17
11	Man	21
Den Helder Zuid Station		
12	Woman	17
13	Woman	19
14	Woman	66
15	Woman	53
16	Woman	16
17	Woman	18
18	Man	50
19	Woman	17
20	Man	57
21	Man	43
22	Woman	24
23	Woman	48
24	Woman	26
25	Man	21
26	Woman	17
27	Woman	23
28	Woman	26
Rijswijk Station		
29	Man	16
30	Man	25
31	Man	23
32	Woman	25
33	Woman	28
34	Woman	44
35	Man	25
36	Woman	40
37	Woman	18
38	Woman	18
39	Man	18
40	Woman	25
41	Woman	60
42	Woman	23

43	Man	21
44	Woman	58
45	Woman	18
46	Woman	21
47	Woman	20
48	Man	35
49	Man	22
Overveen Station		
50	Woman	65
51	Woman	60
52	Woman	22
53	Woman	19
54	Man	26
55	Woman	15
56	Man	21
57	Man	28
58	Man	31
59	Man	23
60	Woman	77
61	Man	24
62	Woman	27
63	Woman	18
64	Man	53

## Appendix G. Statement on the use of AI

For this research, Microsoft Copilot was used in several ways to enhance writing and provide support throughout the research process. This means that it helped to improve the clarity and fluency in academic English by proofreading, and it assisted in the translation of Dutch quotes to English quotes. Moreover, especially during the beginning of the research, it helped to explore alternative formulations of research themes and topics and create structure in the creative process of developing a research direction. Regarding the organizational process, Copilot helped to create planning overviews and summarized procedural steps and deadlines. Concerning the interviews with experts, Copilot helped summarize and provide overviews of the key points of the transcripts. In the final stages of the research, Copilot provided mostly feedback.

Copilot was not used to replace the intellectual, analytical and methodological aspects of this research. Therefore, all decisions concerning the research design, theoretical framework, methodological approach, data collection, analysis, interpretation, and conclusions, were made by the researcher. In addition, when text was rewritten by Copilot, this mostly served as inspiration for how to structure the text and was critically examined by the researcher. When suggestions by Copilot were included in the research, they were critically adapted and reviewed to ensure the academic integrity of this research.

Copilot does not save the prompts that were asked and does not provide a link-based history of previous interactions. Therefore, the prompts that were used are reconstructed below.

### Writing support

- Can you improve the structure and order of this piece of text?
- Can you shorten this piece of text?
- Can you give feedback on this piece of text? And what should I improve?
- Rewrite this in academic English.
- Can you check this piece of text for grammar, spelling and coherence?
- Write an email in which I (XYZ).
- What parts of my Research Proposal can I use for the final research report?
- Which parts of this piece of text are repeated?
- How did I use Copilot?

### Translations

- Can you translate this Dutch quote to English?
- Improve this English translation of a Dutch quote while keeping the meaning of the quote.

### Brainstorming

- What are possible research questions regarding these (XYZ) topics?
- What is a possible academic knowledge gap that I can work on regarding (XYZ) topics?

### Research process support

- Can you help me to make a sufficient planning schedule? And what are important deadlines?
- What are helpful ways to keep track of my progress?
- How can I make this file into a Microsoft Excel file?
- Can you help me with how I can work with Atlas.TI?
- Can you help me figure out (XYZ) function in Microsoft Word?
- Did I miss anything from the Thesis Course Manual that I should still integrate in my research?
- What do I need to prepare for the Go/No Go meeting according to the Thesis Course Manual?

### Research content support

- What are the most important themes that emerged during this interview? And can you give me a summary?
- Can you give me an explanation of topic (XYZ)?
- What do you think of these interview questions?
- What are possible categories for generalizing the functions of experts in these fields?
- Is this piece of text a good explanation for this (XYZ) topic?
- Which key points should be included in this (XYZ) chapter? And how can I structure this?