

# **How can we Motivate Dutch Drivers to Adhere to a new Road Tax System?**

An Intervention Study to Promote Adherence to Estimated Mileage  
Within the 'Betalen naar Gebruik' System

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### **Abstract**

The current paper outlines two studies investigating adherence to the kilometre estimation that Dutch car owners have to make within the new 'Betalen naar Gebruik' (BnG; pay for usage) road tax system. Study 1 investigated seven potential predictors of the intention to adhere to the kilometre estimation. 272 Dutch drivers participated in an online questionnaire. Results indicated that awareness of negative financial consequences of BnG and the perception of positive social norms regarding BnG may determine higher intentions to adhere to the kilometre estimation. Study 2 experimentally investigated whether these factors could increase the intention to adhere. 471 Dutch drivers were randomly assigned to a priming condition (financial stress/social inclusion/control), to increase the factors. They estimated their mileage for the coming two weeks and indicated their intention to follow this estimation. Similar to study 1, the factors were significant predictors of intention. However, since the priming conditions were not effective in increasing the factors, there were no differences between groups in terms of intention. Furthermore, among 397 of the participants, the link between intention and adherence to the estimation was tested using their mileage during the two-week period. There was no significant link, thus pointing to an intention-behaviour gap. Future research should revisit these factors to explore the effects of negative financial consequences and positive social norms on intention using stronger manipulations. Also, it should investigate whether adherence is an intentional choice or whether it is determined more by habit.

### **How can we Motivate Dutch Drivers to Adhere to a new Road Tax System?**

To combat climate change, the European Union legislated that Union countries must become climate neutral by 2050 (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 2022). This means that carbon dioxide (CO<sub>2</sub>) emissions must be decreased significantly to ensure that climate change is not facilitated. Therefore, Dutch government wishes to decrease car-based travel, since the Dutch road system emits around six billion kilograms of CO<sub>2</sub> every year (Centraal Bureau voor de Statistiek, 2023).

To motivate citizens to decrease private car usage, a new road tax system will be instated in 2030 (Ministerie van Algemene Zaken, 2023). Citizens will be required to pay taxes for every kilometre they travel by car, in contrast to the current system where they pay taxes based on their vehicle type. In this new system, referred to as ‘Betalen naar Gebruik’ (BnG; Pay for usage), citizens are motivated to reduce car usage by obliging those who drive their car more to pay more taxes. Experts predict that the system will decrease car-related CO<sub>2</sub> emission by 2,5 billion kilograms (Ministerie van Infrastructuur en Waterstaat, 2022).

In the BnG system, citizens have to prepay for the number of kilometres they estimate to drive during the year. The estimation will be compared to their actual mileage at the end of the year and after-payments must be taken care of based on differences. Citizen may have to pay the government more money due to an underestimation, or may receive money back due to an overestimation (Ministerie van Infrastructuur en Waterstaat, 2022). This can result in organisational issues for the Dutch government when taking care of a large number of after-payments. Furthermore, it can result in financial issues for citizens when they receive an unexpected bill at the end of the year. Therefore, it is important that citizens’ driving behaviour matches their estimation as close as possible.

Furthermore, it is favourable that drivers do not exceed their estimation, since the aim of the BnG system is to limit mileage as much as possible. The current paper focusses on the factors involved in Dutch drivers not exceeding their kilometre estimation, thus adhering to it properly. Study 1 investigated potential predictors of the intention to adhere to an estimation. Study 2 investigated whether experimentally inducing the most promising factors could increase the intention, and how intention is linked to actual adherence.

#### **Potential factors predicting estimation adherence**

To structure factors that determine adherence to an estimated mileage, we can use the Theory of Planned Behaviour (TPB) as a starting point. This theory aims to explain the nature of voluntary behaviours to aid in behaviour change. It takes not only one’s motivation to

execute the behaviour into account, but also possible barriers that may intervene in terms of behavioural execution (Ajzen, 1991). This theory has effectively been applied to various transport-related behaviours, such as travel mode choice (Donald et al., 2014). Previously, it has been shown that this theory provides explanatory value when it comes to defining which mode of travel citizens will choose, and has been used to change people's mode choice and override the habit of frequent car travel (Verplanken et al., 1998). Therefore, it appears applicable in the current case, where the theory is used to define the voluntary behaviour of altering habitual car usage to adhere to a kilometre estimation.

The TPB describes that one's behaviour is largely determined by their intention to execute that behaviour (Ajzen, 1991). In the theory, intention refers to how much one desires to execute a behaviour or how much effort they are willing to exert to achieve a behavioural outcome (Donald et al., 2014). When one strongly intends to execute a behaviour, the TPB predicts that they are likely to be successful in executing it. In the current paper, intention specifically refers to the intention to adhere to one's kilometre estimation. This covers one's desire to match their driving behaviour to the mileage that they have estimated. According to the TPB, the strength of one's intention to adhere to their estimation should predict their eventual adherence.

Important to note is that travel behaviour is highly habitual in nature. For most car owners travelling by car is stuck in their routine. Previously, Gardner et al. (2020) found that to change habitual behaviours, a person's intention to execute an opposing behaviour must be strong. So, to ensure that Dutch drivers will alter their behaviour based on their estimation, it is important to activate a strong intention to adhere. According to the TPB, intention can be activated through three key factors: attitude, social norms and perceived behavioural control (Ajzen, 1991).

The first determinant, attitude, refers to a person's evaluation of facets of a behaviour. In our case it is one's evaluation of travelling with their car (Donald et al., 2014). Travelling using one's car is evaluated with overwhelming positivity due to feelings of autonomy and freedom when travelling (Popov, 2012; Morris & Guerra, 2015). On top of this, the positive attitude also stems from the fact that this mode of travel is highly convenient (Farag & Lyons, 2010). Literature indicates that this strong positive attitude towards car usage can lead to a weak intention to decrease mileage or drive within a certain parameter (Setiawan et al., 2014). Therefore, we can expect that attitude will lead to low intention and adherence among Dutch drivers.

The second TPB determinant of intention, social norms, refers to the opinions, attitudes and behaviours that people experience within their social surroundings, which guide out behaviour in two normative ways (Donald et al., 2014). Firstly, the injunctive norm guides behaviour through the belief that others approve or disapprove a certain behaviour, and it thus provides moral rules that should be followed (Cialdini et al., 1990; Bamberg, 2013). Since BnG is a tax system, it can be expected that properly following its rules is seen as a moral obligation that is approved by society (Onu & Oats, 2016). Citizens may therefore believe that they will gain social approval when they properly follow their estimation, motivating them to adhere. Secondly, the descriptive norm guides behaviour through the behaviour of others, which causes humans to act similarly to others around them (Cialdini et al., 1990). In our case this equates to the feeling that others will alter their driving behaviour based on the instatement of the BnG system. Overall, since the social norm is to follow the tax system like a good citizen and alter driving behaviour accordingly, positive effects on intention can be expected (Bamberg, 2013).

Perceived behavioural control is the TPB's last determinant of intention, and refers to the degree to which a person believes that they are physically and situationally able to execute a behaviour (Donald et al., 2014). Specifically, when one experiences external constraints regarding a behaviour, their intention to perform it will not be strong enough to lead to successful execution. When it comes to estimation adherence, we can say that this factor refers to whether a person feels that they have the ability to reach their destination by means other than their car. If one can easily travel to their destinations using other transport options, they are more likely to have the intention to limit their car usage. When their car is the only viable option for travel, the intention to limit mileage is unlikely to occur (Otary et al., 2021; Setiawan et al., 2014). Therefore, we can predict that perceived behavioural control will be an important factor in determining whether one intends to follow their estimation.

While the TPB provides a good starting point for factors that may promote the intention to adhere to a kilometre estimation, additional relevant factors can be derived from literature. The first that has been shown to be relevant to car usage, is the awareness of environmental consequences of car usage (Katzev, 2003). Previously, it was found that awareness of negative environmental consequences of driving helped increase one's intention to limit car usage (Setiawan et al., 2014). Similarly, if one sees environmental benefits in changing driving behaviour, they will also intend to limit car usage (Setiawan et al., 2014). Applying this to our case, we can say that if one believes that the BnG system will lead to

positive environmental consequences (by decreasing car usage and subsequent CO<sub>2</sub> emission), they should intend to limit driving behaviour.

Financial consequences may be even more relevant than environmental consequences when it comes to BnG-related driving behaviour. Since the BnG system links a direct financial consequence to car usage, Dutch citizens instantly see a personal downside to driving. The financial costs motivate citizens to limit car usage since avoiding car costs allows them to spend their money in other areas of life (Katzev, 2003). Similar behavioural effects have been noted by insurance companies that base their pricing on estimated annual mileage (similar to BnG), where clients reduced their mileage to decrease their insurance premium (Kurylowicz, 2017). So, citizens will likely have a strong intention to adhere, to avoid financial consequences related to overriding the estimation. When one believes that the instatement of the BnG system will lead to negative financial consequences for them, they will more likely intend to limit their driving behaviour so this matches their estimation.

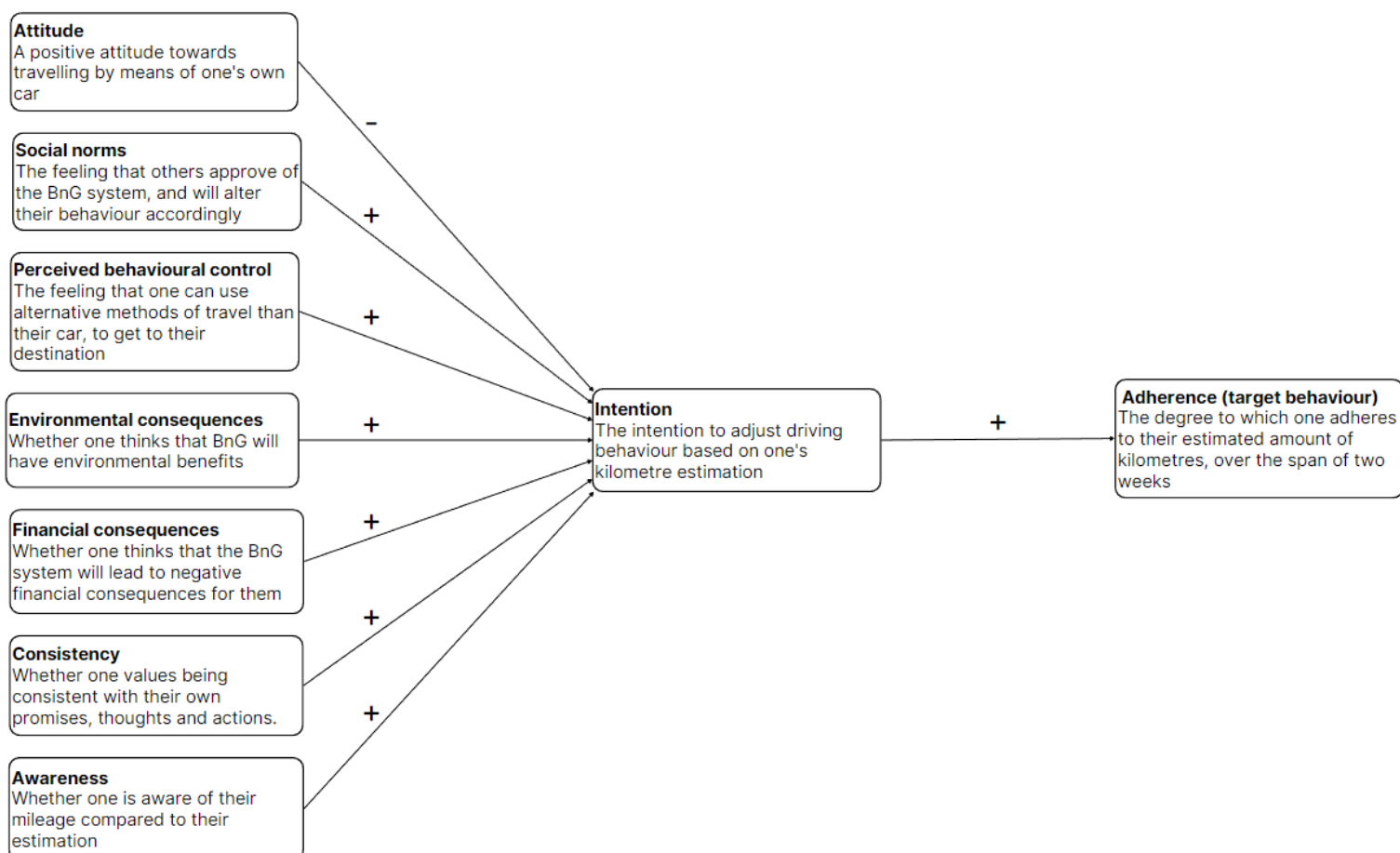
Another important factor to consider since we are talking about intentions and subsequent behaviour is consistency. Consistency is a phenomenon naturally occurring in humans, that has developed over time for behaviour to be predictable (Mower-White, 2015). Generally, we predict the behaviour of others based on the belief that people are consistent in their behaviours, attitudes, and values. For ourselves, we hold this same standard; we wish to be consistent in our actions and words, since this has great social value (Mower-White, 2015). It would appear that some individuals have more desire to be consistent than others, and thus have a stronger desire to act conform their promises (Wright & Jackson, 2022). In the case of the BnG system, we could say that the estimation one makes acts as a kind of promise for their future driving behaviour. Therefore, we could expect that those who naturally wish to be more consistent, are more likely to have strong intentions to match their driving behaviour to their estimation.

The last factor to consider is awareness of one's mileage. For one to notice a need to alter their driving behaviour based on an estimation, they must be aware of their past mileage and how this compares to their estimation. When one is more aware of their mileage, they will be more likely to notice that they are not driving conform their estimation and intend to make changes. Usage-based insurance systems (similar to BnG) have already noted similar effects. When clients were made aware of their mileage and were able to keep track of this easily to check it against their estimation, they decreased their mileage throughout the year (Kurylowicz, 2017). Thus, it can be predicted that those with higher levels of awareness may

have a stronger intention to alter their driving behaviour, since they are more likely to notice that their estimation and actions are incongruent.

**Figure 1**

*Process model: Factors determining adherence to a kilometre estimation made within the BnG system.*



*Note.* The predictors are based on the Theory of Planned Behaviour (Ajzen, 1991) and other relevant literature described above. The headings in the boxes refer to the concept of the predictor, with an explanation of the concept below. The arrows indicate the relationships between the variables, with a (+) indicating a positive relationship and a (-) indicating a negative relationship.

### Study 1: Predictors of Intention

Study 1 aimed to explore which factors derived from literature are involved in determining one's intention to adhere to a kilometre estimation. Specifically, the goal was to test part of the proposed process model (see Figure 1) and to explore the ideal version of that

model. The factors derived from theory were tested through an online questionnaire, in the hopes of using the findings as base for future behavioural change.

Table 1 shows the specific hypotheses that were tested in Study 1, as derived from literature described above. No behavioural measure was taken during this study, thus the link between Intention and Adherence was not yet investigated.

**Table 1**

*Overview of hypotheses tested in Study 1*

Number	Hypothesis
1	Intention will be negatively predicted by Attitude.
2	Intention will be positively predicted by Social norms.
3	Intention will be positively predicted by Perceived behavioural control.
4	Intention will be positively predicted by Environmental consequences.
5	Intention will be positively predicted by Financial consequences.
6	Intention will be positively predicted by Consistency.
7	Intention will be positively predicted by Awareness.

*Note* Table 1 depicts the hypotheses derived from literature presented in the Introduction, which have been visualised in Figure 1.

## Methods

### Participants

An a-priori Power analysis based on a multiple linear regression (MLR) with seven predictor variables was performed before data collection. It clarified that for the study to have a power of 80% to detect a medium effect size ( $f^2 = .15$ ) with  $\alpha = .05$ , the sample had to consist of at least 103 participants. The final sample satisfies this condition. Therefore, the results are likely valid and there is a small chance of detecting a false-positive (Type II error).

The study had inclusion criterion: Respondents had to be in possession of their own car, and this vehicle was not allowed to be acquired through a loan service or their place of employment. A total of 331 individuals met this criterion and filled in the questionnaire, but 59 respondents were excluded due to incorrect answers on the attention check. Therefore, the final sample consisted of 272 Dutch adults with a personal car. Participants were between the ages of 21 and 85 ( $M = 60.04$  years,  $SD = 1.32$ ), 132 of which were female and 140 were male.

Participants were recruited through Panel Inzicht, a Dutch agency that allows citizens to participate in research for reimbursements. Participation was voluntary and anonymous, and was reimbursed with € 2.75. The agency ensured that the sample was representative of the entire Dutch population.

### **Materials**

*Descriptive measures* pertaining to the participants (i.e., age, gender and car possession) were obtained at the beginning of the questionnaire to get an overview of the sample.

*The variables in the process model* were measured using self-constructed scales. Participants were asked to rate a total of 21 statements on a 7-point Likert scale (1 = *Completely disagree*, 7 = *Completely agree*). For each of the variables, a mean score was calculated for the three items pertaining to it (range 1 - 7). A reliability analysis was performed per variable to test the correlations between the constructed items in each scale. Which items were included per variable, what the meaning of the calculated score is, and what the reliability of the scale is can be found in Table 2. The full questionnaire can be found in Appendix A.

*An attention check* was placed in the middle of the questionnaire to help exclude participants who were not paying attention to the content of the questions. The question was disguised as one of the regular questionnaire items (7-point Likert scale, 1 = *Completely disagree* to 7 = *Completely agree*), and stated “I am paying attention, therefore I answer ‘Completely agree’ to this question”.

*Additional information* was requested from participants that will not be included in the present paper. Information includes how participants approached kilometre estimations for the period of a month and of a year, and how they experienced these tasks. This information was used to create part of the advisory report for the Ministry of Infrastructure and Water Management. Further information was gathered due to interest from the Ministry, namely questions regarding further demographic information (economic status, living location, and often-used travel methods), and questions regarding actions in BnG situations.

### **Procedure**

A Qualtrics-based questionnaire (<https://www.qualtrics.com>) was sent to clients of Panel Inzicht. Respondents were first presented with an information letter, after which they filled out an active consent form. Participants were then asked to fill in the demographic questions. Those who met the car possession criterion were able to complete the study in full, and continued to a randomised matrix with items pertaining to Attitude, Perceived

behavioural control, and Awareness. The attention check was also included in this matrix. Next, they were asked to make a kilometre estimation for the upcoming month. Afterwards, they were asked to fill in a second randomised matrix of questions pertaining to Intention, Financial consequences, Environmental consequences, Social norms, and Consistency. Lastly, participants were presented with a short explanation of the study with a thank you message, and were compensated for their time. Completing the questionnaire took approximately 5-10 minutes.

### **Data preparation and analysis**

To prepare for data analysis, unfit participants were filtered out of the datafile. Then, scores were computed for each of the assessed variables present. A mean score was calculated for the three items pertaining to that variable, leading to scores ranging from 1 - 7. Descriptive statistics were calculated for each of the items and scales (see Table 2).

To test the proposed process model, an MLR was performed. The quantitative dependent variable was Intention. The quantitative independent variables were Attitude, Social norms, Perceived behavioural control, Environmental consequences, Financial consequences, Consistency, and Awareness. The assumptions of linearity, homoscedasticity, independence of observations, no multicollinearity and normality were checked and met in the data sample.

**Table 2**

*Reliabilities, interpretation of scores and descriptive statistics related to the variables in Study 1.*

Variable	Meaning of variable score	Items	Reliability rating
Intention ( $M = 4.53$ , $SD = 1.15$ )	A higher score indicates more intention to adhere to the kilometre estimation.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre would motivate me to drive as many kilometres as I have estimated" (<math>M = 4.24</math>, <math>SD = 1.54</math>)</li> <li>2. "If I have to pay per kilometre, I will adjust my driving behaviour to ensure that I uphold my kilometre estimation" (<math>M = 4.51</math>, <math>SD = 1.60</math>)</li> <li>3. "If I have to pay per kilometre, I want my driving behaviour to match my kilometre estimation" (<math>M = 4.81</math>, <math>SD = 1.22</math>)</li> </ol>	Cronbach's alpha; $\alpha = .70$ indicating acceptable reliability.
Consistency ( $M = 5.93$ , $SD = 0.82$ )	A higher score indicates a higher internal desire to act consistent to oneself.	<ol style="list-style-type: none"> <li>1. "I believe it is important that I act according to my promises" (<math>M = 6.08</math>, <math>SD = 0.91</math>)</li> <li>2. "I believe it is important that my words match my actions" (<math>M = 5.95</math>, <math>SD = 0.92</math>)</li> <li>3. "I believe it is important that my behaviour fits my opinions" (<math>M = 5.76</math>, <math>SD = 0.97</math>)</li> </ol>	Cronbach's alpha; $\alpha = .86$ indicating good reliability.
Awareness ( $M = 5.28$ , $SD = 1.36$ )	A higher score indicates more awareness of one's mileage.	<ol style="list-style-type: none"> <li>1. "I am aware of the amount of kilometres I drive by car per month" (<math>M = 5.46</math>, <math>SD = 1.53</math>)</li> <li>2. "I am aware of the amount of kilometres I drive by car per year" (<math>M = 5.75</math>, <math>SD = 1.39</math>)</li> </ol>	Cronbach's alpha; $\alpha = .82$ indicating good reliability.

		3. "I monitor the amount of kilometres I drive with my car" ( $M = 4.61, SD = 1.81$ )	
Financial consequences ( $M = 4.34, SD = 1.34$ )	A higher score indicates that one sees more negative financial consequences for themselves as a result of the <u>BnG</u> system.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre will increase the financial burden of my car" (<math>M = 4.46, SD = 1.55</math>)</li> <li>2. "If I have to pay per kilometre, it will cost me more money" (<math>M = 4.36, SD = 1.48</math>)</li> <li>3. "Due to financial reasons, it would bother me to pay per kilometre" (<math>M = 4.19, SD = 1.68</math>)</li> </ol>	Cronbach's alpha; $\alpha = .81$ indicating good reliability.
Environmental consequences ( $M = 4.64, SD = 1.35$ )	A higher score indicates that one sees more positive consequences as a result of the <u>BnG</u> system.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre will decrease the CO<sub>2</sub> emission coming from Dutch car users" (<math>M = 4.21, SD = 1.71</math>)</li> <li>2. "Paying per kilometre will have good effects on the environment" (<math>M = 4.29, SD = 1.70</math>)</li> <li>3. "I believe it is important to work towards a better environment" (<math>M = 5.41, SD = 1.30</math>)</li> </ol>	Cronbach's alpha; $\alpha = .82$ indicating good reliability.
Attitude ( $M = 6.14, SD = 1.05$ )	A higher score indicates a more positive attitude towards the usage of one's car.	<ol style="list-style-type: none"> <li>1. "I think it is enjoyable to travel with my car" (<math>M = 6.10, SD = 1.21</math>)</li> <li>2. "I travel with my car because it is convenient" (<math>M = 6.07, SD = 1.17</math>)</li> <li>3. "Travelling by car gives me freedom of movement" (<math>M = 6.24, SD = 1.13</math>)</li> </ol>	Cronbach's alpha; $\alpha = .89$ indicating good reliability.

Perceived behavioural control ( $M = 3.61$ , $SD = 1.54$ )	A higher score indicates a more positive view of travelling with other transport modes than one's own car.	<ol style="list-style-type: none"> <li>1. "I can reach my destination well with other modes of travel than my car" (<math>M = 3.80</math>, <math>SD = 1.75</math>)</li> <li>2. "I think it is enjoyable to travel with other travel modes than my car" (<math>M = 3.54</math>, <math>SD = 1.86</math>)</li> <li>3. "I think it is convenient to travel with other travel modes than my car" (<math>M = 3.50</math>, <math>SD = 1.92</math>)</li> </ol>	Cronbach's alpha; $\alpha = .78$ indicating acceptable reliability.
Social norms ( $M = 4.07$ , $SD = 1.35$ )	A higher score indicates a more positive view of the responses that other Dutch citizens will have to the <u>BnG</u> system.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre will motivate Dutch citizens to change their driving behaviour" (<math>M = 4.43</math>, <math>SD = 1.64</math>)</li> <li>2. "Paying per kilometre will decrease the amount of kilometres travelled by car, by Dutch citizens" (<math>M = 4.31</math>, <math>SD = 1.64</math>)</li> <li>3. "Dutch citizens will respond positively to a tax system in which they are required to pay per kilometre" (<math>M = 3.44</math>, <math>SD = 1.60</math>)</li> </ol>	Cronbach's alpha; $\alpha = .78$ indicating acceptable reliability.

## Results

An MLR was run to predict Intention from Attitude, Social norms, Perceived behavioural control, Environmental consequences, Financial consequences, Consistency, and Awareness. The model significantly predicted Intention ( $F(5, 472) = 4.13, p = .001, R^2 = .35$ ). The results indicated that Financial consequences and Social norms were the only significant predictors of Intention in the model ( $p = .002$  and  $p < .001$  respectively). Notably, Awareness and Environmental consequences were marginally significant predictors of Intention ( $p = .052$  and  $p < .062$  respectively). Regression coefficients and standard errors for all variables can be found in Table 3.

**Table 3**

*Regression coefficients, standard errors and significances from the MLR of Study 1.*

Variables	Unstandardized		Standardized		<i>p</i>
	<i>B</i>	Std. Error	$\beta$	<i>t</i>	
Attitude	.001	.06	.001	.02	.983
Perceived behavioural control	.01	.04	.01	.24	.809
Social norms	.39	.07	.42	5.19	<.001**
Environmental consequences	.14	.08	.17	1.88	.062*
Financial consequences	.14	.05	.16	3.12	.002**
Consistency	.13	.08	.10	1.76	.079
Awareness	.08	.04	.10	1.96	.052*

*Note* The dependent variable of this MLR was Intention. Significant findings are indicated with two asterisks (\*\*), marginally significant findings are indicated with one asterisk (\*).

## Discussion

The purpose of Study 1 was to explore which of the seven factors derived from literature predict one's intention to adhere to a kilometre estimation. The results revealed that two of the factors, namely Social norms and Financial consequences, were significant positive predictors. Therefore, hypothesis 1 and 5 were accepted. Environmental consequences and Awareness were revealed to be marginally significant predictors, so hypotheses 4 and 7 were also accepted. Hypotheses 2, 3 and 6 were rejected due to non-significant correlations for Attitude, Perceived behavioural control and Consistency.

An overview of the decisions regarding the hypotheses can be found in Table 4. The significant findings are discussed in more detail below. Based on these findings, a revised version of the process model was created (see Figure 2).

**Table 4**

*Reflections of hypotheses tested in Study 1*

Number	Hypothesis	Decision
1	Intention will be negatively predicted by Attitude.	Rejected
2	Intention will be positively predicted by Social norms.	Accepted**
3	Intention will be positively predicted by Perceived behavioural control.	Rejected
4	Intention will be positively predicted by Environmental consequences.	Accepted*
5	Intention will be positively predicted by Financial consequences.	Accepted**
6	Intention will be positively predicted by Consistency.	Rejected
7	Intention will be positively predicted by Awareness.	Accepted*

*Note* Hypotheses accepted based on marginal significances are indicated with one asterisk (\*) and those based on significant results are indicated with two asterisks (\*\*).

In terms of the strongest predictor of Intention, Social norms, results showed that higher Social norms scores related to higher Intention scores, therefore hypothesis 2 was accepted. The study revealed that when one perceives that their social surroundings have a positive attitude towards the ‘Betalen naar Gebruik’ (BnG; pay for usage) system and will follow its rules correctly, they will have a stronger intention to adhere to their estimation. This is likely because the participants perceive the set-up of the BnG system as a governmental rule, and the social norm is to properly follow these kinds of rules to be a good citizen (Onu & Oats, 2016). Dutch citizens appear to be motivated to adhere to their estimation since following the moral rules behind tax laws is valued by society.

The second strongest predictor of Intention was Financial consequences. Results showed that higher Financial consequence scores related to higher Intention scores, therefore

hypothesis 5 was accepted. It became apparent that when one perceives more negative financial consequences for themselves in the BnG system, they will have a stronger intention to adhere to their kilometre estimation. This is likely because the more one drives within BnG and the more one exceeds their estimation, the more financial costs there will be. The monetary consequences of driving are a motivator for Dutch citizens to limit their driving behaviour to the mileage they have estimated (Katzev, 2003). Citizens may be particularly influenced by financial consequences since we are dealing with taxes. When one is confronted with taxes, there is an immediate negative response referred to as tax aversion; we do not wish to pay tax money, and we tend to see taxes as extreme personal costs (Kessler & Norton, 2016).

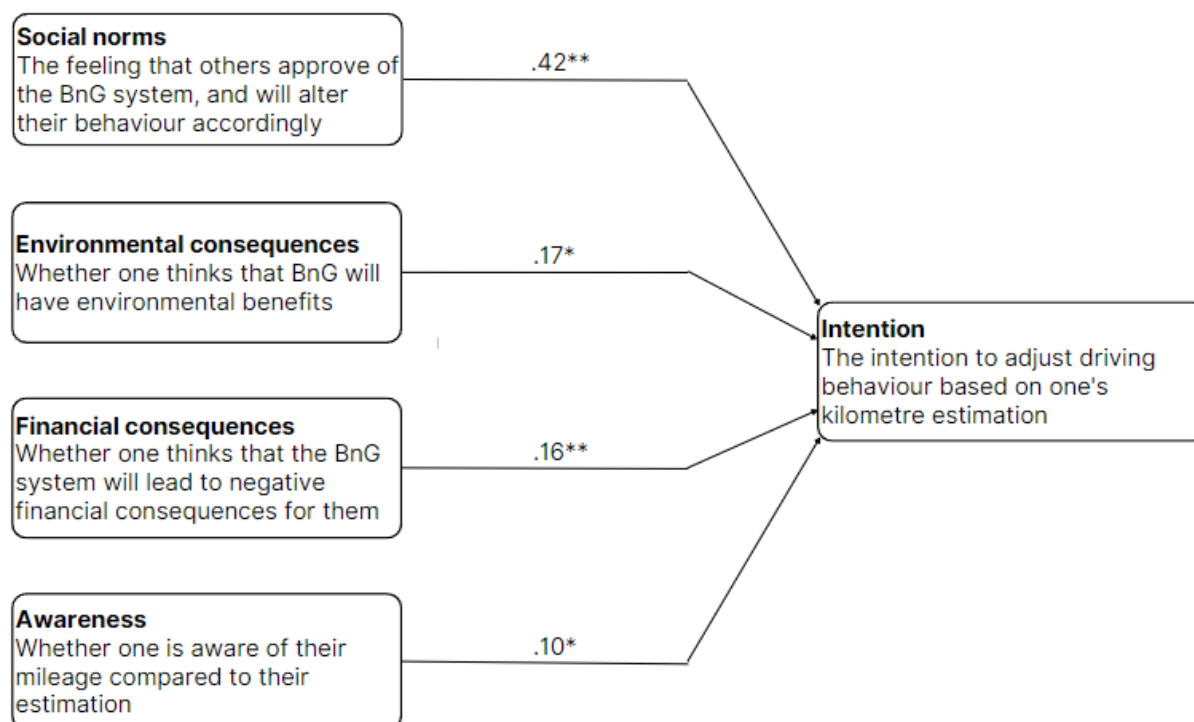
Based on the marginally significant findings, we can see that Environmental consequences also play a role in predicting Intention. Results showed that higher Environmental consequence scores related to higher Intention scores, so hypothesis 4 was accepted. It was revealed that when one believes that positive environmental effects (that it helps decrease CO<sub>2</sub> emission and climate change) will come from the BnG system, they have a stronger intention to adhere to their estimation. This is likely because these people see protecting the environment as important and therefore are more positive about following the system. They look more positively on reducing their mileage and have higher intentions of doing so, since they feel obliged to help aid climate preservation (Setiawan et al., 2014).

Lastly, Awareness was found to be a marginally significant predictor of Intention as well. Results showed that higher Awareness scores related to higher Intention scores, therefore hypothesis 7 was accepted. It was shown that those who are more aware of their past mileage had stronger intentions to adhere to their estimation. Similar effects on intending to limit or reduce car usage has been found in cases where insurance clients pay according to their mileage (Kurylowicz, 2017). This is likely because these individuals monitor their driving behaviour regularly and have a clear view of how much they drive. Due to this awareness, they have a better grip on their mileage and have a strong motivation to not exceed their estimation.

Overall, Study 1 showed that the four factors described above are the most promising when it comes to promoting the intention to adhere to one's estimation. Especially positive Social norms surrounding the BnG system and negative Financial consequences as a result of the system seem influential in terms of Intention and they should be investigated further in terms of Adherence.

**Figure 2**

*Revised process model: Factors determining adherence to a kilometre estimation made within the BnG system, according to Study 1.*



*Note.* The headings in the boxes refer to the concept of the predictor, with an explanation of the concept below. The arrows indicate the relationships between the variables. The strengths are indicated by the standardised B-weights from the Multiple Linear Regression analysis. Hypotheses accepted based on marginal significances are indicated with one asterisk (\*), and those based on significant results are indicated with two asterisks (\*\*).

### **Study 2: Using the factors to increase Intention and Adherence**

Study 1 showed that perception of positive social norms surrounding 'Betalen naar Gebruik' (BnG; pay for usage) and awareness of negative financial consequences of BnG are related to an increase in Intention. Study 2 aimed to test these relationships experimentally, to investigate possible influential links. Furthermore, it aimed to examine the link between Intention and Adherence. Hypotheses regarding Study 2 are discussed below and can be found in Table 5.

Firstly, Study 2 investigated the correlations between the variables, with similar relationships being expected as in Study 1. Namely, that Financial consequences and Social norms both positively predict Intention. Additionally, it is expected that the Social norms is the stronger predictor, as in Study 1.

To investigate whether influencing these factors can increase Intention, Study 2 made use of priming. Priming refers to the process where exposure to a stimulus activates a mental concept, which in turn influences subsequent behavioural choices (Wheeler et al, 2014). Priming was applied through a memory recall task, and participants were presented with either a financial priming condition, a social priming condition or a control condition. Participants were asked to recall and describe a recent event where they either felt financially stressed or socially included in their surroundings, or they described a neutral event about using their car.

Previously, it was found that using priming to put individuals in a financial stress mindset can lead to feelings of financial urgency, therefore increasing the negative valence of financial consequences (Nelson & Morrison, 2005). Therefore, it is expected that the financial priming condition will lead to an increased effect of Financial consequences. Similarly, using priming to induce a social mindset can lead to feelings of social inclusion, in turn increasing the positive valence of social norms (Molden, 2014). Therefore, it is expected that the social priming condition will lead to an increased effect of Social norms. Based on the relationship found between the variables in Study 1, it is expected that the social priming and financial priming conditions will lead to increases in Intention compared to the control condition, and that social priming will lead to a stronger increase compared to financial priming.

The link between Intention and Adherence is investigated to see whether activating strong intentions to adhere to an estimation will lead to proper adherence to this estimation. According to the TPB, it can be expected that higher intention leads to better adherence (Ajzen, 1999). However, this is not always the case due to the so-called intention-behaviour gap. This phenomenon refers to situations where one intends to execute a behaviour but does not end up doing so (Sheeran & Webb, 2016). It is due to a phenomenon known as inertia; a motivational resistance to change, where people do not have enough mental energy to put their intentions into actions (Gao et al., 2020). Especially behaviours that are highly habituated due to their frequent and repetitive nature (such as driving behaviour), can have this motivational gap. To examine whether a gap between intention and behaviour exists in the case of a BnG estimation, Study 2 tested whether one's intention to adhere to their estimation predicts actual Adherence.

**Table 5***Overview of hypotheses tested in Study 2*

Number	Hypothesis
1	Higher scores on Financial consequences will predict higher scores on Intention.
2	Higher scores on Social norms will predict higher scores on Intention.
3	Social norms will be a stronger predictor of Intention than Financial consequences.
4	Financial priming will lead to higher scores on Financial consequences.
5	Social priming will lead to higher scores on Social norms.
6	Financial priming will lead to higher scores on Intention, compared to the control condition.
7	Social priming will lead to higher scores on Intention, compared to the control condition.
8	Social priming will lead to higher scores on Intention, compared to Financial priming.
9	Higher scores on Intention will predict better Adherence.

*Note* The hypotheses were derived from literature as well as findings from Study 1.

## Methods

### Participants

An a-priori Power analysis based on an ANOVA with 3 groups was performed before data collection. It clarified that for the study to have a power of 80% to detect a medium effect size ( $f = .25$ ) with  $\alpha = .05$ , the sample had to consist of at least 159 participants. The final sample satisfies this condition. Therefore, the results are likely valid and there is a small chance of detecting a false-positive (Type II error).

A total of 2534 individuals attempted to fill in the first part of the online study. 1877 respondents did not complete the full questionnaire, mostly dropping out during the part where a picture of their car's odometer had to be sent in. Furthermore, 186 respondents were excluded from the study due to faulty pictures. Therefore, the sample for the first measurement consisted of 471 Dutch adults with a personal car. Participants were between the ages of 19 and 89 ( $M = 57.02$  years,  $SD = 14.39$ ), 188 of which were female and 283 were male. Of these participants, 397 returned for the second measurement of the study. Those participants were between the ages of 22 and 89 ( $M = 58.33$  years,  $SD = 13.73$ ), 152 of which were female and 245 were male.

Participants were recruited through Panel Inzicht, as in Study 1. Participation was reimbursed with € 3,00 in measurement 1 and with € 1,00 in measurement 2.

## Materials

*Descriptive measures* pertaining to the participants (i.e., age, gender, car possession) were obtained at the beginning of the questionnaire to get an overview of the sample.

*Priming* took place through a memory-recall task based on Zhong and Leonardelli (2008). For the control condition, participants recalled an event in which they last made use of their car. For the financial condition, participants recalled an event in which they experienced financial stress. For the social condition, participants recalled an event in which they felt socially connected. They were asked to write at least 25 words regarding this experience. A timer ensured that participants spent at least one minute working on the assignment.

*Manipulation check:* The quality of the priming was checked using three items pertaining to Financial consequences and Social norms, stemming from scales constructed in Study 1. Participants were asked to rate the statements on a 7-point Likert scale (1 = *Completely disagree*, 7 = *Completely agree*). The items, as well as the reliability between them, can be found in Table 6.

*Kilometre estimations* were assessed for a period of two weeks. Participants were asked to estimate the number of kilometres they would approximately drive during this time period, in round kilometres.

*Intention* was assessed with a self-constructed scale, derived from Study 1. Participants were asked to rate three statements on a 7-point Likert scale (1 = *Completely disagree*, 7 = *Completely agree*). The items, as well as the reliability between them in the current sample, can be found in Table 6.

*Mileage* was assessed by asking participants to send in pictures of their car's internal odometer at measurement 1 and measurement 2. Driven mileage in the two-week period was calculated by subtracting the odometer count in picture 2 from that in picture 1. Alongside the pictures, participants were required to fill in the exact count on their odometer during both measurements, to decrease the time needed to process the information. The full questionnaire from measurement 1 and 2 can be found in Appendix B and C respectively.

*Additional information* was requested from participants, that was not included in the present paper due to time constraints. Information includes a kilometre estimation for a four-week period, to get information about the studies effects across a longer time period.

## Procedure

Two online questionnaires were sent to clients of the panel bureau. The first

questionnaire acted as the point of manipulation and pre-measurement for the mileage on the odometer, the second questionnaire acted as the second measure of the mileage on the odometer.

Measurement 1: Respondents first received information about the study and were able to participate if they filled out an active consent form. Those who met the car possession criterion and actively consented to multiple measures being taken were able to complete the study. Those who did not meet the requirements were referred back to the bureau's website. Participants were met with the demographic questions, after which they were randomly assigned to one of the three conditions (financial/social/control). As part of each condition, participants completed a recall task where they described a memory related to the condition they were in. They were required to write at least 25 words about this memory, and were able to progress to the next part of the study after a timer of one minute ran out. Following this, participants rated three items related to financial consequences and social norms. Next, the participants were asked to make a kilometre estimation for the upcoming two weeks and were asked to rate three items accessing their intention to adhere to this estimation. Lastly, participants were asked to upload a picture of the mileage on their car's internal odometer. Alongside this, they were requested to fill in the exact count on the odometer in the questionnaire. Finally, participants were compensated for their time. Participation in measurement 1 took approximately 10 minutes.

Measurement 2: All participants of the first measurement were invited back for a second odometer measurement. They were asked to upload another picture of their car's odometer, and to fill in the exact count in the questionnaire. Lastly, they were presented with a thank you message explaining the contents of the study shortly, and they were compensated for their time. Participation in measurement 2 took approximately 5 minutes.

### **Data preparation and analysis**

To prepare for data analysis, scores were computed for Intention, Financial consequences and Social norms. A mean score was calculated for the three items pertaining to each variable, leading to scores ranging from 1 - 7. Furthermore, one's mileage in the two weeks was calculated by subtracting the odometer reading from the first measurement from that of the second measurement. Using this number, the adherence score was calculated, by subtracting the number of kilometres estimated from the distance travelled. Descriptive statistics were calculated for all variables (see Table 6 and Table 7).

To analyse the relationships between factors from Study 1, an MLR was performed after measurement 1. The quantitative dependent variable was Intention. The quantitative

independent variables were Social norms and Financial consequences. The assumptions of linearity, homoscedasticity, independence of observations, no multicollinearity and normality were checked and met in the data sample.

To test whether the priming conditions had the intended effects on the variables, a manipulation check was performed after measurement 1 using a one-way MANOVA. The quantitative dependent variables in this analysis were Financial consequences and Social norms. The qualitative independent variable was Condition. The assumptions of linearity, multivariate normality, no multivariate outliers, no multicollinearity, and homogeneity were checked and met in the data sample. There were 19 univariate outliers, which were not excluded since removing them did not influence the results.

To analyse the effect of the conditions on Intention, a one-way ANOVA was performed after measurement 1. The quantitative dependent variables in this analysis was Intention. The qualitative independent variable was Condition. The assumptions of linearity, normality, and homogeneity were checked and met in the data sample. There were seven univariate outliers, which were not excluded since removing them did not influence the results.

Lastly, a Pearson's  $r$  correlation was performed among all participants (regardless of their assigned condition) after measurement 2, to test the link between the quantitative independent variable Intention and the quantitative dependent variable Adherence. The assumptions of linearity, and bivariate normality were checked and met in the data sample. Eleven extreme outliers for Adherence were identified in a boxplot ( $3^{\text{rd}}$  quartile +  $3 \times \text{interquartile range}$  or  $1^{\text{st}}$  quartile -  $3 \times \text{interquartile range}$ ). These were excluded since their presence influenced the results.

**Table 6**

*Reliabilities, interpretation of scores and descriptive statistics related to variables in Study 2.*

Variable	Meaning of variable score	Items	Reliability rating
Intention ( $M = 4.13$ , $SD = 1.25$ )	A higher score indicates more intention to adhere to the kilometre estimation.	<ol style="list-style-type: none"> <li>1. "I am motivated to drive as many kilometres as I have estimated" (<math>M = 3.98</math>, <math>SD = 1.58</math>)</li> <li>2. "I want to adjust my driving behaviour to ensure that I uphold my kilometre estimation" (<math>M = 3.96</math>, <math>SD = 1.59</math>)</li> <li>3. "I want my driving behaviour to match my kilometre estimation" (<math>M = 4.48</math>, <math>SD = 1.41</math>)</li> </ol>	Cronbach's alpha; $\alpha = .75$ indicating acceptable reliability.
Financial consequences ( $M = 3.92$ , $SD = 1.59$ )	A higher score indicates that one sees more negative financial consequences for themselves as a result of the <u>BnG</u> system.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre will increase the financial burden of my car" (<math>M = 4.03</math>, <math>SD = 1.71</math>)</li> <li>2. "If I have to pay per kilometre, it will cost me more money" (<math>M = 4.02</math>, <math>SD = 1.74</math>)</li> <li>3. "Due to financial reasons, it would bother me to pay per kilometre" (<math>M = 3.71</math>, <math>SD = 1.85</math>)</li> </ol>	Cronbach's alpha; $\alpha = .88$ indicating good reliability.
Social norms ( $M = 4.29$ , $SD = 1.22$ )	A higher score indicates a more positive view of the responses that other Dutch citizens will have to the <u>BnG</u> system.	<ol style="list-style-type: none"> <li>1. "Paying per kilometre will motivate Dutch citizens to change their driving behaviour" (<math>M = 4.54</math>, <math>SD = 1.58</math>)</li> <li>2. "Paying per kilometre will decrease the amount of kilometres travelled by car, by Dutch citizens" (<math>M = 4.49</math>, <math>SD = 1.53</math>)</li> <li>3. "Dutch citizens will respond positively to a tax system in which they are required to pay per kilometre" (<math>M = 3.84</math>, <math>SD = 1.52</math>)</li> </ol>	Cronbach's alpha; $\alpha = .70$ indicating acceptable reliability.

**Table 7***Interpretation of scores and descriptive statistics related to variables in Study 2, continued.*

Variable	Meaning of the variable score	Descriptive statistics
Odometer 1	The kilometre count on the car's internal odometer at measurement 1.	$M = 114518.92$ , $SD = 81066.28$ , $N = 468$
Odometer 2	The kilometre count on the car's internal odometer at measurement 2.	$M = 114001.34$ , $SD = 82548.93$ , $N = 397$
Distance travelled	The difference between Odometer 1 and Odometer 2, indicating how many kilometres were travelled by car in the two week time span.	$M = 404.48$ , $SD = 479.28$ , $N = 397$
Estimation	The amount of kilometres that one estimated to drive in the two week period.	$M = 467.89$ , $SD = 672.79$ , $N = 468$
Adherence	The Estimation minus the Distance travelled, with a negative score indicating that one travelled less than estimated and a positive score indicating that one travelled more than estimated.	$M = -36.18$ , $SD = 512.14$ , $N = 397$

## Results

An MLR was run to predict Intention from Financial consequences and Social norms. The model significantly predicted Intention ( $F(2, 468) = 28.151, p < .001, R = .12$ ). Both variables added significantly to the prediction (Financial consequences,  $p = .01$ ; Social norms,  $p < .001$ ). Regression coefficients and standard errors can be found in Table 8.

**Table 8**

*Regression coefficients, standard errors and significances from the Intention MLR of Study 2.*

Variables	Unstandardized		Standardized		
	Coefficients		Coefficients		
	<i>B</i>	Std. Error	$\beta$	<i>t</i>	<i>p</i>
Social norms	.10	.40	.12	2.59	.010*
Financial consequences	.36	.50	.35	7.50	<.001**

*Note* The dependent variable of this MLR was Intention. Significant findings of  $p < .01$  are indicated with two asterisks (\*\*), significant findings of  $p < .05$  are indicated with one asterisk (\*).

A one-way MANOVA was run to determine the effect of Condition (control/financial/social) on Financial consequences and Social norms. Descriptive statistics regarding the variables in the different Conditions can be found in Table 9. There were no statistically significant differences between the Conditions on the dependent variables,  $F(4, 934) = 1.52, p = .194$ ; Wilks'  $\Lambda = .99$ ; partial  $\eta^2 = .01$ .

**Table 9**

*Descriptive statistics regarding the manipulation check MANOVA of Study 2.*

Variable	Financial consequences			Social norms		
	<i>n</i>	<i>M</i>	<i>SD</i>	<i>n</i>	<i>M</i>	<i>SD</i>
Control condition	163	4.13	1.47	163	4.31	1.24
Financial condition	157	3.86	1.68	157	4.29	1.21
Social condition	151	3.76	1.60	151	4.25	1.21

*Note* The dependent variables of this MANOVA were Financial Consequences and Social norms. The independent variable was Condition.

A one-way ANOVA was run to determine the effect of Condition (control/financial/social) on Intention. Descriptive statistics regarding Intention in the different Conditions can be found in Table 10. There were no statistically significant differences between the Conditions on Intention,  $F(2, 468) = 2.64, p = .073$ .

**Table 10**

*Descriptive statistics regarding the Condition x Intention ANOVA of Study 2.*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>
Control condition	163	4.22	1.21
Financial condition	157	3.95	1.33
Social condition	151	4.25	1.20

*Note* The dependent variable of this ANOVA was Intention. The independent variable was Condition.

A Pearson's correlation was run to assess the relationship between Intention and Adherence. Preliminary assumptions checking revealed 11 outliers, which were excluded since they influenced the results. Therefore, the analysis was run among 386 subjects. There was no statistically significant correlation between the variables,  $r(384) = .016, p = .750$ , with Intention explaining 0.03% of the variation in Adherence.

## Discussion

Study 2 aimed to experimentally test how perception of positive Social norms surrounding 'Betalen naar Gebruik' (BnG; pay for usage) and awareness of negative financial consequences of BnG are related to Intention, through an online priming study. Furthermore, it examined the link between Intention and Adherence. An overview of the decisions made per hypothesis can be found in Table 11. The findings will be discussed in more detail below.

**Table 11***Reflection of hypotheses tested in Study 2*

Number	Hypothesis	Decision
1	Higher scores on Financial consequences will predict higher scores on Intention.	Accepted
2	Higher scores on Social norms will predict higher scores on Intention.	Accepted
3	Social norms will be a stronger predictor of Intention than Financial consequences.	Rejected
4	Financial priming will lead to higher scores on Financial consequences.	Rejected
5	Social priming will lead to higher scores on Social norms.	Rejected
6	Financial priming will lead to higher scores on Intention, compared to the control condition.	Rejected
7	Social priming will lead to higher scores on Intention, compared to the control condition.	Rejected
8	Social priming will lead to higher scores on Intention, compared to Financial priming.	Rejected
9	Higher scores on Intention will predict better Adherence.	Rejected

The current study replicated findings from Study 1, by once again showing that Financial consequences and Social norms are significant positive predictors of Intention. Financial consequences positively predicted Intention, therefore hypothesis 1 was accepted. Results showed that when one perceives more negative financial consequences for themselves in the BnG system, they will have a stronger intention to adhere to their kilometre estimation. Social norms also predicted Intention positively, so hypothesis 2 was accepted. Results revealed that when one perceives that their social surroundings have a positive attitude towards the BnG system and will follow its rules correctly, they will have a stronger intention to adhere to their estimation. Contradictory to Study 1, Financial consequences was a stronger predictor of Intention than Social Norms, so hypothesis 3 was rejected.

Due to the significant relationships between the variables, we expected that increasing Financial consequences and Social norms through a priming recall task would increase Intention. However, neither the Financial nor the Social priming led to an increase in

Intention compared to the control group or compared to each other. Thus, hypotheses 6, 7 and 8 were rejected. A likely reason for the lack of effect from Condition on Intention comes from the effectiveness of the manipulation. A manipulation check revealed that the financial priming condition did not lead to higher scores on Financial consequences and that the social priming condition did not lead to higher scores on Social norms, when compared to each other and the control group. Therefore, hypotheses 4 and 5 were rejected.

Lastly, it was expected that when one intends to adhere to their estimation, that this will predict their eventual adherence. However, among the sample this was not the case. Those who indicated stronger intentions to follow their estimation, did not perform better in terms of adherence. Their mileage across the two-week period deviated similarly from their estimation as compared to those with lower intention scores. Therefore, hypothesis 9 was rejected.

Overall, Study 2 showed that perception of positive Social norms surrounding the BnG system and awareness of negative Financial consequences related to BnG predict the intention to adhere to one's kilometre estimation. However, due to unsuccessful manipulations, no influential effects were found. In terms of the intention-behaviour link, Study 2 did not find that Intention was related to Adherence.

### **General Discussion**

The current paper aimed to increase knowledge regarding the kilometre estimation that Dutch citizens have to make within the new 'Betalen naar Gebruik' (BnG; pay for usage) road tax system. It was investigated which factors predict the intention to adhere to their estimation, and together Study 1 and 2 provide evidence for two promising factors: Financial consequences and Social norms. These factors can be used for potential intervention strategies that aim to increase adherence to an estimation.

Surprisingly, the studies disagreed on which of these factors was the strongest predictor of intention, with Study 1 favouring Social norms and Study 2 favouring Financial consequences. Reasoning may come from recent media publications regarding the costs of car usage within BnG. In the weeks surrounding the second study, it was published that citizens will have to pay more per kilometre than first expected, which could make Financial consequences a more motivating factor. It could thus be that the participants of Study 2 had seen the developments regarding the financial costs of BnG on media platforms, making

financial consequences more predictive of their intentions compared to the unknowing participants of Study 1.

Study 2 did not manage to manipulate these factors successfully to increase intention, possibly due to the way in which priming works. For a stimulus to effectively prime a concept, these two need to be closely linked in terms of content (Wheeler et al, 2014). If the two are not similar enough in content, subjects are often unable to mentally link the information from the primes to that of the related concepts (Wheeler et al, 2014). The priming tasks in Study 2 were rather ambiguous compared to the factors they aimed to increase, causing the link to be unclear to participants. The manipulations were focussed on increasing feelings of financial stress and social inclusion, which could increase the valence of financial and social cues according to previous research (Nelson & Morrison, 2005; Molden, 2014). However, since the factors in the present study were specifically applied to BnG situations, it could have been difficult for participant to transfer the contents of the priming tasks to the factors. In short, the priming tasks were not designed to fit the content of the factors well enough, and therefore there was no priming effect. In turn, the different Conditions did not differ in scores on Financial consequences and Social norms, which led to a lack of effect coming from Condition subsequent factors such as Intention.

One way to improve manipulation and successfully increase the factors, is stronger and more specific priming. To do this, the content of the primes needs to closely match that of the factors they aim to increase (Wheeler et al, 2014). Content of future primes should be focussed specifically on the BnG context, emphasizing the financial stress and social views surrounding BnG. This way, the receiver of the message can link the primes directly to their choices and opinions regarding BnG, causing the factors to be more influential on the intention to follow the estimation created within this system.

It is important to note that these findings suffer from limited generalisability. The samples of both studies were not representative of the entire Dutch population. While the panel agency aimed to gather samples that were as representative of the population as possible, the samples ended up containing mostly individuals of above average age. The mean age of the participants was 60 in Study 1 and 57 in Study 2, while the mean age of the Dutch population is approximately 42 years old (Centraal Bureau voor de Statistiek, n.d.). It could be that the factors have different effects on younger individuals, or that other factors are more influential to them. For example, it has been found that younger generations tend to value environmental factors more when making decisions, and thus that may also be an important factor to further investigate in the future (Gifford & Nilsson, 2014).

Furthermore, Study 2 failed to find a link between intention and behaviour. This could be because participants did not deem it important to follow their estimation, since no real-world consequences were linked to their adherence in the study. They may have simply filled in an estimation, without taking this into account when using their car. This seems likely since the sample of the study consisted of individuals who participated mainly for the reimbursement, causing them to not be motivated to put effort into following their estimation. Previously, it was found that for intention to lead to behaviour, sufficient motivation to execute the behaviour is needed (Adam & Foyolle, 2015). It could however be that a link between intention and behaviour is present when BnG is instated, since the estimation then actually has real-life consequences causing people to be more motivated to adhere. For example, the factor Financial consequences was important to the participants in the study, but their intention was not high enough to lead to estimation adherence since no real monetary costs were linked to behaviour.

Another possible reason for the lack of effect comes from methodological issues. The set-up of the online study led to a majority of participants having more than two weeks of time in between their measurements. This means that the estimation they made for a two-week period was compared to a mileage of more than two weeks. This could have led to these participants overriding their estimation and thus getting a higher Adherence score. It is therefore possible that the lack of relationship between intention and behaviour does not stem from participants overriding their estimations, but rather methodological issues.

Future research should therefore reexamine the relationship between intention and adherence, using objective methods to gather mileages from participants. For example, it could make use of built-in sensors in the cars of participants, that automatically record the mileage for the amount of time that one has estimated their mileage for. That way, it can be ensured that the proper mileage is compared to the estimation to get reliable outcomes and conclusions. An upside of using this method is that it would overcome the difficulties experienced with gathering participants for Study 2. Namely, Study 2 had a dropout rate of over 81%. Over 2000 of the respondents dropped out once they were required to take a picture of their odometer, or they sent in incorrect pictures in hopes of being compensated without putting in effort to complete the task correctly. Using an automatic sensor system would overcome these problems, and make future research into estimation adherence easier, less time consuming and more reliable.

Theoretically speaking, it is important to further examine the link between intention and adherence to see whether there truly is an intention-behaviour gap (Sheeran & Webb, 2016). The present research believed that adhering to an estimation is an intentional choice that is made voluntarily by Dutch citizens. Therefore, the Theory of Planned Behaviour (TPB) was used as a starting point. It was believed that intention could be targeted by intervention strategies, which would in turn influence behaviour. However, since an intention-behaviour gap was discovered, it could be that estimation adherence is an entirely different kind of behaviour and that the TPB is not a fitting model. It is possible that the gap comes from the fact that driving behaviour is highly habituated, due to its frequently repeated nature. The TPB tends not to be a fitting model in the cases of habituated behaviour, since intention alone does not tend to lead to changes in behaviour in these cases (Gao et al., 2020). Strong motivation is required to alter habituated behaviour, otherwise behavioural execution will fail (Gardner et al., 2020).

If future research once again finds an intention-behaviour gap in the case of a BnG kilometre estimation despite making use of the methodological improvements mentioned before, then it could be concluded that the TPB is indeed not a fitting model since adherence is not a completely intentional choice. It would then be more fitting to look into adherence using theoretical models focussed specifically on behaviours that partly constitute of habit. An example of such a model is the Reflective-Impulsive Model (Strack & Deutsch, 2004). This model combines the influences of intentional thinking and behavioural habit. With this model, future research can answer the question of how estimation adherence operates and how it can best be influenced.

To conclude, the present paper provided the first groundworks regarding the adherence to a BnG-style kilometre estimation. Two promising factors came forward, namely the negative financial consequences from the Bng system and positive social norms regarding the system, which predicted the intention to adhere. However, no link was found between this intention and actual adherence. It is vital that future research revisits these factors and discovers more about whether adherence will be an intentional choice or whether it will be determined more by driving habit.

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## Appendix A – Questionnaire Study 1

### Informatiebrief

Beste lezer,

Allereerst bedankt voor uw interesse en eventuele deelname aan het huidige wetenschappelijke onderzoek.

Door middel van de volgende informatie willen wij u vragen om deel te nemen aan dit online onderzoek. Op de volgende pagina krijgt u de mogelijkheid om aan te geven of u bereid bent om deel te nemen. Deelname aan dit onderzoek is volledig vrijwillig, en u kunt ten allen tijden stoppen zonder dat u hiervoor een reden hoeft op te geven.

De minimale leeftijd voor deelname is 18 jaar.

Voordat u beslist deel te nemen aan dit onderzoek, vertellen wij hieronder wat het onderzoek precies inhoudt en welke vragen u kunt verwachten. Lees deze informatie rustig door en neem gerust contact op met het e-mailadres onderaan deze brief als u vragen hebt.

### Achtergrond van het onderzoek

Dit onderzoek dient voor een scriptie van de master Gedragsverandering aan de Radboud Universiteit Nijmegen, en wordt uitgevoerd door een student. De scriptie focust zich op het rijgedrag van Nederlandse burgers. Het onderzoek zal bestaan uit een aantal korte vragenlijsten waarin u wordt gevraagd naar uw rijgedrag en uw inzicht in uw kilometrage. U wordt niet gevraagd om specifieke aantallen of persoonlijke informatie in te vullen. De vragen zullen zich volledig focussen op uw ervaring rondom uw rijgedrag en uw gevoel van inzicht in uw jaarlijkse kilometrage. Het invullen van de vragenlijsten duurt ongeveer **10 minuten**.

Het onderzoek heeft een minimaal risico en voldoet aan de ethische kaders van de “Light Track” zoals opgesteld door de Ethiek Commissie Sociale Wetenschappen (ECSW) van de Radboud Universiteit. De onderzoeker heeft dit vastgesteld middels het invullen van de checklist behorende bij de Light Track. Doormiddel van deelname draagt u bij aan het aanvullen van missende informatie in de huidige literatuur rondom rijgedrag en kilometrage inzicht onder de Nederlandse bevolking.

### Vertrouwelijkheid van uw gegevens en gegevensverwerking

Voor dit onderzoek wordt het software programma Qualtrics gebruikt, wat data op anonieme wijze verzamelt. Er worden door dit systeem geen IP-adressen verzameld. Tijdens het onderzoek zal er beperkte persoonsinformatie van u gevraagd worden (geslacht en leeftijd). Er wordt niet gevraagd naar informatie waarmee u mogelijk geïdentificeerd kunt worden; deelname is dus volledig anoniem.

De informatie die u verstrekt ten behoeve van het onderzoek wordt zorgvuldig behandeld en is alleen toegankelijk voor bevoegde medewerkers. Het door u ondertekende toestemmingsformulier wordt gedurende 10 jaar na afronding van het onderzoek bewaard. Uw onderzoeksgegevens worden gedurende 10 jaar na afronding van het onderzoek bewaard. Het beleid van de Radboud Universiteit is om data maximaal 10 jaar te bewaren, waarna het zorgvuldig zal worden verwijderd. Vanwege het belang van controle, hergebruik en/of replicatie van onderzoeksresultaten worden onderzoeksgegevens in toenemende mate gedeeld met of openbaar gemaakt voor andere onderzoekers. Door de anonieme verzamelmethode van de data bent u niet te identificeren op basis van uw onderzoeksgegevens. Indien u niet wenst dat uw volledige anonieme antwoorden en gegevens gedeeld worden, vul bij de toestemmingsverklaring op de volgende pagina "Nee, ..." in.

Het is daarnaast ook mogelijk om op elk moment te stoppen met deelnemen aan het onderzoek door de pagina te verlaten. Door vroegtijdig te stoppen voorkomt u dat uw antwoorden gebruikt worden in het huidige wetenschappelijk onderzoek. Sommige personen en instanties moeten inzage kunnen hebben in uw anonieme persoons- en onderzoeksgegevens. Dit is nodig om te kunnen controleren of het onderzoek goed en betrouwbaar is uitgevoerd. Deze personen en instanties die ter controle toegang tot uw gegevens kunnen verkrijgen zijn onder andere: daartoe bevoegde personen binnen de Radboud Universiteit. Ook zij zullen de gegevens vertrouwelijk behandelen. U wordt gevraagd voor deze inzage toestemming te geven. Indien u dat niet wilt, kunt u niet deelnemen aan het onderzoek.

### **Vrijwillige deelname**

Uw deelname aan dit onderzoek is geheel vrijwillig, u krijgt de kans deze te bevestigen op de volgende pagina via de optie "Ja, ...".

Als u besluit om niet deel te nemen aan dit onderzoek heeft dit geen nadelige gevolgen voor u. Ook tijdens het onderzoek heeft u altijd het recht om uw toestemming in te trekken en uw deelname te beëindigen.

Bij vragen, opmerkingen of zorgen over deze studie, kunt u contact opnemen met de Uitvoerende onderzoeker via de hieronder gepresenteerde gegevens.

Met vriendelijke groeten,

Uitvoerend onderzoeker Nadine Meulmeester ([nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl))

Onder begeleiding van Ferry van de Pol ([ferry.vandepol@ru.nl](mailto:ferry.vandepol@ru.nl))

### **Toestemmingsverklaring**

Ik bevestig dat:

- ik schriftelijk naar tevredenheid over het onderzoek geïnformeerd ben;

- ik de schriftelijke informatie goed heb gelezen;
- ik in de gelegenheid ben gesteld om vragen over het onderzoek te stellen;
- mijn eventuele vragen naar tevredenheid zijn beantwoord;
- ik goed over deelname aan het onderzoek heb kunnen nadenken;
- ik uit vrije wil deelneem aan het onderzoek.

Ik begrijp dat:

- ik het recht heb om mijn toestemming op ieder moment weer in te trekken zonder opgave van redenen en zonder dat dit nadelige gevolgen voor mij heeft, door contact op te nemen met Nadine Meulmeester via [nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl)
- ik het recht heb op vernietiging van mijn onderzoeksgegevens tot 1 maand na afronding van het onderzoek;
- ik het recht heb om mijn toestemming voor de (verdere) verwerking van mijn persoonsgegevens in te trekken;
- mijn persoonsgegevens worden verwerkt volgens de geldende Europese privacyregelgeving;
- mijn persoonsgegevens worden verwerkt volgens de privacyverklaring van de Radboud Universiteit (<https://www.ru.nl/vaste-onderdelen/privacyverklaring-radboud-universiteit>);

Ik stem in dat:

- mijn onderzoeksgegevens binnen dit onderzoek voor wetenschappelijke doelen worden verkregen en gedurende 10 jaar beschikbaar zullen zijn voor controle, hergebruik en replicatie;
- het ondertekende toestemmingsformulier met mijn persoonsgegevens gedurende 10 jaar wordt bewaard;
- mijn persoonsgegevens, welke uitsluitend voor administratieve doelen worden verkregen, tot maximaal 1 maand na afronding van het onderzoek worden bewaard.
- voor de controle van het onderzoek toezichthoudende autoriteiten mijn persoons- en onderzoeksgegevens kunnen inzien.

Ik begrijp dat ik akkoord moet gaan met alle bovengenoemde punten om aan het onderzoek deel te kunnen nemen.

Ik stem in met deelname aan het onderzoek:

Ja, ik stem in met deelname en de gegeven informatie (1)

Nee, ik stem niet in met deelname of de gegeven informatie (2)

**Vraag 1**

Wat is uw leeftijd in jaren?

**Vraag 2**

Wat is uw geslacht?

- Vrouw (1)
- Man (2)
- Anders (3)
- Vul ik liever niet in (4)

**Vraag 3**

Wat is uw bruto (huishoud) inkomen per maand?

- Tot 2000 euro (1)
- 2000 - 4000 euro (2)
- 4000 - 5000 euro (3)
- 5000 - 7500 euro (4)
- > 7500 euro (5)

**Vraag 4**

Welke optie omschrijft uw leefomgeving het best?

- In een stad (1)
- In de buurt van een stad (2)
- In een landelijk gebied (3)

**Vraag 5**

Bent u in het bezit van een eigen auto?

- Nee, ik ben niet in het bezit van een eigen auto (1)
- Ik ben in het bezit van 1 eigen auto (2)
- Ik ben in het bezit van 2 of meer eigen auto's (3)
- Ik ben in het bezit van een private lease auto of een lease auto vanuit mijn werkgever/eigen bedrijf (4)
- Voor mij gelden meerdere van de bovenstaande opties (5)

**Vraag 6**

Stel, u maakt een reis binnen uw woonplaats. Welke vervoersmethode gebruikt u dan over het algemeen?

- Auto (1)
- Openbaar vervoer (2)
- Fiets (3)
- Anders (4)

**Vraag 7**

Stel, u maakt een reis naar een locatie die net buiten uw woonplaats ligt. Welke vervoersmethode gebruikt u dan over het algemeen?

- Auto (1)
- Openbaar vervoer (2)
- Fiets (3)
- Anders (4)

**Vraag 8**

Stel, u maakt een reis naar een locatie die ver buiten uw woonplaats ligt. Welke vervoersmethode gebruikt u dan over het algemeen?

- Auto (1)
- Openbaar vervoer (2)
- Fiets (3)
- Anders (4)





**Vraag 11**

We willen u nu vragen om goed na te denken over de hoeveelheid kilometers die u met de auto in de toekomst gaat afleggen.

Denk hier een moment voor uzelf over na, en ga dan door naar de volgende pagina.

Maak hieronder een inschatting van de hoeveelheid kilometers die u denkt te gaan rijden met uw auto in de maand Mei.

Vul de vraag als volgt in:

Ik denk dat ik ... kilometer zal rijden in deze periode.

**Vraag 12**

Klik hieronder één of meerdere opties aan die overeenkomen met de aspecten waarop u de schattingen gebaseerd heeft, of vul zelf een relevante optie in.

Ik heb mijn kilometer schatting voor de maand Mei gemaakt op basis van:

- De afstand naar mijn werk. (1)
- De afstand naar andere locaties (school; familie; sport; etc.). (2)
- Een vakantie/reis met de auto die momenteel op de planning staat. (3)
- De hoeveelheid dagen per week dat ik met de auto reis. (4)
- Een app die mijn kilometrage bijhoudt. (5)
- Een overzicht van mijn kilometrage wat ik zelf actief bijhoud. (6)
- Een verschil dat ik laatst op mijn kilometerteller heb opgemerkt. (7)
- Een gokje. (8)
- Iets anders, namelijk: (9)

**Vraag 13**

Hoe vond u het om een kilometer schatting voor de maand Mei te maken?

- Zeer moeilijk (1)
- Enigszins moeilijk (2)
- Noch gemakkelijk, noch moeilijk (3)
- Enigszins gemakkelijk (4)
- Zeer gemakkelijk (5)

**Vraag 14**

Hoe accuraat denkt u dat uw kilometer schatting voor de maand Mei is?

- Helemaal niet accuraat (1)
- Niet accuraat (2)
- Neutraal (3)
- Accuraat (4)
- Erg accuraat (5)

**Vraag 15**

Maak hieronder nu een inschatting van de hoeveelheid kilometers die u denkt te gaan rijden met uw auto in het jaar 2024.

Vul de vraag als volgt in:

Ik denk dat ik ... kilometer zal rijden in deze periode.

**Vraag 16**

Klik hieronder één of meerdere opties aan die overeenkomen met de aspecten waarop u de schattingen gebaseerd heeft, of vul zelf een relevante optie in.

Ik heb mijn kilometer schatting voor het jaar 2024 gemaakt op basis van:

- De afstand naar mijn werk. (1)
- De afstand naar andere locaties (school; familie; sport; etc.). (2)
- Een vakantie/reis met de auto die momenteel op de planning staat. (3)
- De hoeveelheid dagen per week dat ik met de auto reis. (4)
- Een app die mijn kilometrage bijhoudt. (5)
- Een overzicht van mijn kilometrage wat ik zelf actief bijhoud. (6)
- Een verschil dat ik laatst op mijn kilometerteller heb opgemerkt. (7)
- Een gokje. (8)
- Mijn maand inschatting. (9)
- Iets anders, namelijk: (10)

**Vraag 17**

Hoe vond u het om een kilometer schatting voor het jaar 2024 te maken?

- Zeer moeilijk (1)
- Enigszins moeilijk (2)
- Neutraal (3)
- Enigszins gemakkelijk (4)
- Zeer gemakkelijk (5)

**Vraag 18**

Hoe accuraat denkt u dat uw kilometer schatting voor het jaar 2024 is?

- Helemaal niet accuraat (1)
- Niet accuraat (2)
- Neutraal (3)
- Accuraat (4)
- Erg accuraat (5)

Voor het laatste onderdeel van het onderzoek willen we dat u zich de volgende situatie indenkt:

Stel dat u zou moeten betalen voor elke kilometer die u met uw auto rijdt, in de periode van een jaar. Aan de hand van uw inschatting zou u een voorschot moeten betalen aan het begin van het jaar.

Als het jaar verstreken is zal uw daadwerkelijke kilometrage vergeleken worden met uw inschatting, waarna u:

- 1) geld terug krijgt als u minder kilometers heeft gereden dan ingeschat, of
- 2) extra geld moet betalen als u meer kilometers heeft gereden dan ingeschat.

**Vraag 19**

Hoe zou uw kilometer schatting eruit zien in de genoemde situatie, in vergelijking met de schatting die u eerder in dit onderzoek gemaakt heeft?

- Veel lager (1)
- Enigszins lager (2)
- Hetzelfde (3)
- Enigszins hoger (4)
- Veel hoger (5)

**Vraag 20**

In de situatie zijn twee betalingsmomenten; een voorschot op basis van de inschatting en een narekening als het jaar verstreken is.

Zou u eerder:

- Een lagere inschatting maken om de financiële lasten nu te vermijden en nu zo min mogelijk te moeten betalen (1)
- Een soortgelijke schatting maken (2)
- Een hogere inschatting maken om de financiële lasten nu af te handelen en achteraf niet meer te hoeven betalen (3)

**Vraag 21**

De volgende stellingen gaan over de situatie waarin u per kilometer zou moeten betalen. Geef aan tot in hoeverre u het eens bent met de inhoud.



Betalen per kilometer zal Nederlandse burgers motiveren om hun rijgedrag aan te passen. (Q21\_9)

Betalen per kilometer zal de hoeveelheid gereden kilometers door Nederlandse burgers verminderen. (Q21\_10)

Nederlandse burgers zullen positief kijken naar een belastingsysteem waar zij per kilometer betalen. (Q21\_11)

## Vraag 22

De volgende stellingen gaan over wat u persoonlijk belangrijk vindt. Geef aan tot in hoeverre u het eens bent met de inhoud.

	Helemaal oneens (1)	Oneens (2)	Deels oneens (3)	Neutraal/Geen mening (4)	Deels eens (5)	Eens (6)	Helemaal eens (7)
Ik vind het belangrijk dat ik mijn beloftes nakom. (Q22_1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk dat mijn woorden overeenkomen met mijn daden. (Q22_2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk dat mijn gedrag past bij mijn meningen. (Q22_3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik vind het belangrijk om te streven naar een beter milieu. (Q22_4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Afsluiting

Hartelijk dank voor uw deelname aan dit onderzoek!

*Klik onderaan de pagina nog één maal op de pijl, zodat uw antwoorden worden verstuurd.*

Het doel van dit onderzoek is om meer inzicht te krijgen in het autogebruik van de Nederlandse bevolking, en het inschattingsvermogen omtrent auto kilometrage. Vondsten uit dit onderzoek zullen gebruikt worden in een scriptie gefocust een belastingsysteem waarin men betaald per gereden kilometer. Deze scriptie probeert de reactie van mensen op het systeem en de gevolgen van het systeem op rijgedrag duidelijk te maken.

Dit onderzoek wordt uitgevoerd door een student van de Radboud Universiteit Nijmegen, in opdracht van het Behavioural Insights Team van het Ministerie van Infrastructuur en Waterstaat.

Voor vragen omtrent dit onderzoek kunt u contact opnemen met de uitvoerend onderzoeker,

Nadine Meulmeester, via [nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl)

Nogmaals dank!

## Appendix B – Questionnaire Study 2 Measurement 1 (Dutch)

### Informatiebrief

Beste lezer,

Allereerst bedankt voor uw interesse en eventuele deelname aan het huidige wetenschappelijke onderzoek.

Deelname aan dit onderzoek is volledig vrijwillig, en u kunt ten allen tijden stoppen zonder dat u hiervoor een reden hoeft op te geven. Op de volgende pagina krijgt u de mogelijkheid om aan te geven of u bereid bent om deel te nemen.

Voordat u beslist deel te nemen aan dit onderzoek, vertellen wij hieronder wat het onderzoek precies inhoudt en welke vragen u kunt verwachten. Lees deze informatie rustig door en neem gerust contact op met het e-mailadres onderaan deze brief als u vragen heeft.

### Achtergrond van het onderzoek

Dit onderzoek dient voor een scriptie van de master Gedragsverandering aan de Radboud universiteit Nijmegen, en wordt uitgevoerd door een student. De scriptie focust zich op het rijgedrag en inschattingsvermogen van Nederlandse burgers.

Het onderzoek bestaat uit drie delen, die u allemaal moet voltooien om recht te hebben op een beloning.

- Deze vragenlijst dient als deel 1 van het onderzoek. Deel 1 bestaat uit een aantal korte vragen, een inschattingsvraag, en een vraag naar uw huidige kilometerstand. De kilometerstand zal u doormiddel van een foto moeten insturen. Het invullen duurt ongeveer 10 minuten.
- Over twee weken wordt u gevraagd om deel 2 van het onderzoek te voltooien. Deel 2 zal bestaan uit een vraag naar uw kilometerstand op dat moment, waarbij u nogmaals een foto moet insturen. Dit duurt ongeveer 5 minuten.
- Over vier weken wordt u gevraagd om deel 3 van het onderzoek te voltooien. Deel 3 zal bestaan uit een vraag naar uw kilometerstand op dat moment, waarbij u nogmaals een foto moet insturen. Dit duurt ongeveer 5 minuten.

### Vertrouwelijkheid van uw gegevens en gegevensverwerking

Voor dit onderzoek wordt het software programma Qualtrics gebruikt, wat data op anonieme wijze verzamelt. Er worden door dit systeem geen IP-adressen verzameld. Tijdens het onderzoek zal er beperkte persoonsinformatie van u gevraagd worden (geslacht en leeftijd). Er wordt niet gevraagd naar informatie waarmee u mogelijk geïdentificeerd kunt worden; deelname is dus volledig anoniem.

Het onderzoek heeft een minimaal risico en voldoet aan de ethische kaders van de “Light Track” zoals opgesteld door de Ethiek Commissie Sociale Wetenschappen (ECSW) van de Radboud Universiteit. De onderzoeker heeft dit vastgesteld middels het invullen van de

checklist behorende bij de Light Track. Doormiddel van deelname draagt u bij aan het aanvullen van missende informatie in de huidige literatuur rondom rijgedrag en kilometrage inzicht onder de Nederlandse bevolking.

De informatie die u verstrekt ten behoeve van het onderzoek wordt zorgvuldig behandeld en is alleen toegankelijk voor bevoegde medewerkers. Het door u ondertekende toestemmingsformulier wordt gedurende 10 jaar na afronding van het onderzoek bewaard. Uw onderzoeksgegevens worden gedurende 10 jaar na afronding van het onderzoek bewaard. Het beleid van de Radboud Universiteit is om data maximaal 10 jaar te bewaren, waarna het zorgvuldig zal worden verwijderd. Vanwege het belang van controle, hergebruik en/of replicatie van onderzoeksresultaten worden onderzoeksgegevens in toenemende mate gedeeld met of openbaar gemaakt voor andere onderzoekers. Door de anonieme verzamelmethode van de data bent u niet te identificeren op basis van uw onderzoeksgegevens. Indien u niet wenst dat uw volledige anonieme antwoorden en gegevens gedeeld worden, vul bij de toestemmingsverklaring op de volgende pagina "Nee, ..." in.

Het is daarnaast ook mogelijk om op elk moment te stoppen met deelnemen aan het onderzoek door de pagina te verlaten. Door vroegtijdig te stoppen voorkomt u dat uw antwoorden gebruikt worden in het huidig wetenschappelijk onderzoek. Sommige personen en instanties moeten inzage kunnen hebben in uw anonieme persoons- en onderzoeksgegevens. Dit is nodig om te kunnen controleren of het onderzoek goed en betrouwbaar is uitgevoerd. Deze personen en instanties die ter controle toegang tot uw gegevens kunnen verkrijgen zijn onder andere: daartoe bevoegde personen binnen de Radboud Universiteit. Ook zij zullen de gegevens vertrouwelijk behandelen. U wordt gevraagd voor deze inzage toestemming te geven. Indien u dat niet wilt, kunt u niet deelnemen aan het onderzoek.

### **Vrijwillige deelname**

Uw deelname aan dit onderzoek is geheel vrijwillig, u krijgt de kans deze te bevestigen op de volgende pagina via de optie "Ja, ...". Als u besluit om niet deel te nemen aan dit onderzoek heeft dit geen nadelige gevolgen voor u. Ook tijdens het onderzoek heeft u altijd het recht om uw toestemming in te trekken en uw deelname te beëindigen.

Bij vragen, opmerkingen of zorgen over deze studie, kunt u contact opnemen met de Uitvoerende onderzoeker via de hieronder gepresenteerde gegevens.

Met vriendelijke groeten,

Uitvoerend onderzoeker Nadine Meulmeester ([nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl))

Onder begeleiding van Ferry van de Pol ([ferry.vandepol@ru.nl](mailto:ferry.vandepol@ru.nl))

### **Toestemmingsverklaring**

Ik bevestig dat:

- ik schriftelijk naar tevredenheid over het onderzoek geïnformeerd ben;
- ik de schriftelijke informatie goed heb gelezen;
- ik in de gelegenheid ben gesteld om vragen over het onderzoek te stellen;
- mijn eventuele vragen naar tevredenheid zijn beantwoord;
- ik goed over deelname aan het onderzoek heb kunnen nadenken;
- ik uit vrije wil deelneem aan het onderzoek.

Ik begrijp dat:

- ik het recht heb om mijn toestemming op ieder moment weer in te trekken zonder opgave van redenen en zonder dat dit nadelige gevolgen voor mij heeft, door contact op te nemen met Nadine Meulmeester via [nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl)
- ik het recht heb op vernietiging van mijn onderzoeksgegevens tot 1 maand na afronding van het onderzoek;
- ik het recht heb om mijn toestemming voor de (verdere) verwerking van mijn persoonsgegevens in te trekken;
- mijn persoonsgegevens worden verwerkt volgens de geldende Europese privacyregelgeving;
- mijn persoonsgegevens worden verwerkt volgens de privacyverklaring van de Radboud Universiteit (<https://www.ru.nl/vaste-onderdelen/privacyverklaring-radboud-universiteit>);

Ik stem in dat:

- mijn onderzoeksgegevens binnen dit onderzoek voor wetenschappelijke doelen worden verkregen en gedurende 10 jaar beschikbaar zullen zijn voor controle, hergebruik en replicatie;
- het ondertekende toestemmingsformulier met mijn persoonsgegevens gedurende 10 jaar wordt bewaard;
- mijn persoonsgegevens, welke uitsluitend voor administratieve doelen worden verkregen, tot maximaal 1 maand na afronding van het onderzoek worden bewaard.
- voor de controle van het onderzoek toezichthoudende autoriteiten mijn persoons- en onderzoeksgegevens kunnen inzien.

Ik begrijp dat ik akkoord moet gaan met alle bovengenoemde punten om aan het onderzoek deel te kunnen nemen.

Ik stem in met deelname aan de drie onderdelen van dit onderzoek:

- Ja, ik stem in met deelname en de gegeven informatie (1)
- Nee, ik stem niet in met deelname of de gegeven informatie (2)

**Vraag 1**

Wat is uw leeftijd in jaren?

**Vraag 2**

Wat is uw geslacht?

- Vrouw (1)
- Man (2)
- Anders (3)
- Vul ik liever niet in (4)

**Vraag 3**

Bent u in het bezit van een eigen auto?

- Nee, ik ben niet in het bezit van een eigen auto (1)
- Ik ben ik het bezit van 1 eigen auto (2)
- Ik ben in het bezit van 2 of meer eigen auto's (3)
- Ik ben in het bezit van een private lease auto of een lease auto vanuit mijn werkgever/eigen bedrijf (4)
- Voor mij gelden meerdere van de bovenstaande opties (5)

**Vraag 4 – priming recall vraag – Controle conditie**

Beschrijf hieronder de meest recente situatie waarin u ergens naartoe reisde met uw auto.

Omschrijf uitgebreid:

- hoe deze situatie eruit zag,
- welke emoties er in u op kwamen,

- welke overwegingen door uw hoofd gingen,
- en welke mensen er mogelijk onderdeel waren van deze situatie.

*U kunt pas na een aantal minuten door naar de volgende vraag, neem dus de tijd om goed over de situatie na te denken. U kunt verder met de vragenlijst wanneer de pijl onderaan de pagina verschijnt.*

#### **Vraag 4 – priming recall vraag – Financiële conditie**

Beschrijf hieronder een recente situatie waarin u financiële stress ervaarde, bijvoorbeeld een moment waar u onverwachts een grote rekening moest betalen.

Omschrijf uitgebreid:

- hoe deze situatie eruit zag,
- welke emoties er in u op kwamen,
- welke overwegingen door uw hoofd gingen,
- en welke mensen er mogelijk onderdeel waren van deze situatie.

*U kunt pas na een aantal minuten door naar de volgende vraag, neem dus de tijd om goed over de situatie na te denken. U kunt verder met de vragenlijst wanneer de pijl onderaan de pagina verschijnt.*

#### **Vraag 4 – priming recall vraag – Sociale conditie**

Beschrijf hieronder een recente situatie waarin u zich sociaal verbonden voelde met mensen om u heen, bijvoorbeeld een moment waarin iemand iets aardigs voor u deed.

Omschrijf uitgebreid:

- hoe deze situatie eruit zag,
- welke emoties er in u op kwamen,
- welke overwegingen door uw hoofd gingen,
- en welke mensen er mogelijk onderdeel waren van deze situatie.

*U kunt pas na een aantal minuten door naar de volgende vraag, neem dus de tijd om goed over de situatie na te denken. U kunt verder met de vragenlijst wanneer de pijl onderaan de pagina verschijnt.*

#### **Vraag 5**

De volgende stellingen gaan over uw mening omtrent een belastingsysteem waarbij u moet betalen per kilometer die u met uw auto aflegt, in plaats van een betaling doormiddel van wegenbelasting.



**Vraag 6**

Tot in hoeverre bent u zich bewust van de hoeveelheid kilometers die u in de afgelopen maand heeft gereden met uw auto?

- Zeer onbewust (1)
- Onbewust (2)
- Redelijk onbewust (3)
- Neutraal (4)
- Redelijk bewust (5)
- Bewust (6)
- Zeer bewust (7)

**Vraag 7**

We willen u vragen om goed na te denken over het aantal kilometers wat in de toekomst met uw auto gaat rijden.

Denk aan hoe vaak u per week met de auto reist.

Of denk bijvoorbeeld aan de afstanden die u rijdt naar uw werk, naar een sportvereniging, naar school, naar uw familie, of naar een vakantiebestemming.

Ook kunt u denken aan het aantal kilometers wat u over het algemeen aflegt met uw auto.

Maak hieronder een inschatting van de hoeveelheid kilometers die u denkt te gaan rijden met uw auto in de komende twee weken.

Vul de zin in: Ik denk dat ik ... kilometer zal rijden in de komende twee weken.

**Vraag 8**

Q16 Maak hieronder een inschatting van de hoeveelheid kilometers die u denkt te gaan rijden met uw auto in de komende vier weken.

Vul de zin in: Ik denk dat ik ... kilometer zal rijden in de komende vier weken.

**Vraag 9**

De volgende stellingen gaan over het waarmaken van uw inschattingen. Geef aan tot in hoeverre u het eens bent met de inhoud.

	Helemaal oneens (1)	Oneens (2)	Deels oneens (3)	Neutraal (4)	Deels eens (5)	Eens (6)	Helemaal eens (7)
Ik ben gemotiveerd om minder kilometers te rijden dan ik heb ingeschat. (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik wil mijn rijgedrag aanpassen zodat ik mijn kilometerschatting zo goed mogelijk kan naleven. (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ik wil dat mijn rijgedrag overeenkomt met mijn kilometerschatting. (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Vraag 10**

Voor het onderzoek is het van belang dat we de stand van uw kilometerteller weten op dit moment.

We vragen u daarom om nu naar uw auto te lopen, en een foto te maken van de stand die op uw kilometerteller staat.

*Op de volgende pagina krijgt u instructies over het uploaden/insturen van de foto.*

Noteer hieronder de exacte kilometerstand die op deze foto te zien is.

## Vraag 11

Om de kilometerstand zo accuraat mogelijk aan ons door te geven, vragen we u om een foto van uw kilometerteller te uploaden.

Om dit te doen klikt u op de knop hieronder. Er zal een pop-up scherm verschijnen waar u een bestand van uw computer kunt kiezen. Selecteer het bestand met de foto van uw kilometerteller.

## Afsluiting

Hartelijk dank voor uw deelname aan deel 1 van dit onderzoek!

Het is van belang dat u over 2 weken deelneemt aan deel 2 van dit onderzoek, en dat u over 4 weken deelneemt aan deel 3 van dit onderzoek.

Dit betekent dat u over 2 weken en over 4 weken nogmaals foto's van de stand op uw kilometerteller moet insturen.

Alleen bij het correct en volledig afronden van alle delen van dit onderzoek heeft u recht op een beloning.

Voor vragen omtrent dit onderzoek kunt u contact opnemen met de uitvoerend onderzoeker, Nadine Meulmeester, via [nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl)

*Klik onderaan de pagina nog één maal op de pijl, zodat uw antwoorden worden verstuurd en de vragenlijst correct wordt afgesloten.*

## Appendix C – Questionnaire Study 2 Measurement 2 (Dutch)

### Informatiebrief

Beste deelnemer,

U heeft de link naar deze vragenlijst ontvangen omdat u twee weken geleden heeft meegedaan aan het eerste deel van een onderzoek naar uw autogebruik en uw kilometrage.

In dit tweede deel van het onderzoek willen we u nogmaals vragen om de stand op uw kilometerteller door te geven, zoals u dit in het eerste deel ook heeft gedaan. U zult dus nogmaals een foto van uw kilometerteller uploaden, en de stand die zichtbaar is op de foto invullen in een vraag.

Het invullen/insturen hiervan duurt een paar minuten.

Instructies volgen op de volgende pagina.

### Vraag 1

Voor het onderzoek is het van belang dat we de stand van uw kilometerteller weten op dit moment.

We vragen u daarom om nu naar uw auto te lopen, en een foto te maken van de stand die op uw kilometerteller staat.

*Op de volgende pagina krijgt u instructies over het uploaden/insturen van de foto.*

Noteer hieronder de exacte kilometerstand die op deze foto te zien is.

### Vraag 2

Om de kilometerstand zo accuraat mogelijk aan ons door te geven, vragen we u om een foto van uw kilometerteller te uploaden.

Om dit te doen klikt u op de knop hieronder. Er zal een pop-up scherm verschijnen waar u een bestand van uw computer kunt kiezen. Selecteer het bestand met de foto van uw kilometerteller.

## **Afsluiting**

Bedankt voor uw deelname aan het tweede deel van dit onderzoek!

Over twee weken krijgt u nogmaals een vergelijkbare vragenlijst toegestuurd, waar u deel zult nemen aan het laatste deel van dit onderzoek. In dit deel zal u nogmaals een foto van de stand op uw kilometerteller moeten insturen.

Let op: Beloningen worden pas uitgereikt na het afronden van het derde deel van het onderzoek, wat over 2 weken naar u wordt toegestuurd!

Voor vragen omtrent dit onderzoek kunt u contact opnemen met de uitvoerend onderzoeker, Nadine Meulmeester, via [nadine.meulmeester@ru.nl](mailto:nadine.meulmeester@ru.nl)

*Klik onderaan de pagina nog één maal op de pijl, zodat uw antwoorden worden verstuurd en de vragenlijst correct wordt afgesloten.*