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# The perceived mobility of towns with a contrast in bus frequency

*A study on the inequality and perceived mobility of towns in the Dutch province of Groningen with regard to variation in the frequency of buses per hour.*

**Bachelor Thesis**

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**Abstract**

Perceived mobility based on bus frequency may be different depending on which town is studied. Some towns may be named as low-frequency towns, with one bus per hour passing by. Other towns may be named as high-frequency towns and have multiple buses per hour visiting. The research aim is to understand if this inequality in frequency leads to a difference in perceived mobility. In this study, 24 towns were selected in the Dutch province of Groningen with 12 per frequency group and a survey on perceived mobility and potential measures against inequality of bus frequencies was performed, thus using a quantitative approach. The results show that there is a visible difference in perceived mobility. Respondents from low-frequency towns would prefer an increase in bus frequency, but respondents from high-frequency towns will not accept a lower frequency. Low-frequency towns are more patient but also more pessimistic regarding new possibilities and feel less mobile in comparison to high-frequency towns. A probable solution to help decrease the difference in perceived mobility is to provide more rural buses, which is thought to be reasonably possible by a majority of respondents from both groups.

## **1: Introduction**

### *1.1: Background*

The Netherlands contains a noticeable amount of smaller, rural towns. This is especially true in the less densely populated Northern part of the country, including the province of Groningen. In 2018, approximately 231.000 residents resided in areas outside of the cities (any place over 10.000 inhabitants) within the province, close to 40% of the total provincial population (Brinkhoff, 2024).

Between the villages, there is an inequality when it comes to the frequency of the amount of buses per hour. In selected towns, the bus only drives once every hour and often not in the evening or the weekends. In other selected towns, there are at least two different buses of which at least one bus passes by at a minimum of twice an hour during regular daylight working hours, while these towns very often also have access to public transport in the evening or even the night hours as well as the weekends (OVNL-Wiki, 2024).

An example of this inequality is comparing Meeden and Kiel-Windeweer. The town of Meeden has one bus per hour towards Veendam or Winschoten depending on direction. The bus does not drive in the evenings or weekends. The town has approximately 1.700 citizens. On the other hand, the small town of Kiel-Windeweer has 800 inhabitants, but has two to three buses an hour passing by, connecting the town to four different cities (Groningen, Hoogezand, Veendam and Stadskanaal), despite having almost half the amount of residents compared to Meeden. Additionally, Kiel-Windeweer can be reached on Saturdays and early evenings (OVNL-Wiki, 2024; Brinkhoff, 2024). Towns like Meeden may be called "low-frequency towns", while towns like Kiel-Windeweer may be called "high-frequency towns". Criteria for inclusion and a map are further explained in the methodology.

### *1.2: Central concept*

The central concept of this study is perceived mobility. Perceived mobility is relative to the inhabitants of the towns. To provide an example: two residents live in the same village with a bus passing through every hour. One resident may think it is enough as it connects them to the nearby city. However, the other resident might believe the frequency is not high enough and that the mobility related to the bus is too low. The mobility is in absolute terms the same (1 bus per hour) but perceived to be either adequate or not adequate, depending on the citizen.

### *1.3: Relevance*

The academic relevance lies in the new information provided by research in a very specific area with little attention, as other research on the topic, taking the Bachelor Thesis of Welzen (2011) as an example, tends to focus on places without any connection or comparing rural to urban instead of rural to rural. Research has also been done in rural areas to understand the decline of rural bus connections (Robins, 2017). This study specifically compares rural to rural and towns with unequal levels of mobility, to see if the inequality is so much that it causes a difference in perceived mobility, or whether this inequality is not an important factor and no difference in perceived mobility will be measured.

As for social relevance, a recent plan to scrap a few rural buses around the province of Groningen was met with resistance from the general public (RTV Noord, 2023). It seems that public transport is still seen as important to many citizens, otherwise such a strong reaction would not have happened. An alternative focus is the decreasing number of bus stops in Groningen, mainly in the rural areas. This ranges from disconnecting towns from the bus without an alternative bus stop nearby to increasing the distance between the centre and the closest bus stop. Most reactions to these developments were negative (NOS, 2023).

#### *1.4: Research aim*

This study will research whether there is a difference in perceived mobility of bus-related public transport between respondents of towns with a lower frequency of buses and respondents of towns with a higher frequency of buses. Primary data has been collected by survey in multiple selected towns across the province of Groningen. Additionally, it will look into the possibility of two solutions with the goal of decreasing the inequality in perceived mobility. The plans are to provide more rural buses in low-frequency towns and to experiment with "snellussen", which is translatable to "express buses". These are buses skipping towns, reshaping a high-frequency town into a low-frequency town, but saving time allowing for more buses on busier places, thus increasing urban frequency at the cost of rural bus frequency. The results will show if these plans are acceptable, plausible ideas according to the general inhabitants in rural towns.

#### *1.5: Research question*

The research question would be:

- To what extent does the inequality of the frequency of bus stops in two categories of small towns in the Dutch province of Groningen affect the perception of mobility of the local inhabitants?

Sub-questions are:

- Would the inhabitants of low-frequency towns prefer a higher bus frequency?
- To what extent do the inhabitants of rural towns deem it possible to increase the amount of rural buses?
- Would the inhabitants of high-frequency towns accept a low-frequency connection?
- To what extent do the inhabitants of rural the idea of certain buses connecting larger places, not stopping as often in current high-frequency towns useful?

The research question focuses on the main concept of perceived mobility based on two unequal groups. The first sub-question focuses on low-frequency towns. By asking whether respondents of low-frequency towns would like to turn into high-frequency towns, it may be understood as a signal that more rural buses are wanted which in turn increases mobility. However, the second question focuses on whether the respondents think that more rural buses are possible or not, regardless of their wishes.

The third sub-question focuses on high-frequency towns. By asking whether respondents of high-frequency towns would accept being turned into low-frequency towns, it may be deduced whether residents would permit it or whether it will cause a severe outcry, leading to the express bus plan being undermined and unlikely to be utilised. The final question will see if the express bus plan of buses skipping towns, creating a stronger and faster connection between busy cities at the cost of skipping less busy towns with most buses (therefore turning them into low-frequency towns) is a good plan or a useless plan, regardless of the effect it will have on a high-frequency town itself, as this is the focus of the previous question.

If there is a clear difference in perceived mobility caused by inequality in bus frequencies, the two proposed ideas on decreasing the difference in perceived mobility (more buses in low-frequency towns and/or fewer buses in high-frequency towns) would be concluded in the form of recommendations towards related public bus organisations and governments.

## **2: Theoretical framework**

### *2.1: Introduction to Theory*

A variety of factors makes the concept of inequality related to rural public transport highly complex. Two main concepts were identified as highly relevant to this study, being perceived mobility and inequality. Nevertheless, a multitude of other factors are identified as influencing the concept. While these factors are not calculated as part of the results, they will be considered in the conclusion with regard to the recommendations on the proposed solutions.

### *2.2: Perceived mobility*

Absolute mobility is not a credible measurement. Instead, perceived mobility should be used, as perception is a driving force of many decisions (Bavetta et al., 2017). Due to a variety of factors such as car ownership, age and distance to larger places, it is possible for a town to be highly dependent on public transport or hardly require a bus (Welzen, 2011). Furthermore, perceived mobility is related to perceived transport-poverty, which indicates whether citizens think they have adequate transport methods to move around (Robins, 2017). Additionally, the decrease in the frequency of public transport might be considered as "village-impoverishment" (Devisch et al., 2009). Thus, decreased frequency of buses may lower perceptions of mobility, which is not good for the express bus plan, although it depends on whether the inhabitants actually view it as a problematic decrease.

### *2.3: Inequality*

As found by Ravallion (2005), inequality is damaging and unwanted in a functioning, stable society. However, a certain level of inequality may be justified (von Leyen, 1963). There is usually some difference between cities and towns, as well as smaller and bigger towns, or isolated towns and towns closer to cities, when it comes to inequality (Van Houwelingen et al., 2017). For example: it makes sense that a small, isolated town with high private transport has less access to public transport than a large town forming an important node between a few cities. Therefore, a certain amount of inequality is expected, but too much inequality should cause problems and major differences in perceived mobility.

#### *2.4: Other factors*

Out of the large number of additional factors, a few are notably significant. Politics may play such a role, as the type of government can influence the attention given to public transport (Eerdmans et al., 2009). There is an additional discussion on who is, or should be, (mainly) responsible for public transport: the government funding public transport, society using public transport or the organisations providing the transport (Veldhuizen, 2017).

Privatisation also causes deregulation and a decline in the long term (Bell & Cloke, 1991). If there is little public support for additional rural buses because it is thought that an increase in rural buses will not happen as a starting point, companies will see no reason to invest in more buses as it is too risky and might lead to financial losses (Sauner-Leroy, 2003). Therefore, this leads to a downward spiral of little support from both the public and private sectors.

Health and demography are prominent as well. Due to demographic changes, it is increasingly hard to provide sustainable transport. However, due to the trend of ageing in rural areas, mobility goes down both in absolute terms with fewer buses and relative terms with fewer alternatives of transport, as, for example, cycling is not possible for a senior with age-related physical diseases (Gómez et al., 2021).

A study by Cazemier et al. (2011) found that three factors are the most important in creating suitable public transport for low-density areas, namely financial support, communication between stakeholders and flexible use of both scheduled public transport and on-demand buses. Additionally, not every rural area has the same factors.

#### *2.5: Express bus*

Buses are mainly popular in high-density areas. If it has to move from place to place, it may as well use nodes in between (Bertolini et al., 2019). Despite this, many people who take the bus get out at the same stop in the city centres (Qu & Wang, 2015). Additionally, when a bus skips those towns and only supports the stops between large towns, time can be saved (especially if an alternative faster route can be found, for example over a highway), allowing for a higher frequency if it turns out the people of the towns in between do not always use the bus. An example is former bus line 166 from Groningen (Zernike Campus) to Zoutkamp, which skips many stops compared to bus line 66 which has nearly the same route, but more stops in between (OVNL-Wiki, 2024).

## 2.6: Conceptual model

Figure 1 below provides a conceptual model based on the literature. Starting from the top, both low-frequency towns and high-frequency towns will be compared to determine if there is a difference in perceived mobility between the inhabitants of the town groups. If there is no difference, nothing more has to be done. If there is a difference, the next goal is to look into the possibilities to lessen the difference in perceived mobility. For primary data, the interest and possibility of more buses will be investigated, as well as the acceptance and usefulness of the express bus. Additional factors will be considered as well by secondary data. The final product will be a recommendation on how to decrease differences in perceived mobility between the inhabitants of low-frequency towns and high-frequency towns.

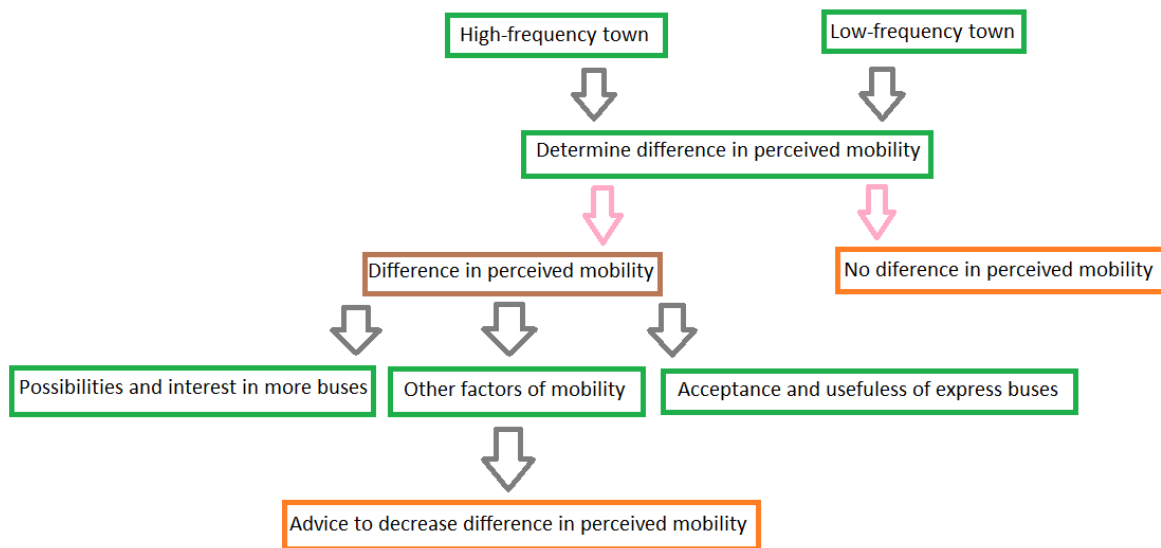


Figure 1: Conceptual model. Source: Author.

## 2.7: Hypothesis

It is expected that the opinions of respondents will differ between low-frequency towns and high-frequency towns. Overall, the expectation is that there will be a difference in perceived mobility between the two towns.

Further expectations are that respondents from high-frequency towns will have a negative opinion about the idea of being skipped, but it is doubtful there will be severe dislike towards the idea among them, as they will still have a connection by bus to other places.

For the low-frequency towns, it may depend on different factors whether the respondents use public transport or not. For example, if there is high car ownership or many respondents are working within the town itself, more rural buses would be futile. Despite this, there is no expectation that the respondents are against the idea of more rural buses as well as a variance between low-frequency towns in terms of other factors.



### **3: Methodology**

#### *3.1: Location*

While the entirety of the Netherlands has a dense public transport network, the research area for this thesis has to be smaller and more specific, to avoid an exorbitant amount of data more suitable for a professional research organisation. Therefore, the research area was the Dutch province of Groningen, which is suitable for two reasons: an expected high amount of suitable towns and the researcher lives in this province, allowing easy physical access to towns and buses if necessary. Initially, the province of Drenthe was considered to be added along with Groningen if it were to be necessary. The three main reasons were the high amount of towns in Drenthe, the proximity to the province of Groningen and the concession which decides the bus lines and frequencies in Groningen-Drenthe, combining both provinces. However, the province of Groningen in itself had enough suitable towns, therefore the research area remained the province of Groningen.

A total of 24 towns within the province of Groningen have been manually selected for data processing. 12 towns have been identified as low-frequency towns and 12 towns have been identified as high-frequency towns. These two categories are where the towns were grouped into a binary variable. There has been no distinguishing between towns, only the two designated groups.

#### *3.2: Criteria for inclusion/exclusion*

The following section details the criteria for inclusion or exclusion:

- Places with over 10.000 citizens are excluded, as they can be considered small cities at this point (urban), nullifying the focus on the rural. Example: Veendam.
- Places with under 500 citizens are automatically excluded, as hamlets this size are unlikely to have any bus stops and data collection may be disproportionately small due to the low population. Example: Pieterburen.
- All places with train stops are excluded as they will interfere with the use of buses, due to the train being an alternative to the bus. Example: Zuidbroek.
- All places with a harbour and public transport boats will be excluded, due to the unique position of being an important connection point which may lead to skewed data compared to other towns. Example: Lauwersoog.
- All places without a bus stop will be excluded because these places are not a subject of interest so useful within this thesis. Example: Ommelandervijk.

After exclusion, a list of approximately 60 towns remained. Google Maps (2024), OV-bureau Groningen-Drenthe (2024) and the detailed OVNL-Wiki (2024) were used to determine routes, bus stops, bus type and bus times. The website CityPopulation.de created by Brinkhoff (2024) provided details of the towns, allowing the researcher to discover if a town is suitable for the population size requirement. The following requirements were made:

- To be classified as a low-frequency town, a town must have one bus line, which drives once per hour. An exception may be made during rush hour if they drive two times per hour. Driving or not driving on the weekend or evening/night did not matter, as it would be too specific and may cause too few available towns for data collection. Example: Meeden.
- Towns which have two bus lines that drive once per hour each were excluded, as it was too much for a low-frequency town, but the goal of high-frequency towns was higher than this. These are medium-frequency towns, which were not included as they were considered at a later stage and would require a full restructuring of the thesis. Example: Nieuwe Pekela.
- A few towns caused complexity with special school buses to Woldendorp (such as line 617), as they only drive four times a day and are meant for high school students at Woldendorp College. However, the bus is still a public bus and non-students may also enter. Due to the extreme low-frequency and specific use, it was decided to not include this bus in research, meaning a low-frequency town may use a public school bus as well aside from a regular bus.
- A high-frequency town needs either at least two buses driving through town of which one has a frequency of at least 2 times per hour outside of late evening hours, or at least three suitable bus lines. Once more, driving or not driving on the weekend or evening/night did not matter. Example: Grootegast.

### 3.3: Selected towns

After a thorough examination, 24 towns were selected after fulfilling all requirements. A list of both groups can be found below (Table 1 & Table 2), while Figure 2 provides a map of the selected towns.

Town:	Population:	Bus line(s):	Notes:
Beerta	2195	17	Do not confuse with line 17 (City of Groningen).
Bellingwolde	2170	12	
De Wilp	1685	89	Smaller eight-person bus.
Finsterwolde	2405	17	Do not confuse with line 17 (City of Groningen).
Lutjegast	1105	101	Frisian bus, often drives only once per two hours.
Meeden	1710	13	
Midwolda	2055	17	Do not confuse with line 17 (City of Groningen). Uses schoolbus 617.
Onstwedde	3005	14	
Oostwold	1420	17	Do not confuse with line 17 (City of Groningen). Uses schoolbus 617. Do not confuse with Oostwold in Westerkwartier.
Wedde	1270	14	
Westerlee	1520	13	
Zevenhuizen	2800	85	

Table 1: Low-frequency towns. Source: Author. References applied: Brinkhoff (2024); OV-bureau Groningen-Drenthe (2024); OVNL-Wiki (2024).

Town:	Population:	Bus line(s):	Notes:
Aduard	2095	2, 35, 39	
Grootegast	3470	39, 101, 133, 139	Bus 101 is a Frisian bus.
Harkstede	3245	5, 516	
Kiel-Windeweer	855	107, 171	
Leens	1665	65, 66, 68, 163, 565	Bus 66 is similar to a school bus, 4 trips per day.
Marum	6125	89, 304, 589	
Musselkanaal	7345	73, 74, 75	
Ten Boer	4630	6, 406, 563, 564	Bus 406 is a night bus.
Ten Post	805	6, 406, 564	Bus 406 is a night bus.
Ter Apel	9830	42, 72, 73, 173	Bus 173 is during rush hours only.
Ulrum	1330	65, 66, 163	Bus 66 is similar to a school bus, 4 trips per day.
Wehe-den Hoorn	705	65, 66, 68, 163, 565	Bus 66 is similar to a school bus, 4 trips per day.

Table 2: High-frequency towns. Source: Author. References applied: Brinkhoff (2024); OV-bureau Groningen-Drenthe (2024); OVNL-Wiki (2024).

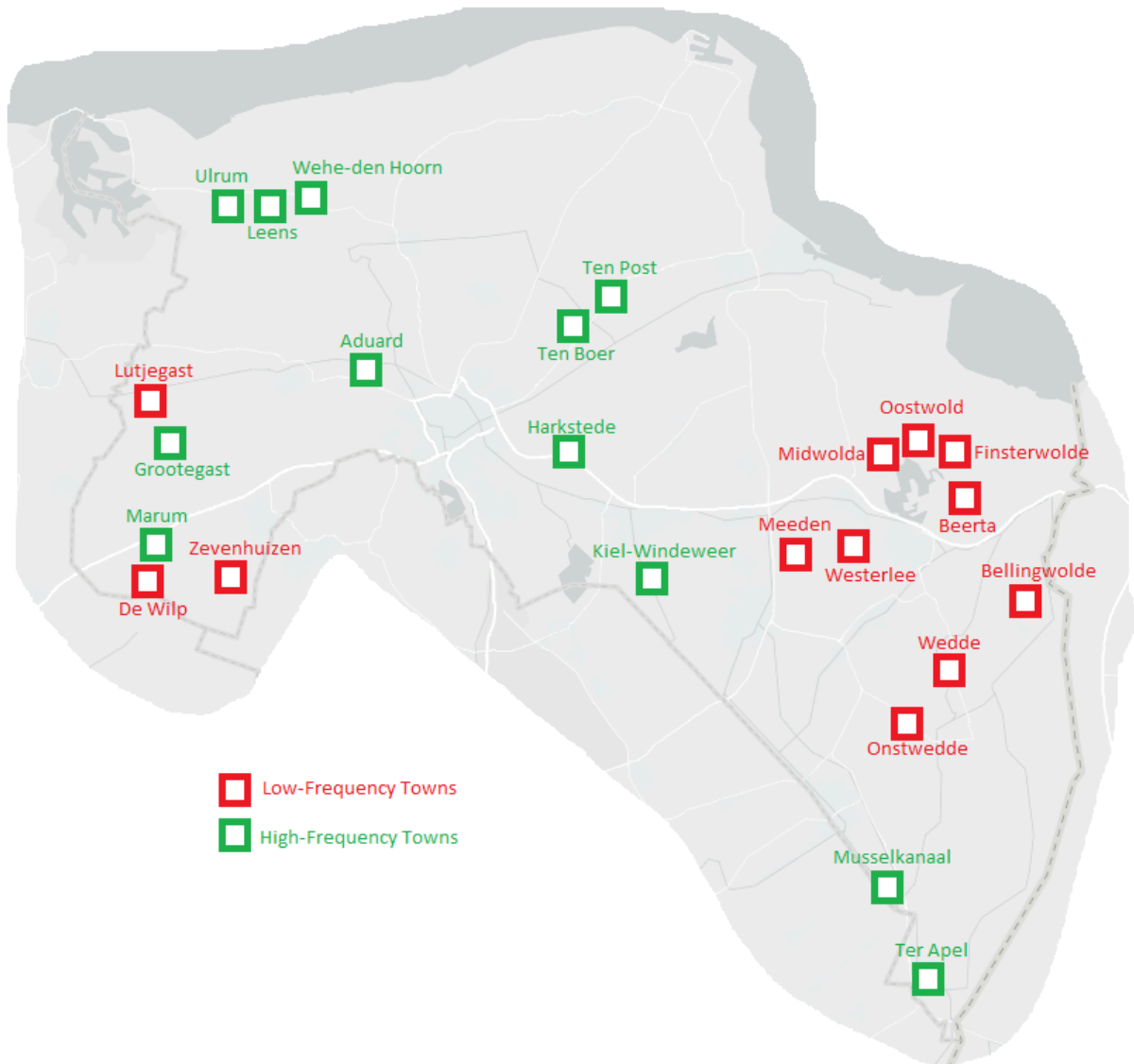


Figure 2: Map of selected towns. Source: Author. Made with ArcGIS and Paint.

### 3.4: Data collection

All eligible towns subsequently have been sent surveys, which the locals of a selected town may fill in if they decide to participate. The data is quantitative, as the required questions are answerable on an ordinal Likert scale, making a qualitative, in-depth interview less advantageous compared to a survey.

The respondents that are sought after only have to live in a selected town. No requirements such as age were requested. Additionally, the survey was allowed to be filled in by people who do not take the bus on a regular basis, as the questions were written in a "what-if" scenario, allowing the citizens to participate. This was done to increase the number of respondents, although it may have led to skewed data.

The survey was spread via social media, mainly Facebook and Instagram. If this would not have been sufficient, paper copies would have been made and physically spread in the selected towns. However, this was not necessary as there were enough respondents within the chosen time limit before surveys would be spread physically.

### *3.5: Survey questions*

First, two optional questions were asked for an overview to check if there may be skewed data (location of town and how often the respondent takes the bus). Five questions were asked for both groups, with one being different depending on the group, related to the solutions of more/less buses. The questions were all asked on an ordinal Likert scale ranging from 1 to 5 and being described as "no problem/I love it" to "very annoyed/I hate it".

The first two questions asked how annoyed the respondents would be if they had to wait 15 minutes for the bus and if they had to wait 60 minutes for the bus. This question would check on patience, with a difference possibly showing signs of inequality in perceptions, including perceived mobility.

The third question differs per group. The low-frequency town respondents were asked if they would like more rural buses, whereas the high-frequency town respondents were asked if they would dislike fewer buses in their town.

The next two questions were asked towards respondents of both groups, for comparative reasons. The fourth question asked whether respondents think it is possible to get more rural buses to be utilised, while the fifth question asked whether respondents think the use of express buses is a useful idea or useless idea.

Finally, an option was given to write additional comments, which allowed everything from statements on the survey to their bus frequency related problems or praises.

### *3.6: Ethics*

No personal data was solicited, except for the town of residence, which was an optional question. The research purely focused on people's perceived mobility by bus. The survey did not ask for specific bus lines or end destinations either.

Nobody was forced to fill in anything against their will and could stop with the survey at any moment. The data from the surveys was measured via Google Forms and safely stored on the home computer, which has a password and protected private wifi for home use only. It has never been opened on a laptop or phone which often connects to public wifi. In the case of physical surveys, there would have always been a capable person making sure the data is safely stored before it would have been entered into the computer programs, after which the original papers would have been destroyed. If somebody wanted to have their data removed for any reason, it would be done without questions. An email address was provided to reach the researcher in case of later questions or objections.

Finally, there was no coercion into specific opinions or judgements in any form. A volunteer shall never be contacted again unless it is about a data breach, which would happen publicly as there are no ways to contact them privately.

### 3.7: Data analysis

The data used is quantitative primary data. Additional mixed secondary data has been used in the theoretical framework and the conclusion.

A data analysis has been performed by using a Mann-Whitney U test after recoding the data into suitable numeric variables in SPSS. A total of 80 respondents have filled in and sent the survey. 50 respondents for the survey related to high-frequency towns while there are 30 respondents for the low-frequency towns survey. While there were enough respondents, there was no normality, thus making a non-parametric alternative necessary compared to an ordinal logistic regression. Additionally, descriptive statistics are created in the form of bar charts and pie charts along with explanations.

## 4: Results

### 4.1: Statistics

The null hypothesis is "there is no difference between the two groups in the frequency a respondent takes a bus, their annoyance on having to wait a quarter of an hour, their annoyance on having to wait an hour, their opinion of the possibility of more rural buses, their opinion of the usefulness of express buses and their opinion on a change in bus frequency." We assume an  $\alpha$  of 5%.

In the results as seen in Table 3, both the quarter and hour annoyance levels are statistically highly significant, therefore showing that there is a difference between the patience of the locals in low-frequency towns and high-frequency towns, which signifies a difference in perceived mobility. Additionally, there is a difference in perception of the usefulness of express buses with a significance of 0,005. Furthermore, there is a difference in perception between the plan of more rural buses and fewer buses in high-frequency towns, signifying either of the groups supports their idea whereas the other group does not. There is no difference in neither their outlook on the possibilities of more rural buses nor their frequency of taking the bus.

Test Statistics <sup>a</sup>						
	Take_bus	Quarter	Hour	More_pos	Plan_pos	MorePlan
Mann-Whitney U	598,500	53,000	11,500	607,500	482,500	41,500
Wilcoxon W	1063,500	1328,000	476,500	1882,500	947,500	1316,500
Z	-1,675	-7,074	-7,985	-1,598	-2,777	-7,239
Asymp. Sig. (2-tailed)	,094	<,001	<,001	,110	,005	<,001

a. Grouping Variable: Town

Table 3: Mann-Whitney U test statistics. Source: Author, SPSS.

#### 4.2: Annoyance with waiting times

The following bar charts provide information on the perception of waiting times in both groups. As seen in Figure 3, half of the respondents in low-frequency towns stated they would not be annoyed and no respondents will be more than just "annoyed" with level 3 as the highest marked response. On the other hand, there are high-frequency town respondents who will be more annoyed and generally, they are more annoyed than usual. However, no respondent on either side is maximally annoyed.

### 15 minutes waiting time

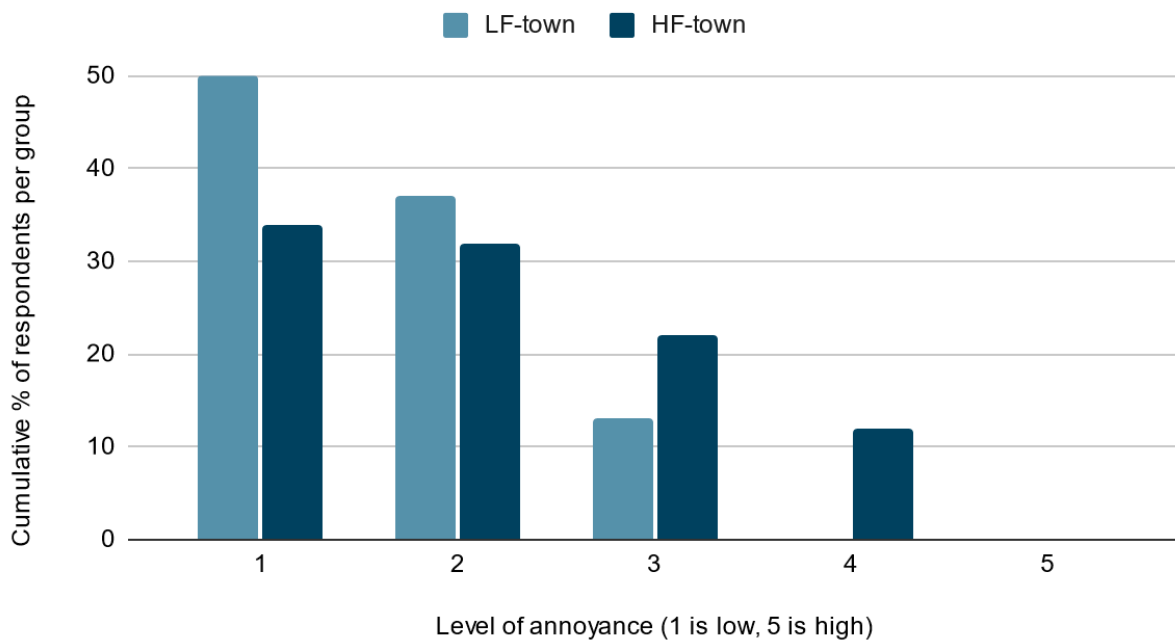


Figure 3: 15-minute waiting time comparison. Source: Author.



In Figure 4, the bar chart shows the annoyance of having to wait an hour for the next bus. While there is no respondent who stated that they have no problem with waiting, one high-frequency respondent is not that annoyed, which makes this respondent stand out. While both groups grow exponentially and the majority in both groups will be very annoyed, the level of annoyance by respondents is overall lower in low-frequency groups than high-frequency groups.

### 60 minutes waiting time

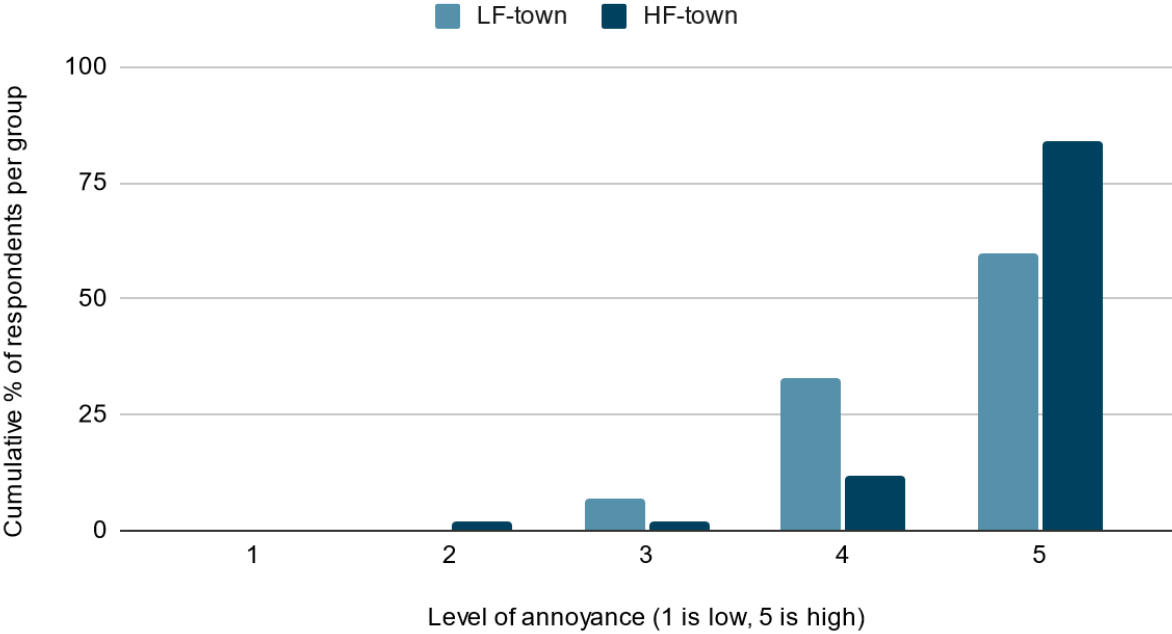


Figure 4: 60-minute waiting time comparison. Source: Author.

#### 4.3: More rural buses

The question of whether respondents from low-frequency towns want more rural buses is represented in Figure 5. Not a single respondent stated that they are against more buses. 23% are neutral, 37% think it is a good idea and 40% think it is a very good idea to add more buses.

Would you like the bus to drive more often than 1x/hour?

30 respondents

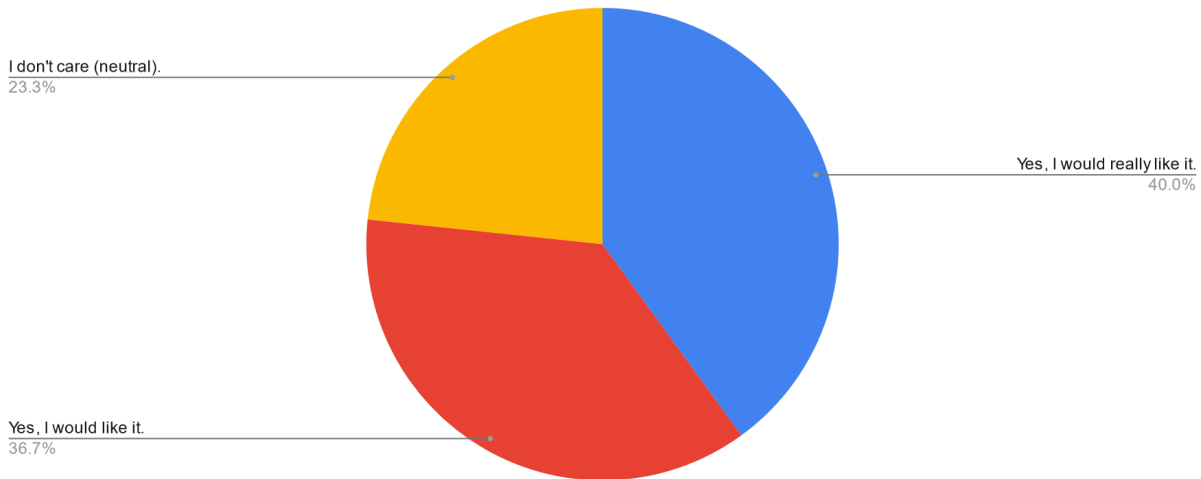


Figure 5: Preference for more rural buses. Source: Author.

#### 4.4: Acceptance of express buses

Figure 6 shows the results of the sub-question on whether respondents from high-frequency towns would accept a lower frequency. A polar opposite to Figure 5, only 2% of the respondents would not find it a problem and 10% are neutral. 38% dislike the idea whereas 50% are fiercely against the idea.

Imagine that buses will drive less often or take a different route, which will mean your town gets skipped, making your frequency permanently like the previous question with a single bus once per hour instead of the former 15 minutes. Would you find this bad?

50 respondents

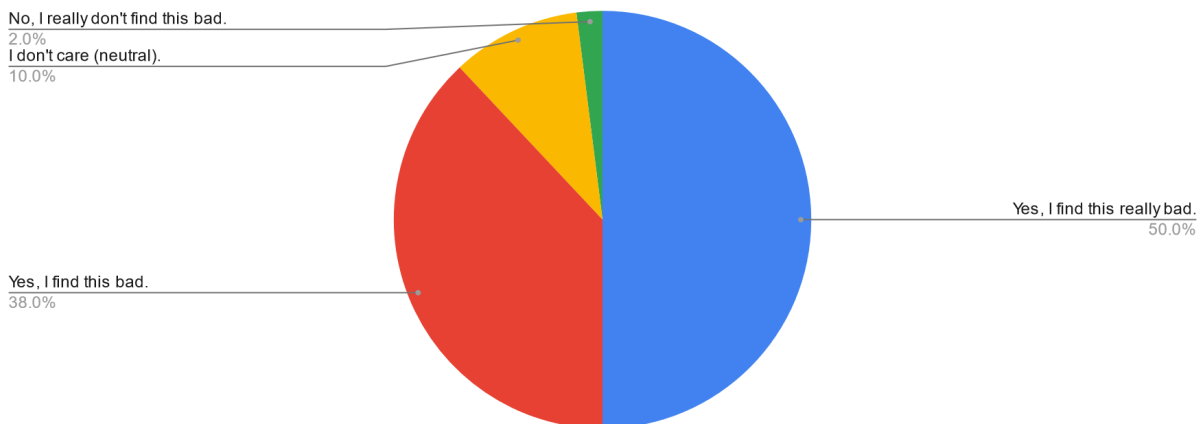


Figure 6: Preference for express buses. Source: Author.

#### 4.5: Possibility of more rural buses

Figures 7 and 8 will respectively provide the opinions of low-frequency towns and high-frequency towns regarding their perceived possibility of rural buses being implemented more. Both groups are similar, though there is a slightly higher pessimistic view among the respondents of low-frequency towns. Additionally, no respondent from either group thinks it is truly impossible to have more rural buses.

Do you think it is possible to supply more buses in the rural areas?

30 respondents

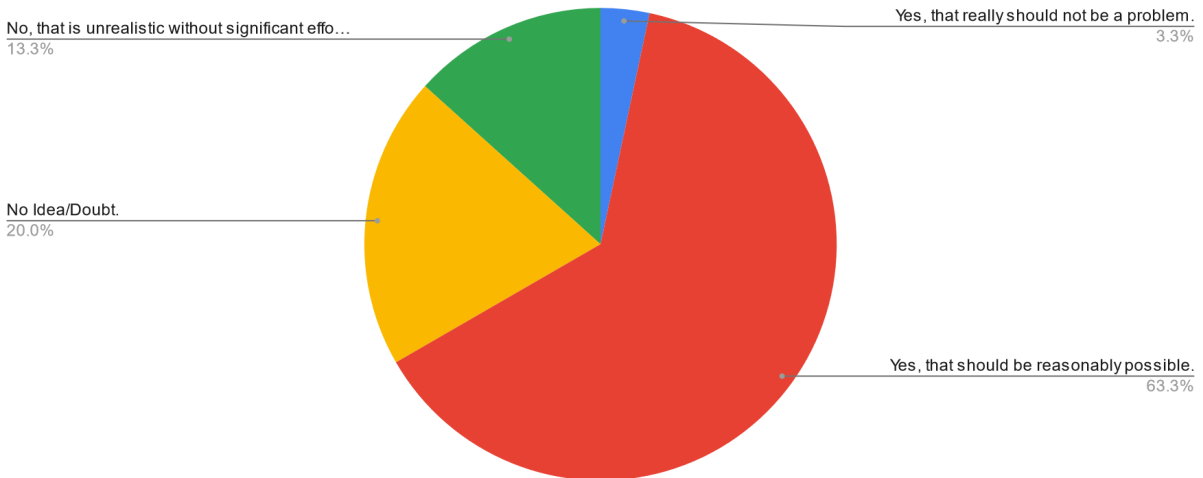


Figure 7: Possibility of more rural buses (low-frequency towns). Source: Author.

Do you think it is possible to supply more buses in the rural areas?

50 respondents

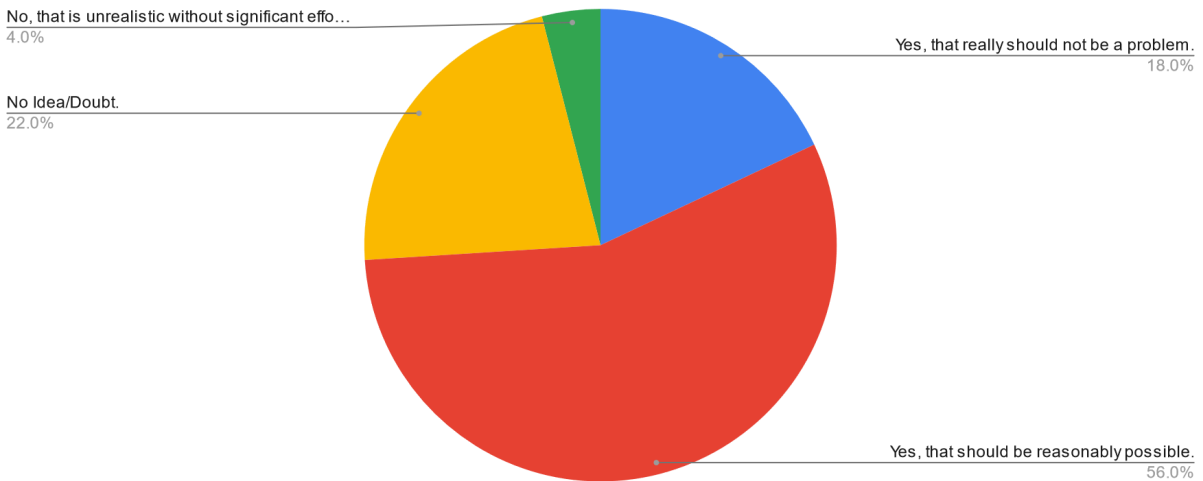


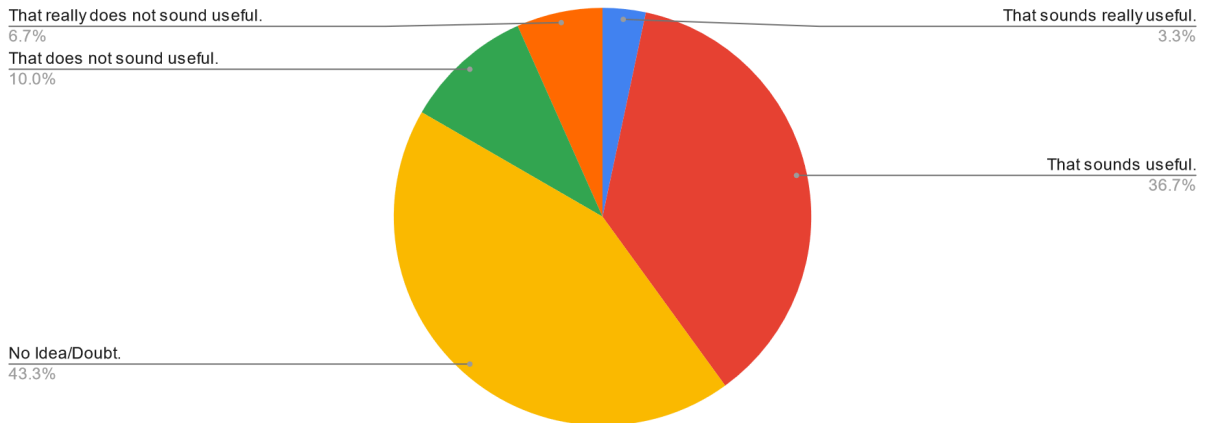
Figure 8: Possibility of more rural buses (high-frequency towns). Source: Author.

#### 4.6: Usefulness of express buses

There is a clear difference in perception on the usefulness of express buses between low-frequency towns and high-frequency towns, respectively seen in Figures 9 and 10. Of low-frequency towns respondents, 40% think it is useful, 43% are neutral and 17% think it is useless. The opposite is true among respondents of high-frequency towns, as 16% think it is useful, 34% are neutral and 50% think it is useless.

Regardless of how it would influence your town, do you think it will have any use for a better and/or faster connection between larger, busier places and stops (usually within the larger places connected by the buses)?

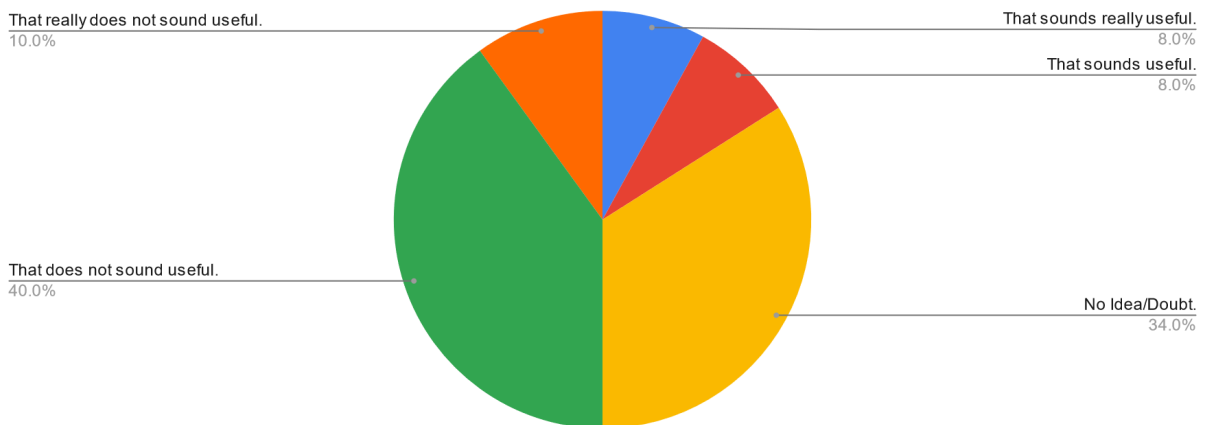
30 respondents



**Figure 9: Usefulness of express bus (low-frequency towns). Source: Author.**

Regardless of how it would influence your town, do you think it will have any use for a better and/or faster connection between larger, busier places and stops (usually within the larger places connected by the buses)?

50 respondents



**Figure 10: Usefulness of express bus (high-frequency towns). Source: Author.**

#### *4.7: Additional relevant comments*

Finally, a few additional comments were left. Respondents from low-frequency towns noted that they have trouble taking the bus if they want to reach healthcare or any educational institute above primary schools, especially during weekends or evenings. One respondent from the high-frequency town noted that the express bus plan seems to be useless as the bus already rarely stops in those towns. No comments from the high-frequency towns were negative about their state of mobility.

### **5: Conclusion**

#### *5.1: Conclusion*

The statistical significance of the survey question of waiting for the bus, as well as the results of the descriptive statistics, signify that inhabitants of low-frequency towns are more patient than inhabitants of high-frequency towns. A difference in patience might be a sign of a difference in perceived mobility, although it may also be related to justified inequality with inhabitants being used to and expecting higher waiting times.

However, it is clear that more rural buses are wanted in low-frequency towns, which, combined with additional comments on the trouble with the frequency and a lack of complaints in high-frequency towns, signify that inhabitants of low-frequency towns are perceiving their mobility as low, more so than inhabitants in high-frequency towns.

The express bus plan is thought to be useful by low-frequency town inhabitants but the opposite by high-frequency town inhabitants, showing a difference in perception of this plan. As the express buses would mainly affect the high-frequency towns, combined with their inhabitants' negative perception of both the plan itself and its usefulness, it is unlikely that express buses are a solution and will only worsen the perceived mobility of inhabitants of high-frequency towns. This may lead to less inequality compared to low-frequency towns, but overall lower mobility is not wanted, as protests already occurred over similar plans that lower mobility and it leads to the aforementioned village-impoverishment.

From additional comments, it seems that health and education play a pivotal role, with physically infirm senior citizens and teenage students not able to drive a car and living too far to use a bicycle, making them dependent on public transport. Additionally, the inhabitants of low-frequency towns seem more pessimistic about the possibility of more rural buses, possibly showing a distrust towards the organisations behind it (provider/government).

#### *5.2: Recommendations*

It is recommended to experiment with more rural buses in low-frequency towns, while not using express buses at the cost of normal buses. This should provide a decrease in inequality as well as perceived mobility. With a large amount of support from inhabitants of both groups, the organisations behind public bus transport should not have to worry about negative reception or little use of the additional buses, likely leading to an attractive investment.

### *5.3: Future research*

Other factors such as finance and politics are also bound to play a role, but in this study, it did not have a focus and was not mentioned by any respondent. Future research may look into other factors and their influence. Non-academic, practical research can be done by providing more rural buses and asking respondents from the same towns if their perceived mobility has changed, as well as making sure if it is financially profitable and enough use to be considered useful.

## **6: Discussion**

### *6.1: Discussion*

The research question is "To what extent does the inequality of the frequency of bus stops in two categories of small towns in the Dutch province of Groningen affect the perception of mobility of the local inhabitants?" According to the results, there seems to be a difference in mobility, with respondents from low-frequency towns rooting for more buses whereas respondents from high-frequency towns are jubilant with the current frequency, not willing to let go of it.

The results are mostly in line with the hypothesis as there is a difference between the two groups. Furthermore, the respondents from high-frequency towns were expected to not agree with express buses. Additionally, many respondents thought it was useless, even if it would not harm their own town. The reception was more negative than expected, with a large group fiercely against the idea. Respondents from low-frequency towns were supporting the provision of more buses, with even more support than initially expected.

### *6.2: Strengths and weaknesses*

A strength of this research is the decent number of respondents, though the high number of people who do not or rarely take the bus (over 80%), may have skewed the data. However, by providing scenarios making the respondents dependent on the bus, the skew is slightly annulled. One weakness is the limited number of questions. This was done deliberately to make it more attractive but does undermine the strength of the results. Additionally, a few references are relatively old, leading to possibly outdated conclusions based on the literature review. However, most of the gathered primary data shows a current perspective of relevant areas.

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## **Appendices**

Survey in Dutch for low-frequency towns:

[https://docs.google.com/forms/d/177gtdYjH4aOPiz5\\_xCye5yGFiSxgQZhDA97C6A6kCDI](https://docs.google.com/forms/d/177gtdYjH4aOPiz5_xCye5yGFiSxgQZhDA97C6A6kCDI)

Survey in Dutch for high-frequency towns:

<https://docs.google.com/forms/d/1wil1dloN-qiaJghSXbMHsdEdztyWY8jDcFFum7i4V-E>

Responses in Dutch for low-frequency towns:

<https://docs.google.com/spreadsheets/d/1LcZm-rQ30nIakht3X0zQya2-nwNc12qlm4oizvithRk/edit?resourcekey#gid=1335915383>

Responses in Dutch for high-frequency towns:

<https://docs.google.com/spreadsheets/d/127e0pl7MAiTQiVHWcGB1smKiXjtiJZDBsNrvDx6k-2E/edit?resourcekey#gid=1705687664>

Survey in English for low-frequency towns:

[https://docs.google.com/forms/d/1UschIU8MbtazD2z6NSESk8y\\_xYzCxGOKzXUX4f9r29E](https://docs.google.com/forms/d/1UschIU8MbtazD2z6NSESk8y_xYzCxGOKzXUX4f9r29E)

Survey in English for high-frequency towns:

[https://docs.google.com/forms/d/1tLzUJo-qrV18uQt1FUK61StIC\\_IncZKTtSpajQFht5M](https://docs.google.com/forms/d/1tLzUJo-qrV18uQt1FUK61StIC_IncZKTtSpajQFht5M)

Ethics template:

[https://drive.google.com/file/d/1MBfU8C\\_MDRVBsH0ZcyOsWkCmUH11Nho6/view?usp=drive\\_link](https://drive.google.com/file/d/1MBfU8C_MDRVBsH0ZcyOsWkCmUH11Nho6/view?usp=drive_link)

SPSS files:

[SPSS Syntax](#)

[SPSS Output](#)

[SPSS Data](#)