The Role of Instrumental, Symbolic, and Environmental Attributes and Perceived Behavioral Control in the Intention to Stop Driving to Work

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PSBE3E-BT15: Bachelor Thesis

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July 3th, 2023

Abstract

Even though cars serve societal needs, they contribute to climate change and traffic congestion. That is why car use has to be decreased, for example when going to work. The intention to adopt sustainable behaviors has been explained by the Theory of Planned Behavior (TPB) and the Instrumental, Symbolic, and Environmental Attributes model (ISE-model), but not all studies have been unanimous about their predictive value. Therefore, the current study investigates whether the ISE-model and perceived behavioral control (PBC) from the TPB are significant predictors of the intention to stop driving to work. It was expected that instrumental, symbolic, and environmental attributes and PBC would positively predict the intention to stop driving to work. Moreover, a moderation of symbolic attributes on the relationship between PBC and the intention to stop driving to work was expected. A self-report questionnaire was used in a correlational design among people living in the Netherlands, which resulted in data analysis of 133 participants. The multiple regression analysis indicated a significant positive effect of symbolic attributes and PBC on the intention to stop driving to work. Also, the moderation effect of symbolic attributes on the relationship between PBC and the intention to stop driving to work was significant. There was no significance of instrumental and environmental attributes on the intention to stop driving to work. These findings suggest that policies should aim for high evaluations of symbolic attributes as well as people's perceived ability to change their behavior in order for people to stop driving to work.

The Role of Instrumental, Symbolic, and Environmental Attributes and Perceived

Behavioral Control in the Intention to Stop Driving to Work

Car use serves many societal needs, but also causes diverse problems, like traffic noise, air pollution, loss of urban space, and traffic congestion (Semenescu & Gavreliuc, 2019). Moreover, it is responsible for over 20 percent of all carbon dioxide emitted each year into the atmosphere (Bamberg & Rees, 2017), thereby contributing to global warming. One way to overcome these problems is by introducing policies that reduce car travel and shift people to other modes of transportation (Priester et al., 2013). When such policies are effective, they can change people's behavior and eventually impact society. However, if policies are not supported, the implementation of policies can be halted (Keizer et al., 2019). This is why many people need to adopt the policies in order for them to increase sustainable behavior and decrease environmental problems. Therefore, it is important to understand the factors influencing the change to sustainable behavior. Specifically, this study aims to find predictors of decreasing the amount of driving to work since work is one of the most common reasons for people to commute. That is why the current research investigates what predicts people's intention to stop driving to work, by focusing on the relationship between attributes, perceived control, and intention to drive to work.

Two theories will be combined to measure the intention to stop driving to work. One theory that uses intention as a measure of behavior is the Theory of Planned Behavior (TPB; Ajzen, 1991). According to the TPB, intention is determined by attitude (i.e., the degree to which someone has a positive evaluation of a behavior), subjective norm (i.e., the perceived social pressure to perform a behavior), and perceived behavioral control (PBC; i.e., the perceived ability to perform a behavior to deal with future situations). The TPB has been used in studies about car use and was found to predict people's modal choices (Wallén Warner, 2021). Specifically, PBC and attitudes seemed to influence car choice behaviors. More

research has found that PBC was a significant predictor of car choice behavior (Klöckner & Matthies, 2009). Additionally, according to Bachman et al. (2018), PBC significantly influenced intention to carpool as a passenger and driver. Lastly, increasing people's perceived controllability of behaviors enhanced the adoption of interventions (French et al., 2014). Therefore, especially PBC seems to be an important predictor of intention and will therefore be used to predict intention to stop driving the car to work. Based on the research described above, it is hypothesized that PBC has a positive correlation with the intention to stop driving to work (H1), meaning that participants that believe in their ability to stop driving to work are also more likely to plan to do so.

Another theory that tries to explain the adoption of sustainable innovations, is the Instrumental, Sustainable, and Environmental Attributes model (ISE-model; Noppers et al., 2014). In this model, the different types of attributes that predict the adoption of sustainable innovations are instrumental (i.e., functional outcomes of ownership), symbolic (i.e., outcomes for one's (self-)identity and social status), and environmental (i.e., outcomes for the environment) attributes. Focusing on instrumental attributes, some examples are travel time, flexibility, convenience, and financial costs (Steg, 2005; Gardner & Abraham, 2006). The basis for these intentions lies in a desire to maximize the expected utility in the context of someone's goals at that moment (Steg, 2005). The role of instrumental attributes has been investigated in the past but no clear answer has been found. For example, Steg et al. (2001) did a study on how people value the different types of attributes and found that respondents were most likely to name instrumental aspects only when asked directly, but not when asked indirectly. Another research that investigated the role of evaluations of attributes on the intention to adopt an electric car found a direct effect of instrumental attributes on intention (Schuitema et al., 2013). However, this relationship was fully mediated by perceptions of hedonic and symbolic attributes in the case of adopting a hybrid electric vehicle as a second

car. Lastly, in another research, it was found that only symbolic and affective motives were strongly related to car use, but not instrumental motives (Steg, 2005). However, these effects might have been partly because of situational characteristics and motives. This shows that it is still debatable whether there is a direct effect of instrumental attributes on the intention to adopt a sustainable behavior. Since I am directly asking for instrumental attributes, it is hypothesized that instrumental attributes have a positive correlation with the intention to stop driving to work, meaning that participants with positive evaluations of the instrumental attributes are more likely to intend to stop driving to work (H2).

Secondly, evaluations of environmental attributes depend on the effects of the ownership and use of a sustainable innovation on the environment (Noppers et al., 2014), meaning the environmental impact of behavior. These include perceptions of noise, waste, and greenhouse gas emissions. Studies have found that people take environmental consequences into account when making choices (De Groot & Steg, 2007). When environmental costs are low, which is usually the case for sustainable behaviors, people are more likely to adopt the behavior (Noppers et al., 2019). This fact would enhance the intention to adopt the behavior of not driving to work. However, this correlation no longer existed when evaluations of adoption norms were controlled for. Therefore, it seems that environmental attributes do predict the adoption of sustainable innovations, but that the effect depends on which variables have been added to the model. Since I am only focusing on the attributes, it is hypothesized that environmental attributes have a positive correlation with the intention to stop driving to work, meaning that participants with positive evaluations of the environmental attributes are more likely to intend to stop driving to work (H3).

Lastly, symbolic attributes stand for the sense of self and social identity that people feel as a result of ownership or using a sustainable innovation (Schuitema et al., 2013). By owning certain goods or adopting certain behaviors, people are able to signal something about

themselves (Fennis & Pruyn, 2007). Therefore, they can buy products to shape a positive self-image and signal their qualities to others. When instrumental drawbacks are involved, which is often the case with sustainable behaviors, the effect of symbolic attributes might be especially strong (Noppers et al., 2019). This is because it increases the likelihood to attribute the behavior to personal characteristics. So, when someone stops driving to work, this often has instrumental disadvantages and it would therefore be attributed to personality. Some research has found that symbolic attributes are the most important predictor of the three attributes since symbolic attributes were found to be the only attribute uniquely related to the intention to adopt sustainable innovations (Noppers et al., 2019). On the contrary, a study done by Noppers et al. (2014) found that participants only recognize the importance of symbolic attributes when asked indirectly, but not when asked directly, thus people do not seem to realize their effect (Steg et al., 2001). Based on these studies, it is hypothesized that symbolic attributes have a positive correlation with the intention to stop driving to work, meaning that participants with positive evaluations of the symbolic attributes are more likely to intend to stop driving to work (H4).

Lastly, because of the research described above, it is expected that there is an order of the strength of the relationships between the different types of attributes and intention. It is hypothesized that symbolic attributes have a stronger positive correlation with the intention to stop driving to work than environmental attributes and that environmental attributes have a stronger positive correlation with the intention to stop driving to work than instrumental attributes (H5).

In the current study, the ISE-model is extended with the PBC measure of the TPB so that the attributes together with PBC predict the intention to stop driving to work. Some studies have shown that PBC and attitudes, which I measure as attributes, do not only have an individual relationship with intention, but that there is also an interaction effect between PBC

and attitudes (Gourlan et al., 2019; Hukkelberg et al., 2014; Kothe & Mullan, 2015). Gourlan et al. (2019) found that PBC only had a positive influence on intention when attitudes were moderate or high, but that PBC had a negative correlation with intention when attitudes were low. Another study, done by Kothe and Mullan (2015) found that the effect of PBC on intention was only significant when levels of attitude were high, but not when they were low. These findings suggest that attitudes act as a moderator for the relationship between PBC and intention to adopt a behavior. The specific attributes that are investigated in this moderation effect are symbolic attributes. Symbolic attributes are used to signal a positive and consistent view of themselves to others (Sirgy,1985). So, if the behavior of not driving to work is consistent with someone's self-identity, people are more likely to adopt this behavior. That should result in a positive effect of PBC on intention to stop driving to work since behavior is more likely to be acted out if people feel able as well as want to do it. However, when someone feels that not driving to work is inconsistent with their self-view, this behavior is not wanted. Therefore, PBC is not expected to influence intention, because feeling able to perform a behavior will not result in acting in line with an unwanted behavior. Therefore, it is hypothesized that symbolic attributes act as a moderator of the relationship between PBC and the intention to stop driving to work (H6; Figure 1), meaning that PBC only has a positive correlation with the intention to stop driving to work when symbolic attributes are rated positively.

Figure 1

Conceptual model of the attributes of the ISE-model and PBC as predictors of intention
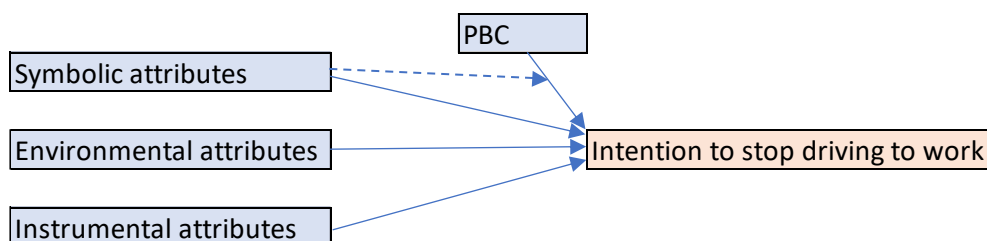
The current research uses the combined model of ISE and TPB, in order to get a better understanding of the intention to stop driving to work. To my knowledge, no previous research has investigated the link between the ISE-model and PBC from the TPB. This research is valuable by applying the model to the behavior of not driving to work and thereby seeing whether it is also applicable in this situation. Moreover, it extends previous literature by investigating how the evaluations of symbolic attributes affect the relationship between PBC and the intention to stop driving to work. A better understanding of the predictors of intention helps to create more focused interventions, by accentuating the most relevant aspects within a policy. In that way, climate and social problems can be overcome by stimulating people to adopt sustainable behaviors.

Methods

Participants

At the end of data collection, 207 people participated in this research, of which 92,8% ($n = 192$) came to the survey via a link through social media and 7,2% ($n = 15$) entered the survey through a QR-code from flyers. Of the participants, 2,9% ($n = 6$) did not consent and 9,2% ($n = 19$) did not have access to a car and were therefore excluded from data analysis. Furthermore, 23,7% ($n = 49$) of the participants did not answer enough questions to be considered in the analysis since they left the questionnaire before answering the question about their intention or all of the attributes. This resulted in 133 participants in the analysis. Participants lived in the Netherlands and they were Dutch- or English-speaking. Of the participants, 34% ($n = 45$) were male, 65% ($n = 85$) were female, and 1% ($n = 1$) other genders. Table 1 shows the participants' age and education levels, indicating that most participants were aged between 46 and 55 years old, and most participants had received an Applied Bachelor's degree.

Table 1

Age and education distribution of the sample

	Percentage	*n*
Age		
18–25	19%	25
26–35	17%	22
36–45	16%	21
46–55	26%	34
56–65	18%	24
66+	4%	5
Education		
High School degree	5%	7
Post-secondary vocational education	9%	12
Applied Bachelor's degree	37%	49
Academic Bachelor's degree	22%	29
Master's degree	21%	27
Doctoral degree	5%	7

Procedure

The sample was gathered through several media and via the distribution of flyers between the 19th and the 25th of May of 2023. First of all, questionnaires were distributed by five Bachelor Psychology students using the snowball method via WhatsApp, Facebook, Instagram, and LinkedIn. Also, flyers with a QR code to the questionnaire (see Appendix A) were spread at the Zernike Campus of the University of Groningen and around the city center. This means that the sample is a convenience sample. The text to gather people included requirements to participate since not everyone would be useful for this study. The requirements were that participants needed to be 18 years old or older, they needed to have access to a car, and they needed to have work to which they had to commute. Once participants entered the online survey via Qualtrics, they received information about the research. This included the fact that for every participant that completed the survey, one euro would be donated to the Voedselbank Groningen, up to a maximum of 150 euros. Afterwards, participants gave their consent to participate and they were able to change the language

settings from English to Dutch. Participants were then asked whether they have to drive to work and how often they use the car. Then, they were asked whether they are affected by commuting policies and their opinions about them. Afterwards, they were asked about the dependent variable, their intention to stop driving to work. Later, participants were asked whether they viewed not driving to work as a gain or loss. Then, questions about participants' evaluations of instrumental, symbolic, and environmental attributes were asked, and then the questions about PBC. Moreover, participants' political views and environmental self-identity were asked. The end of the questionnaire consisted of demographics, namely age, gender, education, and income. No debriefing was necessary. In total, this questionnaire took approximately 10 minutes per participant.

Materials

This research used an online questionnaire that has been approved by the *Ethics Committee of Psychology* of the Faculty of Behavioral and Social Sciences of the University of Groningen. This questionnaire had been created in English and was then translated into Dutch so that the questions could be answered in both languages. The questionnaire has been used for several research projects, so more questions have been asked than were relevant to the current research. Only the relevant scales will be discussed in more detail below. The scale that measured the intention to stop driving to work consisted of one statement, namely: '*I intend NOT to use a car in the future.*' Participants had to answer whether they agreed or disagreed on a 5-point Likert scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; $M = 3.1$, $SD = 1.5$).

Then, participants were asked to give their opinion about statements concerning the behavior of not driving to work, by using the attributes scales by Noppers (2014) that were altered to investigate the intention to not use the car. The instrumental ($M = 3.0$, $SD = 1.0$, $\alpha = .767$), symbolic ($M = 3.2$, $SD = 1.0$, $\alpha = .855$), and environmental ($M = 4.2$, $SD = 0.8$, $\alpha =$

.806) attributes were measured using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Each of the attribute scales consisted of 3 items with adequate internal reliability. The instrumental attribute scales consisted of statements like '*Not using the car is comfortable*'. The symbolic attribute scales included the statement '*Not using the car shows who I am*'. An example of a statement of the environmental attributes was '*Not using the car emits few greenhouse gasses.*'

Lastly, PBC was measured using the TPB scales from Ajzen (2006) with a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*; $M = 4.5$, $SD = 2.0$) and had adequate internal reliability ($\alpha = .879$). One of the three items was '*I am confident that if I wanted to I could stop using the car to go to work.*'

Design

This research had a correlational design and was done in the field. The independent variables that were measured, were PBC and attributes. The levels of attributes were instrumental, symbolic, and environmental attributes. The outcome variable was the intention not to drive to work.

Data Analysis

To analyze the data, a multiple linear regression was used. Before doing this analysis, the assumptions had to be checked. These were: independent observations, normally distributed regression residuals, homoscedasticity, no multicollinearity between the predictors, and linearity between each predictor and the outcome variable. To check for normality, a residual histogram was analyzed. Looking at the histogram, it appeared that residuals were roughly normally distributed (see Appendix B). Also, a residual scatterplot was analyzed and no specific pattern was found, therefore indicating that the linearity and homoscedasticity checks have been met. Furthermore, the VIF values of the predictors indicated only a moderate correlation between the predictors, so this appeared not to be

problematic. This means that the assumptions were not violated and the analysis was justified. Lastly, all of the predictors were centered to prevent multicollinearity between the moderator, symbolic attributes, and PBC.

<div align="center">**Results**</div>

Multiple linear regression was used to test if symbolic, instrumental, and environmental attributes, PBC, and the moderator significantly predicted intention to stop driving to work. First, Model 1 without the interaction effect was analyzed. Results showed that 55.5% of the variance in intention to stop driving to work could be accounted for by symbolic, instrumental, and environmental attributes and PBC, $R^2 = .555$, $F(5, 126) = 41.515$, $p < .001$, $MSE = 1.06$, $\eta^2 = .57$. The partial eta squared statistic indicated a large effect size.

Then the moderation of symbolic attributes on the relationship between PBC and the intention to stop driving to work was added in Model 2. Results showed that 56.7% of the variance in intention to stop driving to work could be accounted for by all of the independent variables together, $R^2 = .567$, $F(5, 125) = 35.105$, $p < .001$, $MSE = 1.03$, $\eta^2 = .53$. The partial eta squared statistic indicated a large effect size. The change from Model 1 to Model 2 by adding the moderation effect was significant, $\Delta R^2 = .015$, $\Delta F(1,125) = 4.652$, $p = .033$.

The following analysis focuses on the hypotheses, based on the final model. According to H1, it was expected that PBC positively predicted the intention to stop driving to work. The final model indicated a medium to large effect of PBC on the intention to stop driving to work, with a semi-partial correlation of $sr = .43$ (see Table 2), thus supporting H1. To test H2, I investigated the correlation of symbolic attributes on the intention to stop driving to work. A positive correlation was hypothesized. The model indicated a small to medium effect of symbolic attributes on the intention to stop driving to work, with a semi-partial correlation of $sr = .23$. Therefore, I find support for H2. For H3, I tested whether the effect of environmental attributes on the intention to stop driving to work was positive. It was found

that environmental attributes did not significantly predict the intention to stop driving to work, so I did not find support for H3. Moreover, H4 was tested to see whether instrumental attributes had a positive effect on the intention to stop driving to work. Results indicated no significant effect of instrumental attributes on the intention to stop driving to work, thus I found no support for H4. Additionally, the order of strength of symbolic, instrumental, and environmental attributes was investigated for H5. The results indicated a larger effect size of symbolic attributes than the effect size of environmental attributes. However, both environmental and instrumental attributes were insignificant predictors of intention to stop driving to work, so no conclusions can be made about the order of their strengths. Therefore, I only find partial support for H5. Finally, H6 investigated whether symbolic attributes moderated the relationship between PBC and the intention to stop driving to work. It was found that adding the moderator to the model significantly improved the model. Also, the results showed that the moderator significantly predicted the intention to stop driving to work. Its semi-partial correlation of $sr = .12$ indicated a small effect. Therefore, H6 was supported.

Table 2

Results of multiple linear regression

Model		B	SD	β	t	p	95% CI	sr
1	(Constant)	3.13	0.09		34.77	.000	[2.950, 3.306]	
	Environmental Attributes	-0.02	0.14	-.01	-0.15	.880	[-0.302, 0.259]	-.01
	Instrumental Attributes	-0.02	0.13	-.01	-0.13	.898	[-0.273, 0.240]	-.01
	Symbolic Attributes	0.58	0.14	.39	4.03	.000*	[0.296, 0.867]	.24
	PBC	0.39	0.05	.50	7.16	.000*	[0.278, 0.491]	.42
2	(Constant)	3.03	0.10		30.35	.000	[2.831, 3.227]	
	Environmental Attributes	0.03	0.14	.01	0.18	.860	[-0.255, 0.305	.01
	Instrumental Attributes	-0.02	0.13	-.01	-0.15	.881	[-0.272, 0.234]	-.01
	Symbolic Attributes	0.57	0.14	.38	4.00	.000 *	[0.288, 0.852]	.23
	PBC	0.39	0.05	.51	7.42	.000*	[0.289, 0.499]	.43
	PBC*Symbolic Attributes	0.10	0.05	.13	2.16	.033*	[0.008, 0.188]	.12

Note: All independent variables were centered at their means. * $p < .05$.

Discussion

The current study investigated whether instrumental, symbolic, and environmental attributes and PBC influence the intention to stop driving to work. Also, a moderation effect of symbolic attributes on the relationship between PBC and intention to stop driving work was investigated. Understanding these predictors would help us create policies that effectively change people's behaviors. Results indicated support for a positive effect of symbolic attributes on the intention to stop driving to work when the other predictors were controlled for. This means that people who evaluate symbolic attributes highly have higher intentions to stop driving to work. This result provides additional support for what was found by Noppers et al. (2014), who theorized that the influence of symbolic attributes on the adoption of sustainable innovations would be especially strong. An explanation for this effect is that people sometimes define their personalities by their actions (Fennis & Pruyn, 2007). So in the context of car use, some people define their personalities by using their car, thereby their intention to drive to work. Thus, people not only drive because they have to but also because it fits their personalities. Therefore, policymakers that try to reduce car use should accentuate the symbolic attributes of not driving to work, for example by saying that you become a good person by not using the car.

Another important finding is that PBC significantly predicted the intention to stop driving to work. This means that people who felt able to stop driving to work reported higher intentions than people who did not feel able to. This finding provides additional support for the correlation found by Bachmann et al. (2018) who stated that PBC influenced the intention to carpool. Also, French et al. (2014) found that elevating perceived controllability increased the adoption of interventions. Our finding has further implications that PBC is an important consideration in the case of other sustainable behaviors. Therefore, policymakers should try to

let people feel that they are capable, for example by explaining how easy it is to change to sustainable behavior.

Interestingly, no significant effects were found of instrumental attributes on the intention to stop driving to work. This means that people's evaluation of instrumental attributes did not change their intention. The result partly contradicts previous research, since Steg et al. (2001) had found that instrumental attributes significantly predicted intention when participants were asked directly, but that this effect was no longer there when they were asked indirectly. It seems that when the aim of the research is more clear, participants tend to answer in more socially desirable ways, which increases the relationship between instrumental attributes and the intention to adopt a sustainable behavior. Possibly, the current research was not phrased directly enough so that no significant result was found. Furthermore, Steg (2005) found that participants with a neutral or negative car attitude thought more that the car only has instrumental functions compared to those with a positive car attitude. Possibly, our participants had a positive attitude against car use and therefore placed less value on the instrumental attributes alone. This would explain the non significance of our findings. Future research could look more into car attitude as a moderator of the relationship between the attributes and intention to stop driving to work.

Moreover, no significant effect of environmental attributes on the intention to stop driving to work was found, contradicting previous research (Noppers et al., 2019). The significant effect of symbolic attributes might have undermined the significance of environmental attributes, since the attributes partially overlapped and therefore measured similar things. This complicates the interpretation of each individual variable and this might have resulted in that the effect of environmental attributes could no longer be found. To prevent this problem, more items should be used per scale so that the different types of attributes do not overlap. Another explanation comes from the study done by Kwan and Hung

(2023). They found that pro-environmental attitudes, which are linked to environmental attributes, did not predict car use on their own. It appeared that this relationship depended on whether people were motivated by intersubjective norms or by personal norms. Therefore, future research should investigate if the same moderation effect can be found in the case of environmental attributes. Furthermore, it is possible that the type of car influences the relationship between environmental attributes and the intention to stop driving to work. For example, some participants said that they drove an electric car, which they might have used as justification to keep driving to work. Research has found that such compensatory beliefs can in fact rationalize environmentally detrimental behavior such as driving (Hope et al., 2018), which makes this effect plausible. Future research could therefore look into the effect of the type of car on the relationship between the attributes and intention to stop driving.

Furthermore, the results indicated an order of the strength of the relationships between the attributes and intention to stop driving to work, but the hypothesis was only partly supported. Namely, symbolic attributes had a stronger correlation with intention to stop driving to work than environmental attributes, but both environmental attributes and instrumental attributes were insignificant and had no order of strength. The strongest effect of symbolic attributes could be explained by the fact that there are instrumental drawbacks involved when people decrease their car use, which causes people to attribute the behavior to their personalities (Noppers et al., 2019). The lack of order between environmental and instrumental attributes could again be explained by the overlap between these scales, so that the attributes measured similar things. Future research should use more distinct scales in order to find more evidence for an order of strength of the three attributes.

Lastly, the moderation of symbolic attributes on the relationship between PBC and the intention to stop driving to work was found to be significant. This means that the intention to stop driving to work was highest when evaluations of symbolic attributes as well as PBC were

high. These findings provide additional support for earlier research (Gourlan et al., 2019; Hukkelberg et al., 2014; Kothe & Mullan, 2015) that found a moderation effect of attitudes on PBC. Our result extends the literature by finding that symbolic attributes, instead of attitudes, also moderate the relationship between PBC and intention to stop driving to work. Possibly, this has further implications that the interaction between symbolic attributes and PBC would also exist for the intention to adopt other sustainable behaviors. Future research should confirm this expectation.

To better understand our results, it is important to recognize the potential limitations of our study. First of all, since a convenience sample was used, this decreases generalizability to the entire population of the Netherlands. The sample of this study had mostly highly educated participants, as well as people aged between 46 and 55 years old, whereas the Dutch population is more divided in education and age. However, no studies have been done to investigate whether the effects of attributes and PBC on the intention to stop driving to work depend on age and education. Therefore, future research could look into the demographics as a moderator of the relationship between attributes and PBC on the intention to stop driving to work. Additionally, the phrasing of the attributes might have interfered with the results. The attributes were evaluated based on the behavior of 'NOT using the car.' Because this is negatively phrased, this possibly complicated participants' evaluations of the attributes, since it makes it harder to imagine what the behavior means. In the future, it might be more effective to use 'driving to work' and then reverse code these results to interpret them. Furthermore, since no experiment was performed, only correlational statements can be made. Therefore, it is unknown whether people with high evaluations of the symbolic attributes on PBC have high intentions to drive to work because of their evaluations, or if it is the other way around. To investigate this, an experiment could be done in the future where participants are placed in a condition that heighten evaluations of either one of the attributes or PBC by

using advertisements. Afterwards, participants could be asked about their intentions to drive to work so that causal attributions could be made. Another limitation is the intention-behavior gap. Since only people's intention to stop driving to work was measured, it is unknown what the influence is of the attributes on actual behavior. Even though intentions are thought to be good predictors of behavior (Ajzen, 1991), the current study was unable to confirm this relationship, since only self-report intentions were measured. Therefore, a follow-up study is suggested where the actual behavior is measured by having people report how often they drive to work in a longitudinal study.

Despite these limitations, the results suggest several theoretical and practical implications. In the past, policies to increase sustainable behaviors have focused on downplaying instrumental attributes in their effort to change people's behaviors. However, as our results suggest, symbolic attributes seem to be more important than instrumental and environmental attributes. Our findings also explain why some policies that tried to reduce care use by focusing on instrumental and environmental attributes turned out to be ineffective. Therefore, an effective addition to current campaigns might be to enhance evaluations of symbolic attributes by highlighting how behaviors fit someone's personality. Moreover, since PBC was found to significantly predict intention, policies should try to increase people's perceptions of controllability, by making the behavior seem easy to perform. Using these strategies will help to decrease the environmental impacts resulting from car use.

In conclusion, this study has enhanced our understanding of the influence of attributes and PBC on people's intention to decrease their car use. Specifically, the results suggest that people mostly consider symbolic attributes and PBC when they intend to stop driving to work, thus only partly finding support for the extended model that combined TPB with the ISE-model. Additionally, symbolic attributes and PBC were found to interact in their relationship with intention to stop driving to work, meaning that both variables need to be

evaluated highly. Lastly, extending previous research, it was found that there was an order of the strength of the relationship between the attributes and intention to stop driving to work, where symbolic attributes were a better predictor than instrumental and environmental attributes.

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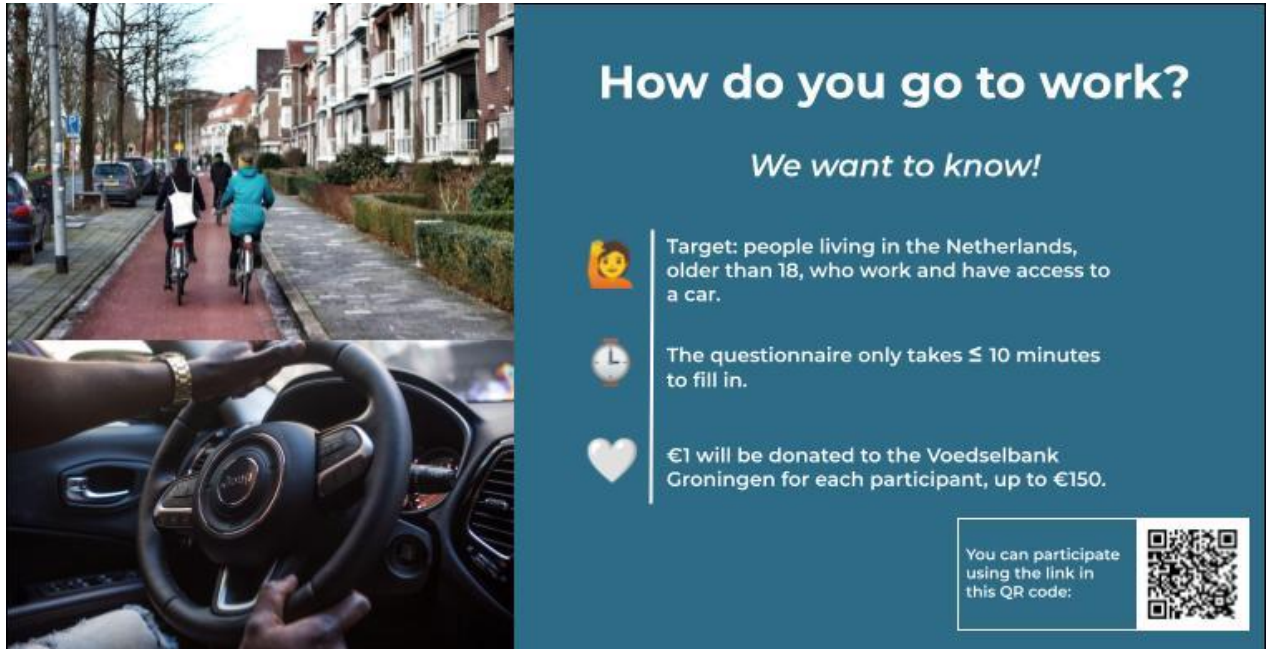
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Appendix A

Figure A1

Flyer with QR-code to the questionnaire
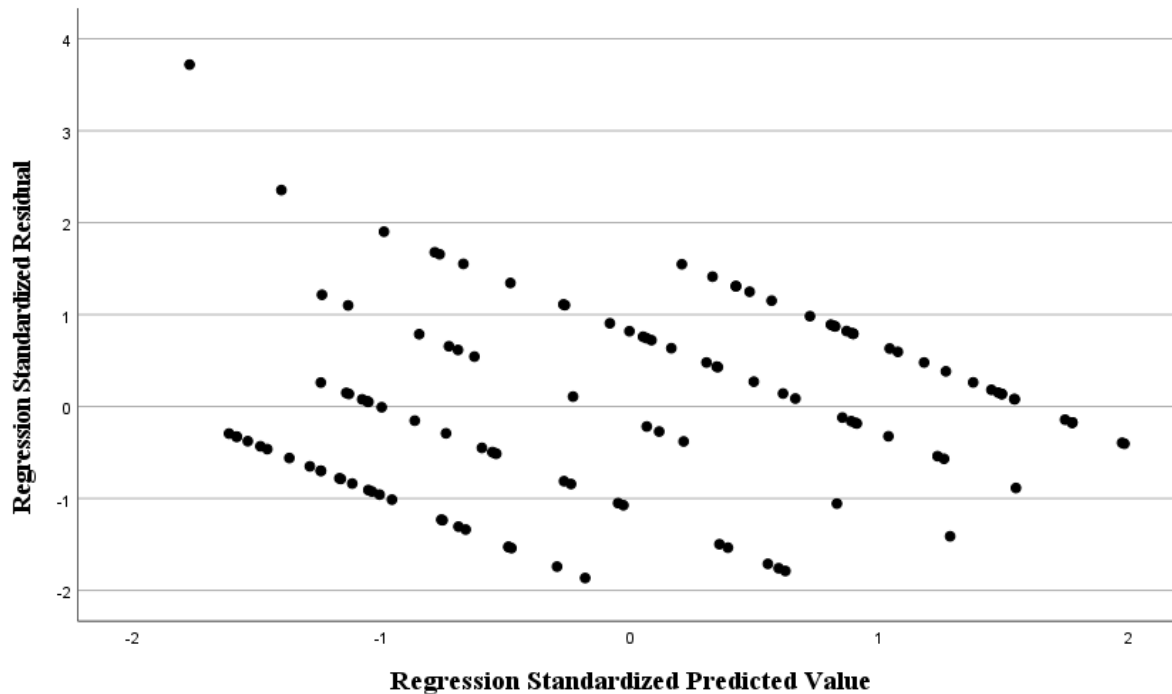
Appendix B

Figure B1

Scatterplot of regression residuals
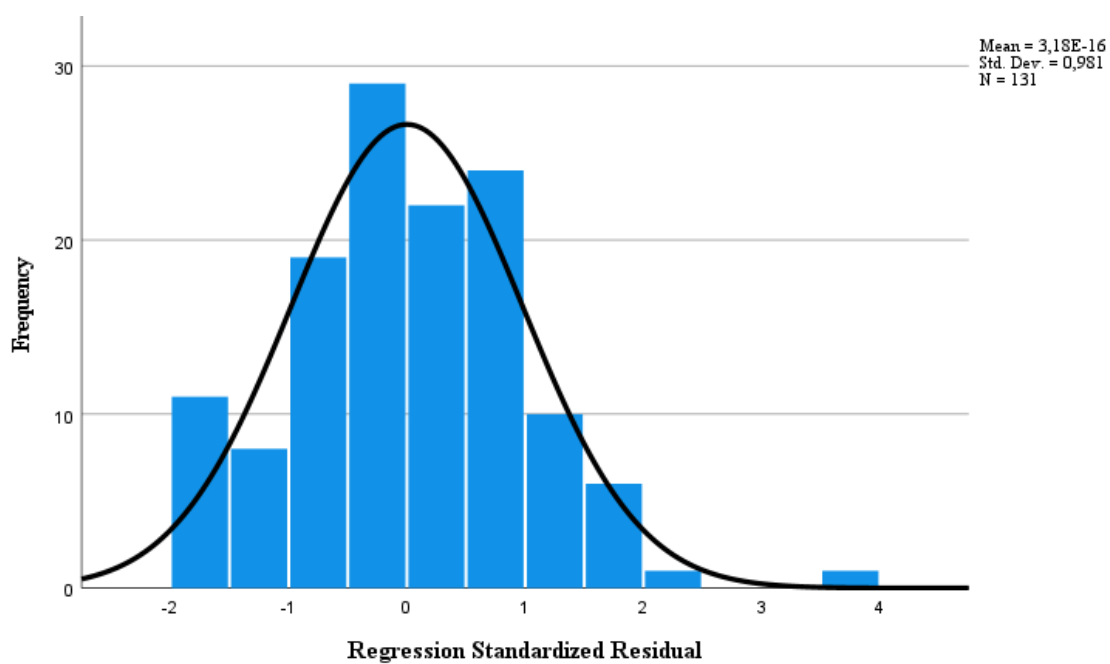

Figure B2

Histogram of regression residuals

Table B1

Multicollinearity checks for each predictor of Model 1 and Model 2

Model		Collinearity Statistics	
		Tolerance	VIF
1	(Constant)		
	Environmental Attributes	0.61	1.64
	Instrumental Attributes	0.47	2.14
	Symbolic Attributes	0.37	2.69
	PBC	0.71	1.41
2	(Constant)		
	Environmental Attributes	0.60	1.68
	Instrumental Attributes	0.47	2.14
	Symbolic Attributes	0.37	2.70
	PBC	0.70	1.42
	PBC*Symbolic Attributes	0.96	1.04