

Commuting by motorcycle?

The perception of riders and non-riders in the Netherlands

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Summary

In the Netherlands, motorcycle license and motorcycle ownership has decreased under the working population in the last years. While commuting with a motorcycle could bring benefits in modern day traffic, the motorcycle is not being chosen over alternative commuting modes. Not much literature is available on this topic, and the motorcycle is mostly not even seen as a full-fledged mode of transport. The most discussed topic about motorcycling is the aspect of safety, and this is the suggested reason to explain the observation of the decrease in motorcycle and license ownership.

The results of this thesis show that the opposite is true for motorcycle riders, with just 9% of them stating that safety is a reason not to commute by motorcycle. Moreover, it appears from the literature that riders seem to have a quite good perception of the risks that come with motorcycling. The reasons that do seem determinative for not choosing the motorcycle for commuting are all in the context of practicality.

Non-riders on the other hand do not seem to have a correct perception of the risks of motorcycling. They rate the safety of travelling by motorcycle lower than riders do, but fail to put it in a right perspective with respect to other commuting modes. Next to this could it be that the image of motorcycling they have does not help to promote this way of transport either.

1. Introduction

In figure 1 can be seen that motorcycles and mopeds account for 15% of all road vehicles in the Netherlands. But, from the 12 million vehicles in total only 655.991 of these were motorcycles, which is around five percent (CBS, 2018).

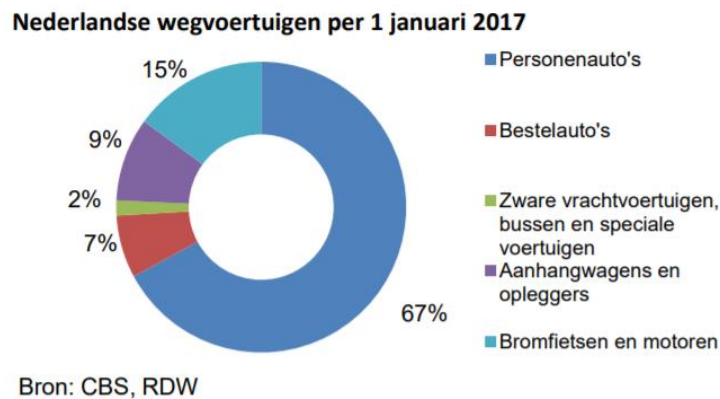


Figure 1: Dutch road vehicles by type. Source: CBS, RDW.

Following the latest CBS/RDW statistics about the motorcycle- and license ownership in the Netherlands, it can be seen that people above the age of 50 years old owned more motorcycles in 2018 than in 2014, as where people with the age of 18-50 years old owned less motorcycles in 2018 than four years before. For the same timespan there was taken a look at the ownership of a motorcycle driving license, which showed the same trends. For the age categories of 50-65 and 65+ the change in motorcycle license ownership was respectively a 17% and 4% increase. For the age group of 18-50 this was a 13% decrease in the period 2014-2018 (CBS, 2018).

If then is looked at the working population, the age groups that have risen in motorcycle and license ownership are only a small part of this working population, and the largest part of the working population, in the age categories up to 55, belong to the group where motorcycle and license ownership has decreased (CBS, 2016A).

Only a small percentage of all road vehicles in The Netherlands are motorcycles, and following the above there is a trend under the largest part of the working population -the people who commute- going on of owning less motorcycles and motorcycle licenses over the last four years. Using a motorcycle for commuting could bring benefits, such as the ones mentioned by Pitch & Reimer (2012) 'relatively small vehicles enable greater freedom of movement and potentially could help reduce congestion and the need for large parking infrastructures'. Now the question arises how the ongoing trend as described above could be explained together with the fact that such few people use the motorcycle for commuting at all, although it could bring benefits. Not much literature exists on the topic of motorcycles as a transport mode, and as Pitch & Reimer (2012) state in their paper introducing

the motorcycle as a part of the concept of ‘automobility’; ‘one form of mobility circulating within this system appears to be missing from the literature of automobility altogether – the motorcycle’. They notice that it is ‘more than a little ironic’ that the motorcycle as a mode of transport is invisible in the literature, because one of the most common accidents involving motorcyclists in advanced industrial economies are accidents where motorcyclists were ‘invisible’ for car drivers (Maxwell, 1998). Subsequently, the topic of the safety of motorcyclists and accidents involving motorcyclists is what is most discussed within the area of motorcycle transportation (see for example Zettas et al., 1979; Wick et al., 1998; Robertson et al., 2002; Aare and Von Holst, 2003; Clarke et al., 2004). Since this topic has most research interest it will be interesting to see if the safety of motorcyclists could also be the reason for the ongoing trend as described above.

The risk for riders of motorized two-wheelers in the Netherlands is higher relative to other transport modes, especially the mortality risk for motorcycle riders is relatively high. See figure 2.

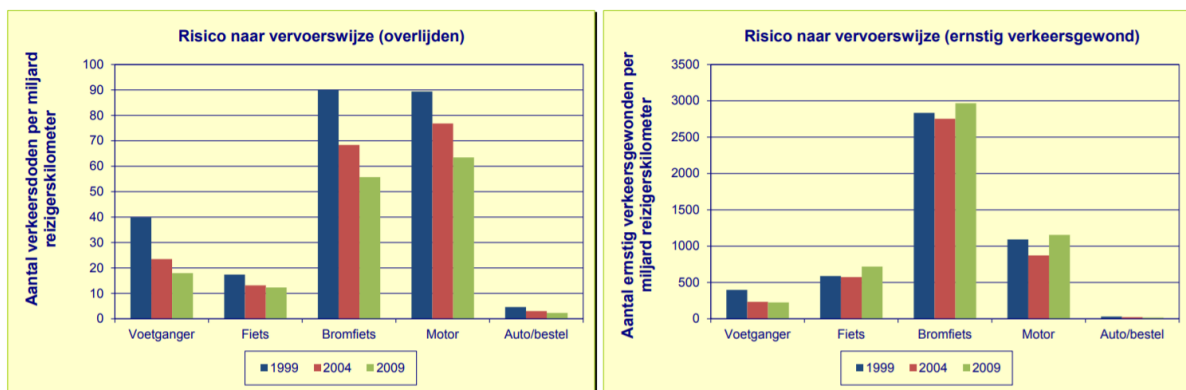


Figure 2: Number of road deaths and serious road injuries per billion passenger kilometers respectively in the Netherlands for different modes of transport. Sources: CBS, IenM and Dutch Hospital Data (DHD). From: SWOV Factsheet Risico in het verkeer.

The above figure gives the facts about the risk for motorcycle riders in traffic. But, because of the seriousness of accidents with motorcycles such as the severity of the injuries as discussed in Robertson et al. (2002); ‘the motorcyclists were more severely injured, had more extremity trauma, and a higher mortality rate’ (with respect to accidents with cars), or because of the relative high risk of fatality (figure 2) people can have a different, likely a worse perception of the risk motorcycle riders are being exposed to in traffic. It is therefore also needed to know how people see and respond to certain risk, as Slovic (1987) stated. In other words how people perceive this risk, because this might also play a role in the reasoning of people not to use a motorcycle.

1.1 Aim of the study and research question

This thesis consists mainly of two parts in order to try and explain the trend of less motorcycle use under the working population in The Netherlands, firstly by looking at the non-motorcycle riders

and how their perception of travelling by motorcycles is and secondly the motorcycle riders, how they perceive and experience travelling by motorcycle. The main question is therefore formulated as follows:

To what extent does the perception motorcycle- and non-motorcycle riders have prevent people from using this mode of transport for commuting?

1.2 Structure of the thesis

In the next chapter will be continued with the theoretical framework where general insights from the existing literature relevant for this paper will be discussed. In section 2.5 the formulated research questions to help give an answer to the main question will be discussed and explained. In chapter three the data will shortly be examined and after this the results will be discussed in chapter four. Thereafter in chapter five conclusions will be formed. At last the limitations of this paper and suggestions for further research will be discussed in chapter six.

2. Theoretical framework

The term motorcycle has been reviewed a lot already in the above writing, but a clear definition has not yet been given. For this paper a motorcycle or motorbike is a powered two-wheeler which is not seen as a moped in terms of the Dutch law; the *Wegenverkeerswet 1994*. A powered two-wheeler is defined as a moped when it is restricted in speed and power to a maximum of 45 kilometers an hour, a maximum cylinder capacity of 50 cm³ or a maximum engine power of 4 Kilowatts (Art. 1e lid a, *Wegenverkeerswet 1994*). Because mopeds have these characteristics they are comparable to the usage characteristics of a bicycle (Susilo & Maat, 2007) and therefore not relevant for this paper. Every two-wheeler with a higher construction speed or larger engine therefore is considered a motorcycle. This definition is used because this paper focusses on motorcycle riders in The Netherlands only and therefore seems most appropriate.

2.1 Individual benefits versus costs

As mentioned in the introduction the chance on serious or fatal injury is higher for motorcycles than for other commuting modes. When riding a motorcycle a person takes a higher risk than a person driving a car. A motorcycle is smaller making it less visible, is faster and needs less room so is more quickly overlooked and has simply less protection than someone inside the 'cage' of a car, which can probably explain a part of the accident statistics for motorcyclists. Accidents caused by a car driver

failing to see the motorcycle are in 'post industrialized economies' therefore one of the most common accidents (Maxwell, 1998). On the other hand can travelling by motorcycle bring benefits, but given the share of people using a motorcycle for commuting the benefits seem not to weigh against the costs. As mentioned above it is also important how people perceive a risk (Slovic, 1987) because this is important for how this risk is eventually reflected in their behavior. Subsequently a key factor in how a person perceives a certain risk is how this persons attitude is towards a certain risky action (Sjöberg, 2000). Therefore this section will continue with what is in the -little available- literature on the subjects of the motorcycle and its rider to see what the general attitude in the literature towards these are, because one's attitude towards 'the motorcycle rider' could be of influence on a person's perception and weigh in the 'costs' as described above. Thereafter the literature on the safety of motorcycles in traffic will be reviewed shortly as well as what the literature says about commuting in The Netherlands. To complete the theoretical framework the hypotheses will be discussed and explained.

2.2 Image of motorcycling

Just as there is little literature about motorcycles as a mode of transport, there is even less academic literature on motorcycle riders. Maxwell (1998) wrote that in the US were up to 10 million motorcycle riders but, 'despite these numbers social scientists have virtually ignored the phenomenon'. This paper mentions only one other study on the topic of motorcycle riders, which is about an outlaw motorcycle gang. It also mentions that journalists on the other hand have not ignored 'the phenomenon' of the motorcycle rider, but that they have focused on the stereotype of outlaw bikers. Another study, of Schouten and McAlexander (1995), studying subcultures by their consumption, has taken a look at Harley Davidson owners. And this does also fit into the stereotype stimulating way of defining motorcycle riders. One could argue that these studies could be put away as dated and therefore not representative anymore, but on the other hand recent media reports on the topic of motorcycle riders in The Netherlands are focused on one aspect only; outlaw motorcycle gangs. The ban on motorcycle clubs 'No Surrender' and 'Bandidos' for example (NU.nl, 2018A) have a lot of media attention, as well as the prosecutions of their former leaders (for example: NU.nl, 2018B and NU.nl, 2018C). If this is the image the broader audience gets to see of motorcycle riders, or in this context mostly referred to as 'bikers', this will in all probability be of influence on the attitude people have towards motorcycles and their riders. On the other hand this stereotyping of motorcycle riders as risk takers can also be looked at from the opposite point of view as Mannering (1995) does, who states that because of the dangers which come with riding a motorcycle this 'may tend to attract risk-seeking individuals in all age and socioeconomic categories' (Rothe and Cooper, 1987 as described in Mannering, 1995). And as a consequence of this the 'sample of motorcycle operators may be more

likely than the general population to be involved in accidents', in other words this paper implies that it could be true that motorcycle riders are larger risk takers than the general population.

2.3 Accidents

Following the fact that motorcyclists are exposed to a higher risk on serious or fatal injury relative to other forms of travel, it is a logical consequence that there is a lot of research interest in motorcycle accidents and the injuries following from these accidents. Chesham et al. (1993) reviewed the literature on motorcycling safety from the 1970's up to the 1990's, and concluded that for the first decade the emphasis was on accident analysis, which later shifted to analyzing the process of motorcycle riding. A third period is described as developing in the 1990's where 'the main concern is to use riders' beliefs and attitudes about safe riding to predict their behavior on the roads and so their accident involvement'. For more recent years it seems two main directions on motorcycling safety research can be distinguished. A lot of papers are from a medical point of view, for example Robertson et al. (2002) researching spinal injury patterns, or Zettas et al. (1979) examining general injury patterns from motorcycle accidents. This part of the research is mostly about the consequences of motorcycle accidents, whereas the other part focusses mainly on the cause of accidents and is more from a traffic engineering point of view, with the aim of constructing policy advice for improving traffic safety.

One of the most comprehensive and recent studies of motorcycle accidents is the report of Clarke et al. (2004), from another Western-European country and a region quite similar to The Netherlands in the context of this paper. They examined a database of motorcycle accidents from the Midlands in Great Britain and a questionnaire held under British motorcyclists. In this way not only could be looked at the accidents statistics themselves but it could also be compared with the view of motorcyclists. They saw a perception of the motorcyclists that differed from the accident statistics. A lot of causes for accidents in the database involved risk taking, and they found that respondents to the questionnaire too mentioned risk taking as causes for accidents, and mainly on the part of the motorcycle riders and not for other road users. Multiple categories of causes for accidents are examined and causes such as losing control on bends, motorcycle maneuverability (filtering through traffic for example) or head tail collisions are all classified as partly or fully blamable on the motorcycle rider. But following the figures from the database, a large share of the accidents is not to blame on the riders, 38% of the cases included right of way violations and in these type of accidents more than 80% of the time it was to blame on the other party involved in the accident (Clarke et al., 2004). On the other hand, a quarter of the riders pointed out driving 'too fast for conditions' in contradiction to driving above the speed limit (which 58% of the respondents said to do frequently or always, and the rest said to do occasionally) is a major cause for accidents. And in this case the respondents did had a correct perception, as this was in line with findings from the accident statistics (Clarke et al., 2004).

These findings are in line with the study of Mannering and Grodsky (1995) which concluded that 'motorcyclists have a reasonable grasp of the factors that increase the likelihood of accident involvement'. They analyzed motorcyclists perceived accident risk and found that 'motorcycle accidents are for the most part not the results of misjudgments about the overall risk of motorcycling'.

2.4 Commuting

What is of central interest in this thesis is the mode of transport people use, or in this case rather what they do not use for travelling from and to their work. In the Netherlands every day on average commuting takes more than half an hour. The modal split for commuting in the Netherlands is 77% by car, 10% by train and 6% by bicycle and the remaining 7% for other modes, which includes the motorcycle (CBS, 2016B). Males commute almost twice the distance females do and spend on average 40 minutes doing so where females commute 28 minutes on average, which is explained by the fact that females work more part-time jobs and live closer to their work (CBS, 2016). In addition, Oakil et al. (2016) found that females were more likely to commute during morning rush hours but less likely during afternoon rush hours. Explaining variables for this finding were among others household shopping and child chauffeuring activities before or after the commute. These activities obviously cannot be done combined with a motorcycle as commuting mode, and could be a possible explanation for the lack of using the motorcycle as a commuting mode, especially for females. Another influence on the mode of transport is the region of the Netherlands a person lives in. Per province the relative shares of the different transport modes differ, for example people in Limburg or Drenthe use the car for more than half of all movements as where this is ten percent less in the more crowded Randstad provinces as Zuid-Holland and Noord-Holland. The opposite applies for public transport for these provinces, with shares of 3.8% and 2.3% of all movements for Limburg and Drenthe and 8.6% and 9.1% for Zuid-Holland and Noord-Holland (CBS,2017). It should be noted that these figures are about all movements and not just for commuting, but the same conclusion in line with the above figures is drawn by Susilo and Maat (2007), who examined the influence of built environment to the trends in commuting journeys. The degree of availability of public transport can therefore possibly be of influence on the modal choice for commuting, and therefore also be of influence whether or not to use the motorcycle for commuting.

2.5 Research questions

In order to help giving an answer to the main question, research questions are formulated. The first question will take a look at the possible differences between motorcyclists and non-motorcyclists. It will be interesting to see if there is a difference and when there is what the difference will be between people riding motorcycles and people who don't, for the safety risk people associate

with motorcycles. On the one hand people who do not ride motorcycles could have a worse perception of the risks associated with riding a motorcycle than the actual risks. As mentioned above, suggested by Sjöberg (2000), a crucial factor in the perception of risk is a person's attitude. If a person has information about the statistics on the road deaths and serious injuries as discussed in the introduction it could be the case that this is of influence on one's attitude, and therefore on the risk perception. On the other hand the motorcycle riders can underestimate the risks or do not perceive the risks as such. Or, as Pinch and Reimer (2012) mention, motorcycle riders are willing to take a risk because of what is in return in terms of the experience and associated excitement riding a motorcycle, and this is something non-motorcycle riders do not experience and therefore cannot take into account in their consideration whether or not a certain risk is worth taking.

To see if there is a difference between the two groups the first research question is formulated as follows:

Q1: Do motorcycle license owners see a motorcycle as less dangerous than non-motorcycle license owners see motorcycles?

Following the first research question the second research question is also about perceived risk. But now there will be examined how the risk assigned to motorcycles and other transport modes relate to the actual accident statistics. The first research question takes a look only at the possible difference in perception of motorcycles between the two groups, riders and non-riders, but this question expands this to other options of transport. In this way it can be sorted out if the outcome of research question one also holds when the other transport modes are included. If the ratings of the motorcycle riders as well as the ratings of the non-motorcycle riders for the different modes of transport then are compared to the actual numbers of the accident statistics more can possibly be said on the perception these two groups have regarding the safety of motorcycles. The second research question is therefore formulated as follows:

Q2: Do non-motorcycle license owners perceive the motorcycle as more dangerous relative to other transport modes?

'It is important to recognize that an important positioning of the motorcycle is as a leisure commodity, particularly within the more affluent markets of Europe and North America' (Pinch & Reimer, 2012). Since this thesis focusses on motorcycles as a mode of transport for commuting it will be relevant to take a look at how many motorcycle riders actually use their motorcycle for commuting, or if they use them for just recreational purposes or a combination of both. With many modes of

transport becoming more and more 'mundane, quotidian and banal' (Binnie et al., 2007) it could be the case that the experience of riding a motorcycle as potentially 'extraordinary, engaging and liberating' is an important part of peoples' leisure experience, and therefore an important part of its leisure appeal (Pinch & Reimer, 2012). If this is the case, the question rises why the 'experience' of riding a motorcycle wouldn't be a possible argument for using the motorcycle as a mode for commuting too. To find out what the main purpose is riders use their motorcycle for, the third research question is formulated as follows:

Q3: Do motorcycle owners use their motorcycle more for recreational purposes than for non-recreational purposes?

Independent of the outcome of research question three it will be interesting to see whether or not people define the motorcycle as an alternative for the car for commuting. It will most likely be the case that motorcycle riders can judge this better because they have experience riding and therefore know the pro's and con's, where non-motorcycle riders do not have this experience and will not be able to give a valid response. Therefore focusses this research question just on the motorcycle riders, and is formulated as follows:

Q4: Do motorcycle riders not see the motorcycle as an alternative for the car?

When research question four is not rejected, it will be the question what the main reason is for not seeing the motorcycle as an alternative for the car. Because the main focus is on the safety and perception of safety this is what is being looked at. The last research question is therefore formulated as follows:

Q5: Is the motorcycle not seen as an alternative for the car because of the safety risks?

3. Data

The data used for testing the hypotheses is obtained via an online survey. The survey consists of a maximum of 16 questions, or 10 or 11 questions when the respondent does not have a motorcycle license or does not own a motorcycle. The complete survey can be found in the appendix. The program used to create the survey is Qualtrics Survey Software and it has been distributed via Facebook and multiple personal networks. The resulting data output has been processed with Microsoft Excel. The

survey has been held during July 2018 and had a total response of 293 people. The results of the survey will further be discussed in section 4.1. Descriptive statistics will be used to try and give an answer to the research questions.

4. Results

4.1 General results

In total 293 people responded to the survey, of which 273 actually completed the survey. Of these respondents 88 (32.23%) were female and 185 (67.77%) were male. More than half of the respondents (54.95%) were in the age category of 18 – 30 years old. The next three 10-year step age categories were more or less evenly distributed with respectively 13.19%, 16.12% and 14.65% of the total. In the age category of 65+ were only 3 people which account for 1.10% of the total.

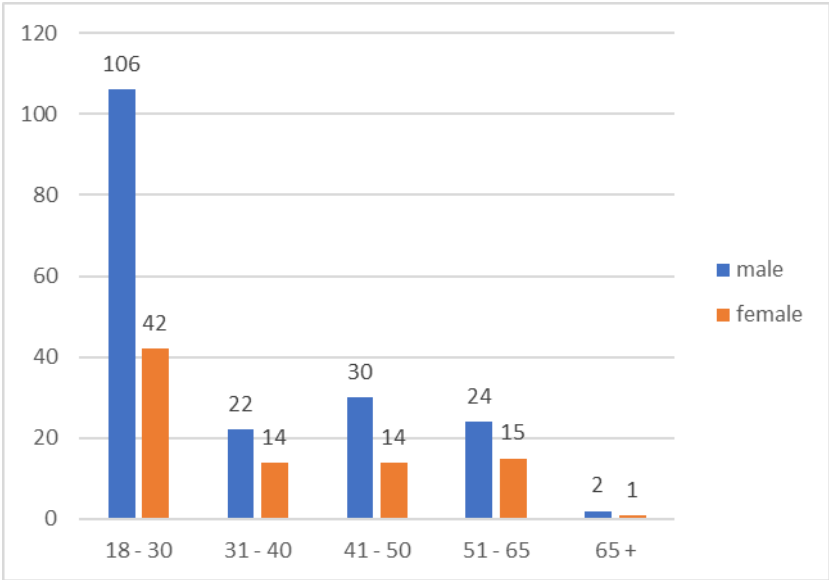


Figure 3: The respondents by age and gender.

Of all the respondents 261 have a driving license for the car and 13 do not. Furthermore 170 of the respondents are in possession of a motorcycle driving license and 104 are not. Of the 170 people in possession of a motorcycle driving license 159 actually owned a motorcycle at the time of answering. Not an unimportant aspect, because someone who has not ridden a motorcycle for years might not have representative or valuable answers. In the last five years in the Netherlands the share of motorcycle license ownership relative to the car license ownership was 13.12% (CBS Statline, see appendix for calculation). In the response group this share is a lot higher with 65.51%. Also, the respondents with a motorcycle license own on average more often a motorcycle than the average for The Netherlands. For the response group 93.52% of the people owning a motorcycle license also

owned a motorcycle at the time of answering. For The Netherlands in total the average registered motorcycles relative to the motorcycle license ownership is 45.93% for the last five years (CBS Statline, see appendix for calculation). An explanation for these deviations from the national averages could be explained by the dissemination of the survey. A lot of respondents were reached via Facebook groups in order to reach enough motorcycle riders to have a sufficient response group. A person who is not interested in motorcycles and does not own one (anymore) but could still own a motorcycle license is likely not to be reached in this way, or the other way around only people who are motorcycle enthusiasts and more likely to own a motorcycle have in this way been reached and responded to the survey. Another consequence for the results caused by the dissemination of the survey could be the average age of the respondents. As mentioned before more than half of the respondents are in the age category up to 30 years old, and just three people older than 65 have responded. A dissemination via Facebook or online in general is possibly more easily accessible for younger people than for older people which could be the reason of this skewed proportion.

In figure 4 can be seen what level of education the respondents to the survey have followed (n=273). It can be seen that this group is quite well educated with a share of 62.1% having completed a HBO or WO study. Only 15 respondents (8.7%) have not followed or completed further education.

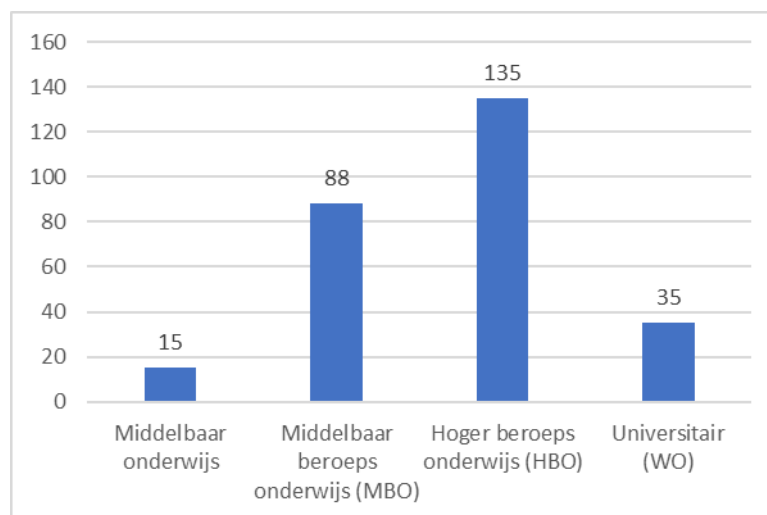


Figure 4: Level of education response group (n=273).

To see if the this distribution of education is the same for motorcycle riders and non-motorcycle riders this is set against each other in figure 5. Knowing that the response group consist of almost two thirds of motorcycle riders it can be seen that in particular in the MBO education group the motorcyclists are well represented. Also in the HBO group a considerable share is in possession of a motorcycle driving license and in the WO and 'Middelbaar onderwijs' group this share is much smaller.

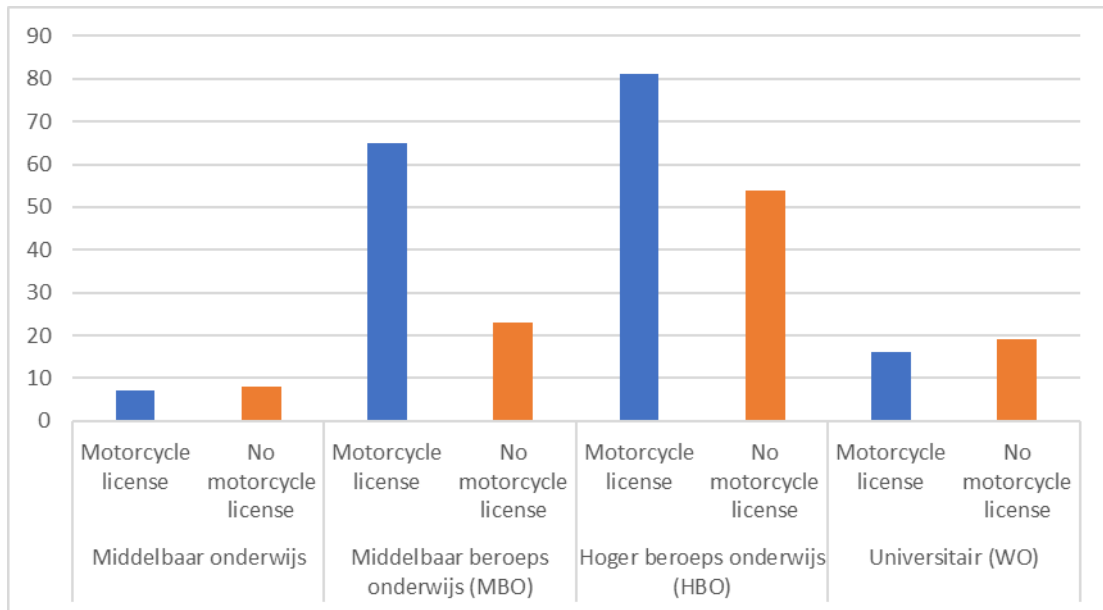


Figure 5: Level of education for motorcycle license and non-motorcycle license owners (n=273).

In figure 6 the modal split for commuting of the response group can be seen. As expected is the largest share for the car, followed by the motorcycle and the bicycle. Public transport takes fourth place with 9% and the other modes as the moped, by foot and different all account for a small share. The respondents who filled in different did not use any other mode than the modes included but said to travel the same distance by bicycle and car, or evenly used the motorcycle and the car.

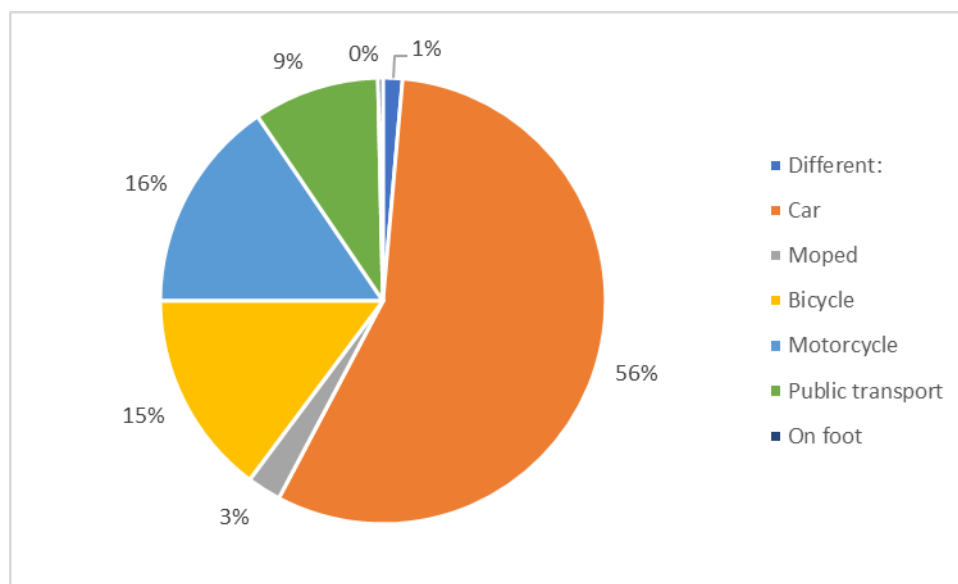


Figure 6: Modal split response group (n=284).

The share of the motorcycle is in the total modal split is quite large if compared with the modal split for the Netherlands in general as discussed in the theoretical framework. This can again be explained by the large share of motorcycle riders in the response group. Nonetheless, it is important to divide

the two groups, motorcycle- and non-motorcycle license owners, to filter these out and see how the distributions between the modes for commuting will be in this way. Figure 7 shows the modal split for motorcycle license owners, and figure 8 the modal split for non-motorcycle license owners. Firstly it is noticeable that in figure 8 only four modes are in the pie chart. Of course is the mode motorcycle not included here but also 'on foot' and 'different' are not present, but these are the modes that have the smallest shares in figure 7 and are of least interest. What is of interest is the share of the response group with a motorcycle license that actually uses the motorcycle for commuting, which is exactly a quarter of this group. What is also interesting to notice in these two charts is that the share of people who commute by car is larger for the group having a motorcycle license. A logical consequence of this is that this group uses the bicycle or public transport a lot less for commuting; 7% and 5% respectively for the motorcycle license group and 28% and 16% for the non-motorcycle license group.

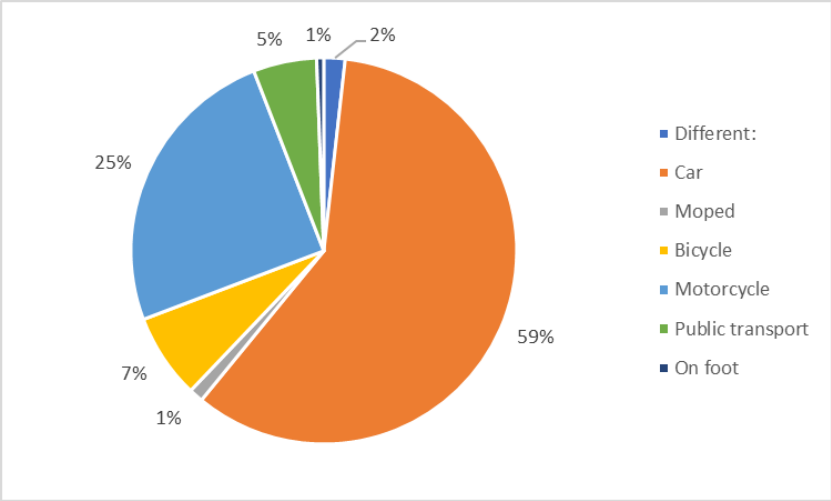


Figure 7: Modal split motorcycle license owners (n=169).

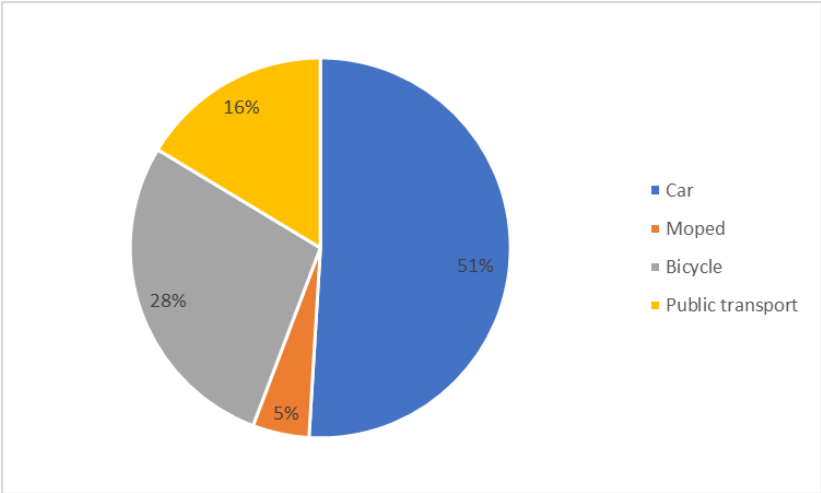


Figure 8: Modal split non-motorcycle license owners (n=104).

4.2 Motorcyclists versus non-motorcyclists

Research question one is formulated as follows; *Do motorcycle license owners see a motorcycle as less dangerous than non-motorcycle license owners see motorcycles?* In the questionnaire is asked to give a rating to travelling by motorcycle of 1-10 with 1 being very unsafe and 10 being very safe. The average rating for all of the respondents was a 6.34 (n=273). The respondents not in possession of a motorcycle license rated it with an average of 5.44 (n=103) where the respondents owning a motorcycle license rated it on average 6.88 (n=170). So the motorcycle riders rate the safety of travelling with a motorcycle 1.44 points (26%) higher, and next to that under the respondents not having a motorcycle license the lowest rating was 1, where the lowest rating under the motorcycle license owners was a 3. What also is striking is that of the respondents without a motorcycle license not one person rated the safety with a 10, where 30 of the 169 motorcycle license owners (17.8%) did assign a 10. See figure 9 for the complete distribution. These results show a clear difference between the two groups and therefore could be said that motorcyclists do see a motorcycle as less dangerous than non-motorcyclists do.

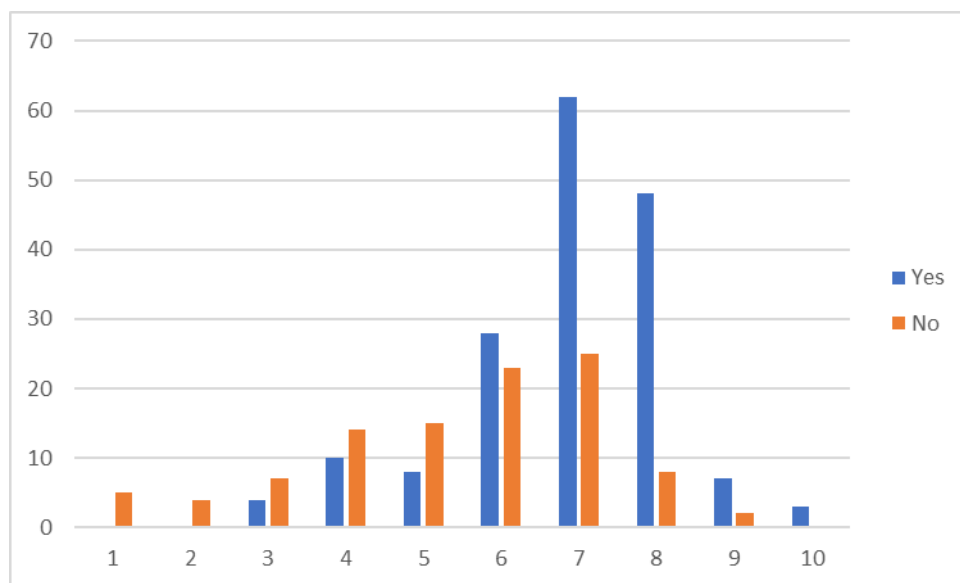


Figure 9: Rating assigned to the safety of travelling by motorcycle, for motorcycle- and non-motorcycle license owners.

4.3 The motorcycle versus other commuting modes

For research question two the ratings for all of the transport modes will be examined, but only those of the respondents not in possession of a motorcycle driving license. Research question two is formulated as follows: *do non-motorcycle license owners perceive the motorcycle as more dangerous relative to other transport modes?* The average rating for each of the commuting modes is displayed in table 1.

Commuting mode	Average rating
Motorcycle	6.88
Car	8.10
Public Transport	8.22
Bicycle	6.71

Public transport is rated the most safe way of commuting, followed by the car. On the third place follows the motorcycle and the least safe way of commuting rated by the respondents is the bicycle. Notable is that all the modes are rated with a sufficient grade in terms of the general Dutch grading system (in education); with possible grades from 1 up to 10, a 5.5 or higher is considered sufficient. Even the lowest rated mode the bicycle is well above the minimum of 5.5 for being sufficient, and this implicates that the respondents' perception of the different commuting modes is positive regarding safety. Now is the question for research question two how people rate these transport modes relative to each other and if this is a correct perception with regards to the actual safety risk belonging to the different commuting modes, and especially the motorcycle.

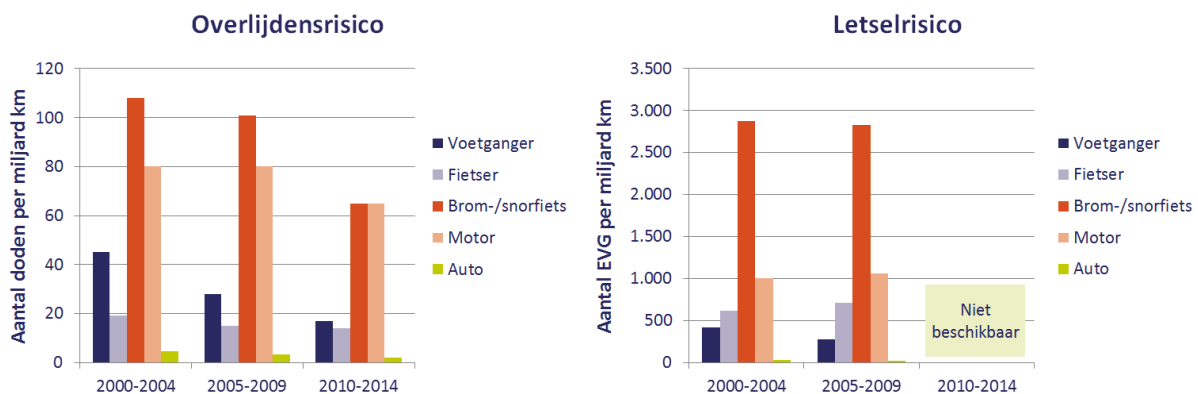


Figure 10: Number of deaths and serious injuries per billion passenger kilometers respectively in the Netherlands for different modes of transport. Source: SWOV (2017A).

In figure 10 the risk on death or serious injury is showed for different modes of road transport per billion kilometers. What is missing in these graphs is public transport, the by the respondents rated safest mode for commuting. What on the other hand is included in these graphs is the moped (brom-/snorfiets) which is not included in the safety rating questions in the survey. From the response group 3% said to use the moped for commuting, a small share but as can be seen a relative high risk mode for death or injury in traffic.

The mode public transport is not included in the graphs in figure 10, probably because public transport as a whole is not purely road transport, only the bus and partly the tram take part in road traffic. Also are no figures for deaths and serious injury per billion kilometers known, but it is known that about 200 people are killed or seriously injured (hospitalized) per year because of accidents with public

transport (SWOV, 2011). But, of these 200 injured or killed people just 10% is a passenger, and therefore only these on average 20 injured or killed people are relevant in this context because the safety of travelling with public transport is of interest. To place this number into perspective, 661 persons died in total in traffic in 2011 (CBS, 2013) and 19,700 persons were seriously injured in total in traffic in 2011 (SWOV, 2017B). It would therefore appear that the respondents have a correct perception of the public transport being the safest way of commuting in terms of traffic safety.

To see how the perception of the other modes is relative to the actual accident statistics it is hard to compare the absolute numbers to the ratings given by the respondents. Therefore will be looked at how the ratings relate to each other and whether or not this is consistent with the relative proportions between the actual statistics. Of the three modes left it seems that the perception of the respondents is right about the car being the safest way of commuting. The average rating is an 8.10 and in the statistics (see figure 10) can be seen that the car has by far the lowest risk on deaths as well as on serious injury. The motorcycle as well as the bicycle are rated lower than the car which too corresponds with the statistics, the motorcycle is rated 1.22 points lower than the car and the bicycle is rated 1.39 points lower. The difference between these two is 0.17 points in favor of the motorcycle, which is not a relatively large difference on a score of 6.88 (for the motorcycle). This is however not a correct perception when looking at the actual risk belonging to the two commuting modes. As can be seen in figure 10 the risk on serious injury is approximately 50% higher for the motorcycle than for the bicycle. The risk of death by traveling by motorcycle is on average even around four times higher than for traveling by bicycle. The respondents therefore have not only wrongly arranged the commuting modes motorcycle and bicycle relative to each other, but the relative difference in risk between the two modes is also not recognized and reflected in the ratings.

Altogether the ratings of the respondents not in possession of a motorcycle license seem to correspond with the statistics about public transport and the car to be the number one and two safest commuting modes, but it does not correspond with the 'rankings' of the motorcycle and the bicycle. Next to that the relative differences in ratings between the motorcycle and the car and bicycle do not show a correct perception of the actual relative differences in risk on death or serious injury between these commuting modes, the actual statistics show larger relative differences. Research question two did also state an incorrect perception of this sample of the respondents, but stated that these respondents would have a perception opposite of what is described above. It could therefore be said that non-motorcycle license owners do not have a correct perception of the relative risks belonging to the different commuting modes and that research question two could only partly be true.

4.4 Recreation or commuting purposes?

Research question three is formulated as follows; *do motorcycle owners use their motorcycle more for recreational purposes than for non-recreational purposes?* In the survey only the respondents who indicated that they own a motorcycle license and that they own a motorcycle got the question for what purpose(s) they use their motorcycle. The options given were recreational, for holiday, for commuting or all of these, and the results are displayed in figure 10. The question stated if one has more purposes to choose the most important one, and there is the option to choose for all purposes. If one had another purpose than available in the options they could fill in their own answer. Only two respondents did this and said to give motorcycle driving classes, so it is their profession to ride a motorcycle.

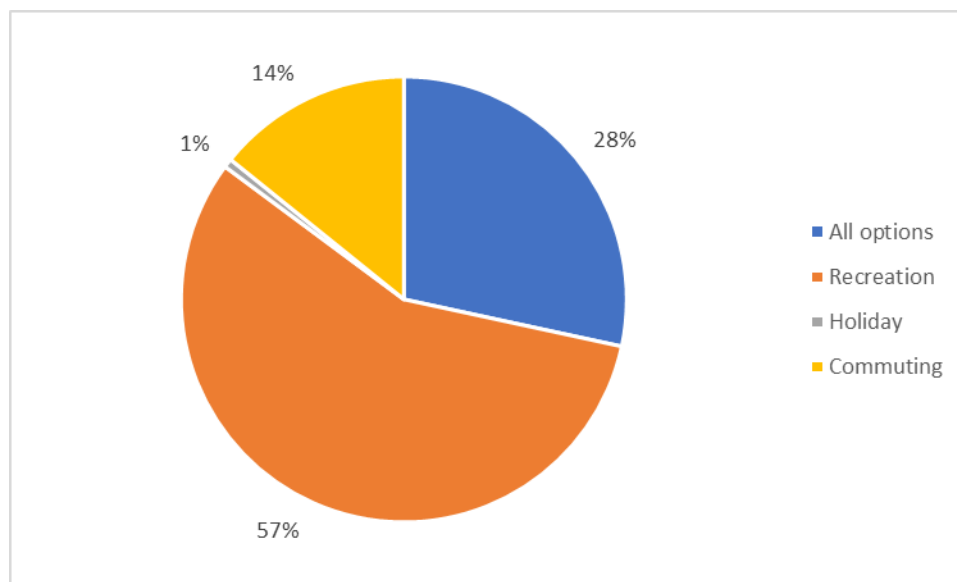


Figure 11: The main purpose of the motorcycle use for the respondents (n=155).

It can be seen that the largest share of people uses their motorcycle for recreational purposes only. Just one percent of the respondents uses the motorcycle for holiday only, but since this is such a small share and holiday is a recreational event this will be seen as one part (holiday was added as a separate option to be able to see if there was a group who just used their motorcycle for this purpose). 14% of the respondents stated to use their motorcycle just for commuting, and 28% said to use their motorcycle for both recreational (including holiday) and commuting purposes. For the share of people who stated to use their motorcycle for all purposes the distribution between these purposes is not known, but they did answer the question in what time of the year they ride. Of these 45 people only 1 said to ride just in summer; 16 in spring, summer and fall and 28 said to ride all year long. 21 of these people also said to use the motorcycle as mode of transport for commuting. So approximately half of

the people who answered to use their motorcycle for all purposes are likely to use their motorcycle for commuting most of the year.

With a share of 58% of the respondents using their motorcycle just for recreational purposes and 14% using their motorcycle just for commuting, together with the likely distribution of the remaining 28% to be fifty-fifty between people commuting a lot by motorcycle and people using their motorcycle less often for commuting, it can be said that research question three could be true.

4.5 The motorcycle as alternative for the car?

Research question four is formulated as follows; *do motorcycle riders not see the motorcycle as an alternative for the car?* 128 persons (77.8%) answered yes to the question if they see the motorcycle as an alternative for the car for commuting, and 35 persons (22.2%) answered no (n=158). So more than three-quarters of the motorcycle riders think that this mode of transport is an alternative for the car for commuting, and therefore research question four could probably not be true, indicating that they do see the motorcycle as alternative to the car for commuting.

4.6 Why is the motorcycle not seen as an alternative to the car?

In the theoretical framework is stated that if research question four is not rejected it will be the question what the reason is people do not see the motorcycle as an alternative to the car for commuting. But, with research question four being rejected there still is a group of a little less than a quarter of the motorcycle riders that says to not see the motorcycle as an alternative commuting mode. Therefore research question five will still be looked at, and is formulated as follows; *is the motorcycle not seen as an alternative for the car because of the safety risks?*

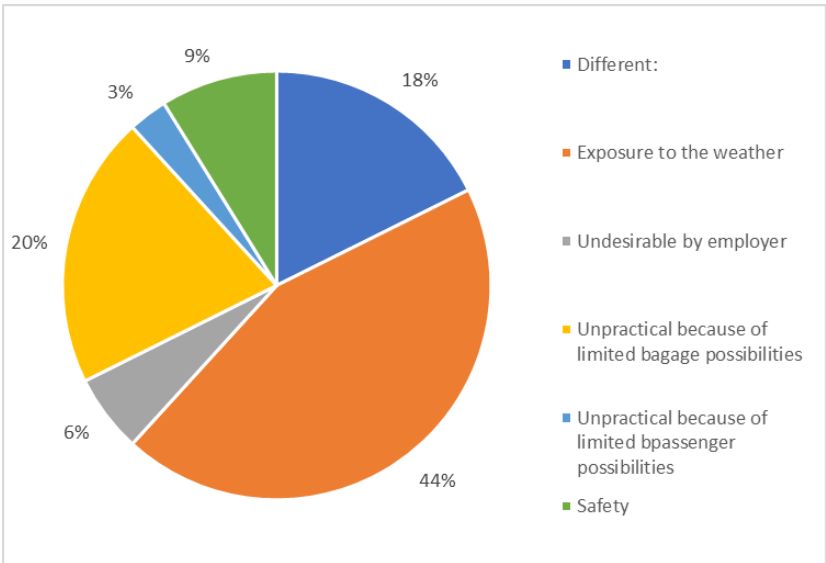


Figure 12: Reasons the respondents gave for the motorcycle not being an alternative to the car for commuting (n=34).

In figure 11 can be seen what the respondents gave as a reason for not seeing the motorcycle as an alternative to the car for commuting. The reason answered the most is the exposure to the weather with 44%. The next two most mentioned reasons are the unpracticality because of the limited baggage possibilities and the limited passenger possibilities. 6% said it is undesirable by their employer and 3% gave a different reason. These different reasons are basically all an addition to the categories of the motorcycle being unpractical. Two respondents answered for example that the distance to their work is not enough to make up for time to unlock the motorcycle and put on the protective gear. Two others answered that they simply are not able to commute by motorcycle because one has a company car needed for his job and the other is a driving instructor (for the car). So none of these respondents mentioned anything about safety, and for the overall group for this research question only 9% has indicated that the motorcycle is not an alternative to the car for commuting because of the safety reasons. Therefore it could be said that research question five is not true.

4.7 Overview of the results

In total 273 people completed the survey of which were for the largest part males in the younger age categories. Of this total 159 respondents owned a motorcycle license and motorcycle at the time of answering. More than half of all the respondents uses the car for commuting, and if the group is divided in motorcyclists and non-motorcyclists it appears that for the group motorcyclists even a larger share uses the car for commuting than the non-motorcyclists group. Of the group motorcyclists a quarter uses their motorcycle for commuting.

The safety of travelling by motorcycle is rated 26% higher by motorcyclists relative to non-motorcyclists, and for different commuting modes non-motorcycle license owners do not seem to have a correct perception of the relative differences in safety risk (serious injury or death) between the different options for commuting. Furthermore did 58% of the respondents indicate to use their motorcycle just for recreational purposes, and for 14% their motorcycle is purely used for commuting. The remaining share includes people who vary between mostly commuting and some recreation to mostly recreation and some commuting. More than three-quarters of the motorcyclists said to see the motorcycle as an alternative for the car for commuting. The persons who stated to not see it as an alternative said practicality, limited passenger and baggage possibilities and exposure to the weather, to be the reason for it not being an alternative.

5. Conclusion

With the facts of declining motorcycle ownership and motorcycle license ownership in the Netherlands the question aroused why this trend develops like this, while this mode of transport could bring useful benefits for commuting in present-day traffic in the Netherlands. To help answer this question the following research question is formulated; *To what extent does the perception motorcycle- and non-motorcycle riders have prevent people from using this mode of transport for commuting?*

What appears from the literature is that in most transport research the motorcycle is not seen as a full-fledged mode of transport, and as a consequence there is not much literature available. The most research is about motorcycling safety, which shows that 'motorcycle accidents are for the most part not the results of misjudgments about the overall risk of motorcycling' (Mannering & Grodsky, 1995) and that motorcyclists have an overall reasonable perception of the risks associated with driving a motorcycle, and what the factors of influence are on this risk. The image of motorcycling in general and 'the rider' does not appear clearly in the literature. It is argued that the motorcycle rider is often put down as a certain stereotype and that further literature is just missing. This stereotype, the male criminal biker, does get fed by the many media attention in the Netherlands to outlaw biker gangs. On the contrary is stated by Rothe and Cooper (1987) that 'motorcycling may tend to attract risk-seeking individuals in all age and socioeconomic categories' meaning that the stereotype of risk seeking persons -which of course are not only criminal bikers, but these could be included in this group- could be true. In either way, the image of the motorcyclist as a risk taker is what is described. At last what emerges about commuting in the Netherlands is that males commute more and longer (CBS, 2016), and Oakil et al. (2016) have found an explanation why this could be the case. Only one third of the respondents to the survey was female, which could mean that the results of this thesis are in line with these findings. Now these findings apply for commuting in general, but because of the nature of the reasons females commute less, combining commuting with doing groceries or bringing kids to school, these are certainly relevant for explaining why females use the motorcycle very little for commuting.

About the perception of safety of motorcycling appears from the result that motorcyclists— seem to see this as safer than people who are not motorcyclists. The evidence from the literature about the correct perception motorcyclists have about the risks involved in riding a motorcycle would suggest that the motorcyclists in this case have a better picture about this than non-motorcycle riders. Next to this is the idea that non-motorcycle riders have a less truthful perception about the risks of riding reinforced by the results of research question two where can be seen than non-motorcycle riders do not seem to have a correct perception of the relative differences in risk associated with different

commuting modes. Because these non-riders seem to think the motorcycle is less safe than it probably actually is, this could well be a reason not to start riding, or to consider the motorcycle as an alternative for their current way of commuting.

To the question if the motorcycle is seen as an alternative to the car for commuting answered more than three-quarters of the motorcyclists yes, but on the contrary only a small share of this same sample of motorcycle riders said to actually use their motorcycle as commuting mode. The largest part of the respondents uses their motorcycle just for recreational purposes. If this is looked at together with the modal split, for the whole group as well as the motorcycle owners group, which also shows that the large share of people who says to see the motorcycle as alternative to the car does not actually do use their motorcycle for commuting. The result of research question four is therefore questionable in terms of how much this actually says something relevant and actually reflects peoples' behavior. Their stated preference does not correspond with their revealed preference. The more interesting is the result of research question five because of this. Because of the relative large research interest in motorcycling safety, the accident statistics and the lower rating assigned to the safety of traveling with a motorcycle in the questionnaire it could be stated obvious that the main reason for the motorcycle to not be an alternative to the car is the safety. However, according to the respondents the opposite is true with only 9% of the motorcyclists indicating safety as a reason to not see the motorcycle as an alternative for the car for commuting. What they do see as the biggest reason for it not to be an alternative are practical reasons, exposure to the weather and limited passenger and baggage possibilities.

Altogether it seems non-motorcycle riders do not have a correct perception of the risks associated with riding a motorcycle, with rating it less safe than motorcycle riders do, and next to that not rate it correctly in perspective to other commuting modes with respect to the actual accident statistics. This is not consistent with each other, but the more it shows the probable incorrect perception non riders have. This could therefore be a reason the motorcycle is not chosen or even considered to be used for commuting. Motorcycle riders on the contrary seem to have a right perception about the risks, and do not see safety as a reason to not use the motorcycle for commuting. What they do indicate as reason to pass on the motorcycle is practicality. As stated in section 2.1, that the benefits of using a motorcycle seem to not weigh against the costs, appears for the motorcycle riders questioned for this thesis indeed to be true, with the costs in this context to be exposure to the weather, limited passenger possibilities and limited baggage possibilities.

To round up the conclusion, it seems that commuting by motorcycle will only be interesting for a part of the people now commuting by car. Although there will possibly be a small group of people who could benefit from a switch to the motorcycle, people commuting alone and without (a lot of) baggage, this will however in my view probably not happen soon. Although the reason to not choose

for the motorcycle under the motorcyclists has for more than 90% of this group nothing to do with the safety risks, this reason probably does for non-motorcyclists. And this is quite understandable if you have not experienced the benefits. The motorcyclists who can experience the benefits still choose for the largest part not to commute on their motorcycle. So maybe a motorcycle is for the general public just not suitable for transporting themselves, and for the people who do ride it is mostly a form of transport especially for recreation. In this way riding a motorcycle seems for the largest group to be a demand not derived for getting from A to B, but more a demand for the experience to get from A to wherever.

6. Limitations and suggestions for further research

At last some limitations have to be specified. Firstly are the results limited to the Netherlands, maybe they could also be relevant for other western European countries but probably not more than that. The second limitation is also a consequence of the questionnaire results, caused by the way of disseminating the questionnaire. Because by far most of the respondents have been reached via internet, specifically via Facebook this probably leads to a certain group to be reached with regards to age, which is clearly the case as can be seen in section 4.1. Next to that it is likely that via these Facebook groups a group of people with a certain enthusiasm about the subject is reached, which could be of influence on the results.

Any real policy recommendations cannot be given, because of the fact that motorcycling is relatively more dangerous than other forms of transport for commuting. It therefore seems not responsible to for example state that the use of motorcycles for commuting should be stimulated, because this simply cannot be justified with a view to the safety aspect. The only way in which such a scenario could possibly be justified is after further investigation, which leads to the suggestions for further research.

At first it could be interesting and relevant to look further at the possible benefits that could be accompanied by more commuting on a motorcycle. For example the benefits that could follow this as regards the parking pressure, congestion or emissions. Investigating any policy stimulating motorcycle use will only be relevant and justifiable if the benefits resulting from this could be substantial. And if this would be the case it could also be interesting and probably necessary to look at possible safety increasing measures for motorcyclists (from a traffic engineering point of view). Next to this it could be interesting to gain more insight in which 'type' of motorcyclists are mostly involved in accidents, the recreational riders or the commuters. Because someone riding all year long every day is based on his traveled distance expected to be in an accident sooner than someone who just rides a

couple months a year, but on the other hand this person could be much more experienced because of the larger distance that is traveled (and probably in all weather conditions) resulting in different relative chances to be in an accident. But again, these subjects will only be relevant to investigate further if more is known about the possible benefits that could follow more commuting by motorcycle.

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Appendix

1.

Average percentage motorcycle driving license relative to car license ownership in The Netherlands from 2014 to 2018.

Personen met een rijbewijs; rijbewijscategorie, leeftijd, regio, 1 januari				
Regio's: Nederland				
	Onderwerp	Personen met rijbewijs	Personen met rijbewijs	
	Rijbewijscategorie	Autorijbewijs totaal	Motorrijbewijs	
Perioden	Leeftijd rijbewijshouder	aantal	aantal	
2014	Totaal	10658020	1409962	13,23%
2015	Totaal	10755934	1417000	13,17%
2016	Totaal	10894336	1427273	13,10%
2017	Totaal	10986066	1435862	13,07%
2018	Totaal	11070447	1444517	13,05%
Bron: CBS			Gemiddeld:	13,12%

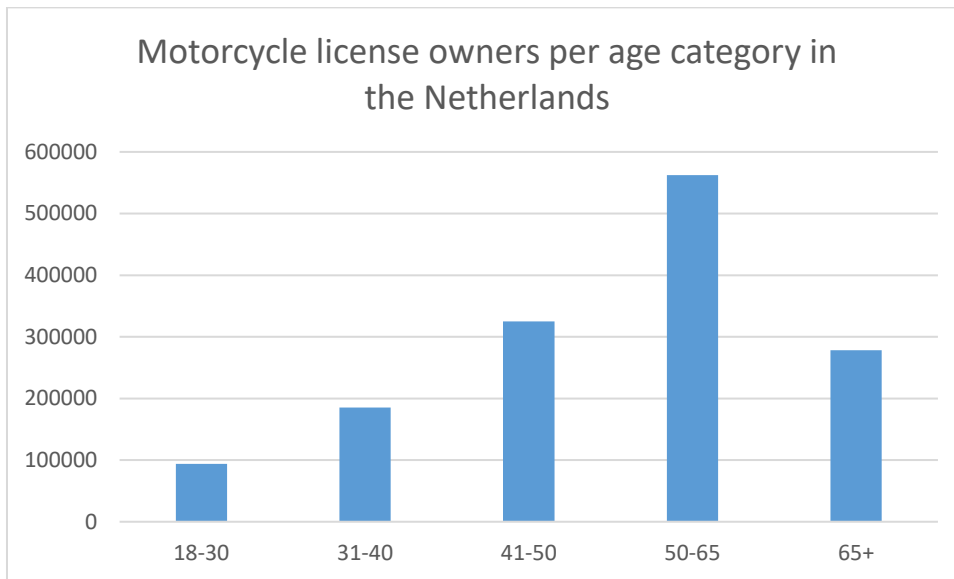
2.

Motorcycle driving license ownership and registered motorcycles for 2014 to 2018.

Personen met rijbewijs		Motorrijbewijs		geregistreerde motoren	
aantal		aantal		aantal	
1409962	13,23%	2014		653991	46,38%
1417000	13,17%	2015		652336	46,04%
1427273	13,10%	2016		652544	45,72%
1435862	13,07%	2017		655991	45,69%
1444517	13,05%	2018		661639	45,80%
Gemiddeld: 13,12%				Gemiddeld: 45,93%	

Transport en mobiliteit 2016.

3.



Bron: CBS Statline 'Personen met een rijbewijs; rijbewijscategorie, leeftijd, regio, 1 januari 2018'.

4.

Below is the questionnaire as distributed. It is in Dutch because there are only Dutch respondents and after some questions is indicated when a respondent got that question or not, for example question five if they answered 'yes' at question four.

Enquête bachelor scriptie

Remco Zeegers

Deze enquête is onderdeel van mijn bachelor scriptie voor de studie Economie & Bedrijfseconomie aan de Erasmus Universiteit Rotterdam. Ik schrijf mijn scriptie bij het vak Transport Economie, en centraal staat een transportmiddel die in de bestaande literatuur eigenlijk niet voorkomt als zijnde een wijze van vervoer: **de motor**. Ik ben geïnteresseerd in de vraag waarom niet meer mensen de motor gebruiken als alternatief voor bijvoorbeeld de auto, en de perceptie die mensen, zowel motorrijders als niet-motorrijders, hebben over de motor als wijze van vervoer. Invullen neemt slechts twee minuten in beslag en helpt mij enorm!

Er worden in deze enquête geen persoonsgegevens gevraagd en uw identiteit kan dan ook op geen enkele manier achterhaald worden. Uw antwoorden zullen uitsluitend gebruikt worden voor onderzoeksdoeleinden.

V1. Over het algemeen, welke wijze van vervoer gebruikt u voor woon-werkverkeer? Ingeval u meerdere wijzen gebruikt, kies degene waar u de grootste afstand mee aflegt.

- A Openbaar vervoer (bus, tram, trein, metro)
- B Fiets
- C Auto
- D Brommer/scooter
- E Motor

F Te voet
G Anders: _____

- V2A. Hoe zou u de veiligheid van reizen met de motor beoordelen op een schaal van 1 tot 10? Waarbij 1 erg onveilig is en 10 erg veilig.**

1	2	3	4	5	6	7	8	9	10
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Erg onveilig Erg veilig

- V2B. Hoe zou u de veiligheid van reizen met de auto beoordelen op een schaal van 1 tot 10? Waarbij 1 erg onveilig is en 10 erg veilig.**

1	2	3	4	5	6	7	8	9	10
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Erg onveilig Erg veilig

- V2C. Hoe zou u de veiligheid van reizen met het openbaar vervoer, over het algemeen, beoordelen op een schaal van 1 tot 10? Waarbij 1 erg onveilig is en 10 erg veilig.**

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Erg onveilig Erg veilig

- V2D. Hoe zou u de veiligheid van reizen met de fiets, over het algemeen, beoordelen op een schaal van 1 tot 10? Waarbij 1 erg onveilig is en 10 erg veilig.**

1	2	3	4	5	6	7	8	9	10
---	---	---	---	---	---	---	---	---	----

Erg onveilig Erg veilig

- V3. Heeft u een autorijbewijs?**

A Ja
B Nee

- V4. Heeft u een motorrijbewijs?**

A Ja
B Nee

- V5. Hoe lang heeft u het motorrijbewijs? Wanneer vraag 4 = ja**

A 1 – 5 jaar
B 6 – 15 jaar
C 16 – 25 jaar
D Langer dan 25 jaar

- V6. Bezit u momenteel een motor? Wanneer vraag 4 = ja**

A Ja
B Nee

- V7. Normaalgesproken, welk(e) gedeelte(n) van het jaar gebruikt u de motor? Wanneer vraag 6 = ja**

A Het hele jaar door
B Alleen in de lente, zomer en herfst
C Alleen in de zomer

V8. Voor welke reden(en) gebruikt u de motor? Ingeval meerdere opties gelden kies dan de belangrijkste. Wanneer vraag 6 = ja

- A Recreatie/vrije tijd
- B Vakantie
- C Woon-werkverkeer
- D Alle bovenstaande
- E Anders: _____

V9A. Denkt u dat de motor een alternatief is voor de auto voor woon-werkverkeer? Wanneer vraag 4 = ja & vraag 1 ≠ E.

- A Ja
- B Nee

V9B. Waarom niet? Wanneer vraag 9A = nee

- A Onpraktisch vanwege beperkte bagagemogelijkheden
- B Onpraktisch vanwege beperkte passagiersmogelijkheden
- C Blootstelling aan weersinvloeden
- D Veiligheidsredenen
- E Ongewenst door werkgever
- F Anders: _____

Afsluitend volgen nu nog een drietal algemene vragen.

V10. Geslacht:

- A Man
- B Vrouw

V11. Leeftijd:

- A 18 - 30
- B 30 - 40
- C 40 - 50
- D 50 - 65
- E 65+

V12. Wat is uw hoogst genoten opleiding?

- A Basisonderwijs
- B Middelbaar onderwijs
- C Middelbaar Beroeps Onderwijs (MBO)
- D Hoger Beroeps Onderwijs (HBO)
- E Universitair (WO)

Einde, bedankt voor het invullen!