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Title: The association between news and attitudes towards a Dutch road pricing proposal

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The association between news and attitudes towards a Dutch road pricing proposal

Abstract

This study investigates the association between news exposure and attitudes/beliefs about a Dutch road pricing proposal (Kilometerheffing) with individual level data. We have combined the data from a public attitude survey (N = 705) with a content analysis of 280 news articles on the pricing proposal published in five leading Dutch newspapers. Our findings show that news exposure and attitudes/beliefs about road pricing policies are associated not only at the aggregate level, as shown by past research, but also at the individual level. The direction of attitudes/beliefs and tone of news change in the same direction (e.g. the higher the amount of negative news exposed, the more negative the attitudes towards Kilometerheffing). Our findings also show that the significance and direction of association (in parallel with or opposite to the tone of news - negative or positive) changes according to the issue featured in the news and the strength of the individual's values. News exposure is not associated with beliefs about the impact of Kilometerheffing on one's own financial situation but rather with beliefs about the impact of Kilometerheffing on the environment and congestion. Furthermore, the strength of the biospheric value (which concerns the quality of nature and environment) negatively moderates the relationship between news exposure and beliefs about the impact of Kilometerheffing on environment-congestion.

Key words: attitudes, beliefs, news, media, road pricing, values

1. Introduction

Road pricing policies are generally seen by economists and transport planners as an effective measure to deal with transport related problems (e.g. congestion) (Verhoef, 2008). But, the number of implemented road pricing schemes is relatively limited (Vonk Noordegraaf et al. 2014). Public support plays a major role in road pricing policy processes. Low public support, which in turn reduces political acceptability, usually means that road pricing policies do not succeed in being introduced (Isaksson and Richardson 2009; Jones 2003; Oberholzer-Gee and Weck-Hannemann 2002). Cools et al. (2011) and Ison and Rye (2005)

stress that providing information to the public is of vital importance to increase public support for the policy. In road pricing policy research, it is often argued that news, especially the tone of the news (negative or positive), affects attitudes towards road pricing policies (e.g. Jones 2003; Rye et al. 2008).

However, the relationship between the media and public attitude has not been empirically researched. To our knowledge, the study of Winslott-Hiselius et al. (2009) is the only one which investigates the association between media coverage and public attitudes towards a road pricing policy (Stockholm congestion charging) at an aggregate level. This study measures the tone of media coverage and public attitude at three points in time and shows that both develop in the same direction. In other words, an increase in the amount of positive news in the media coincides with an increase in the number of individuals who are positive towards road pricing policy in the public sphere. However, the inferences made from aggregate level data do not necessarily hold at an individual level¹ (Robinson 1950). For instance, the study of Winslott-Hiselius et al. (2009) does not provide evidence as to whether or not the relationship found between attitudes and the tone of news in their analysis exists at an individual level, in other words whether or not an individual who reads a higher amount of positive news has a more positive attitude towards road pricing policies. To address this gap, our study investigates the association between media content and public attitudes about road pricing policies at an individual level by integrating the data from a public attitude survey with a content analysis of news articles.

We analyzed the association between media content and attitudes about the Kilometerheffing proposal, one particular form of road pricing policy, in the Netherlands. Since 1977 several road pricing proposals have been intensively discussed in the Netherlands although all the proposals have ultimately failed to be implemented. The proposal was to charge car drivers per kilometer driven, and in the meantime abolish fixed taxes (annual road tax and (part of the) car purchase tax). The charge per kilometer would

¹ This problem, defined as “ecological fallacy” in social sciences, may be eliminated only by some sophisticated statistical models (Glynn and Wakefield 2010).

vary according to vehicle type (based on emissions), time and place. The proposal occupied the Dutch political arena for about 5 years and was abolished in 2010. The decision to abolish the policy was predominantly ascribed to the lack of public support (Schonewille and Vermeer 2010; van Keken and Witteman 2010; Weel 2010). It is often argued that the media, and the negative coverage in particular, played a role in the non-introduction of the road pricing policy by influencing both policy actors and public attitude (e.g. Hendriks and Tops 2001; Seidel et al. 2004). However, no study has yet empirically investigated the relation between media content and public attitude in the Netherlands.

The rest of this paper is structured as follows. Section 2 introduces the theoretical grounding regarding the association between attitudes and media content and poses our hypotheses. Section 3 explains methodological issues related to public attitude surveys, the content analysis of news articles and the link between them. Section 4 presents our results. Finally, section 5 presents conclusions and a discussion.

2. The association between media content and attitudes/beliefs regarding road pricing policies

In this section we pose four hypotheses related to the association between media content and attitudes/beliefs about road pricing policies. Before discussing the hypotheses we first explain some core concepts and the nature of the association between media content and attitudes/beliefs. "Attitudes are positive or negative evaluations" of objects such as people, entities or policies (e.g. road pricing policy) (Olson and Kendrick 2012, p. 230). Beliefs are evaluations regarding whether an attitude object (e.g. road pricing policy) has a particular attribute or leads to a particular outcome (e.g. the impact of road pricing on environment) (Perloff 2003). Attitudes and beliefs are formed (and modified) either by direct experience with attitude objects (e.g. experience of the implementation of a road pricing policy) or indirectly by exposure to information about the attitude object available in the social environment (e.g. friends, colleagues) and in the media (Chaiken 2001; Manstead 2001). Exposure to media messages potentially plays an important role in the formation of attitudes

and beliefs when it is not possible to directly experience the attitude objects (Zucker 1978). For instance, in a country like the Netherlands, where road pricing policies have never been implemented, media content regarding these policies is likely to play a major role in attitude formation. The association between news exposure and attitudes is quite complex and extensively investigated from different theoretical perspectives in the field of communications. The causal link might run in both directions. Firstly, exposure to media content might affect attitudes. However, the magnitude and duration of the media effect might be very different depending on several factors such as the type of media content or the frequency of exposure. Secondly, attitudes might determine the type or amount of exposure to media content (Scheufele and Tewksbury 2007; Coleman et al. 2009; Entman et al. 2009). People may avoid exposure (or reject influence) and seek out media content which is consistent with their pre-existing attitudes and beliefs. Even when the same media content is used, people have been found to selectively attend to these media messages in line with their pre-existing attitudes and beliefs (Perse 2001). Below we introduce our hypotheses and the background for each hypothesis, resulting in the formulation of each hypothesis.

This study investigates the relationship between news and attitudes by focusing on two aspects of media content: (1) the tone of news (negative or positive) and (2) the degree of personal experience with the issue featured in news. The research in the field of communication demonstrates that exposure to positive news affects attitudes positively whilst negative news affects attitudes negatively (e.g. Zaller 1992; Boomgaarden et al. 2011; De Vreese and Boomgaarden 2006a; De Vreese and Boomgaarden 2006b). However, the reverse causal link between news exposure and attitude might be observed in some cases because of selective exposure and attention as mentioned above (Perse 2001). Based on these studies, we expect that *exposure to positive news about the Kilometerheffing proposal is positively associated with attitude towards Kilometerheffing while exposure to negative news is negatively associated with attitude (Hypothesis 1)*.

The issue featured in the news is another factor which determines the nature of the relationship between attitude and news. Zucker (1978) suggests that the less people have

personal experience with the issue in their daily lives, the more they rely on the media for information and the more likely it is that the media will affect their attitudes and beliefs regarding this issue. Studies have empirically tested this hypothesis by analyzing the attitudes and news regarding two issues: economic situations and environmental issues. News about the assessment of national economic situations does not affect expectations of one's own personal economic situation because people use information in their immediate surrounding (e.g. the cost of living, job losses in neighborhood) and do not rely on the media information to predict their personal economic situation in future (Boomgaarden et al. 2011). In contrast, news about environmental issues does effect opinions about this issue because people rely on media information about environmental issues as they do not experience environmental problems in their daily lives (McCombs 2004; Soroka 2002b). Based on these studies, we argue that the degree of reliance on news differs for two aspects of Kilometerheffing. Firstly, we argue that people did not rely on the media about the impact of Kilometerheffing on people's financial situation to form their beliefs about the impact of Kilometerheffing on their own particular financial situation. This is because the media can only cover the financial impact of Kilometerheffing on certain social groups (e.g. drivers during peak hours, people with environmentally friendly cars) whereas road pricing schemes (like Kilometerheffing) have specific consequences for each individual depending on their particular life conditions such as existing transport expenses and mobility patterns (e.g. the number of kilometers an individual drives). Therefore, people would not rely on the media information about the impact of Kilometerheffing on people's financial situation to form their beliefs. Instead, they might infer the impact of Kilometerheffing on their own financial situation by using their own information regarding their personal life conditions (e.g. mobility patterns) and the design of the Kilometerheffing proposal (e.g. flat charge or price variation according to time and place)². We therefore hypothesize that *exposure to neither positive nor*

² We note that people may not accurately predict the impact of a road pricing scheme on their personal financial situation before its implementation (Schuitema et al., 2010). We argue here that people do rely on their own predictions to form their beliefs regardless of the accuracy of their predictions.

negative news about the impact of Kilometerheffing on people's financial situation is associated with one's beliefs about the consequences of Kilometerheffing on one's own financial situation (Hypothesis 2). Secondly, we argue that people relied on the media for information about the impact of Kilometerheffing on the environment and congestion (from now on denoted as environment-congestion) to form their beliefs about this issue as the information regarding the impact of the Kilometerheffing on environment-congestion does not involve one's specific life conditions but an overall nationwide (or regional) evaluation as presented in the media. We therefore hypothesize that *exposure to positive news about the impact of Kilometerheffing on environment-congestion is positively associated with beliefs about the impact of Kilometerheffing on environment-congestion while exposure to negative news about the impact of Kilometerheffing on environment-congestion is negatively associated with beliefs about this issue (Hypothesis 3).*

We furthermore test how individual values moderate the association between exposure to news about these two aspects of Kilometerheffing and beliefs about these issues: beliefs about the impact of Kilometerheffing on environment-congestion and beliefs about the impact of Kilometerheffing on one's own financial situation. Values are defined as "ideals, guiding principles in one's life, or over-arching goals that people strive to obtain" (Perloff 2003, p. 41). Individuals become highly involved in processing messages which touch upon their values and respond to such messages differently (Perloff 2003). We might therefore expect that people with strong biospheric values, which concern the quality of nature and environment, respond to both negative and positive news about the impact of Kilometerheffing on environment-congestion differently than people with weak biospheric values. Similarly, it is possible that people with strong egoistic values, concerning the financial costs and benefits incurred on their resources, react differently to news about the impact of Kilometerheffing on people's financial situation than people with weaker egoistic values. However, as explained above, people would not rely on media information about financial impacts. Therefore, neither significant association between news and beliefs about financial impact of Kilometerheffing nor the moderation effect of egoistic value on this

association might be observed. Based on this background, we hypothesize that *biospheric values strength moderates the association between news about the impact of Kilometerheffing on environment-congestion and beliefs about the impact of Kilometerheffing on environment-congestion whereas egoistic value strength does not moderate the association between news about the impact of Kilometerheffing on people's financial situation and one's beliefs about the consequences of Kilometerheffing on one's own financial situation (Hypothesis 4).*

3. Methodology

3.1. Data sources

This study combined the data from two different sources: a content analysis of 280 newspaper articles published during the Kilometerheffing policy process between 2005 and 2010 and a public attitude survey (N=705) conducted in December 2012. Our study developed five linear regression models based on this data. As contextual factors in the analysis (e.g. the type of issue in the media messages, the frequency of exposure) might affect the duration of the media effect, the time difference (about two years) between the issue-date of newspaper articles and the measurement of attitudes should be given some consideration. Studies show that the media effect may be lost in a short time after exposure or remain for a longer period of time, although there is no agreement on what period of time a short or long time period is (Garz 2013; Tan 2008; Yanovitzky and Greene 2009). However, in general, when people are highly dependent on the media for information about an issue (Soroka, 2002b; Zucker 1978), they find the issue personally relevant (McCombs 2004; Coleman et al. 2009) and they are repeatedly exposed to news about the issue over a long period of time (Garz 2013; Lecheler et al. 2015), a long-lasting media effect is likely. One might therefore expect a lasting impact of media content about Kilometerheffing on attitudes (two years later after exposure) for the following three reasons. Firstly, people were highly dependent on the media messages when forming their attitudes and beliefs about the Kilometerheffing proposal because it has never been implemented. Secondly, the Kilometerheffing proposal was a personally relevant issue for the majority of Dutch people

since it was expected not only to influence most people financially but also to have an impact on their mobility behavior. Finally, people were repeatedly exposed to media coverage during the research period of 2005-2010 because the policy was high on the political and media agenda during this period³. However, one should note that road pricing policies were discussed in the public sphere in the Netherlands for several years before 2005. It is possible that people already had pre-existing attitudes and beliefs about road pricing policies prior to the exposure to the media content analyzed in our study (between 2005 and 2010) and thus were selective in their exposure or paid attention to media content which was consistent with their pre-existing attitudes and beliefs. Therefore, the observed correlations in our regression models might be the reflection of selective exposure rather than the effect of the exposure to the media content analyzed.

3.2. Content analysis

A content analysis of the news articles about Dutch road pricing policy was carried out by Ardiç et al. (2013). It analyzed news articles published in the five national newspapers with the five highest circulation rates in 2010: *De Telegraaf* (type: popular, political leaning: right), *Algemeen Dagblad* (type: popular, political leaning: right), *de Volkskrant* (type: quality, political leaning: centre/left), *NRC Handelsblad* (type: quality, political leaning: right) and *Trouw* (type: quality, political leaning: centre/left). Newspapers are widely used as a source of news by the Dutch public (Commissariaat voor de Media, 2011) and a large number of Dutch newspaper readers (more than 35% and 45% of the total and paid newspaper readers respectively) read one or more of these five newspapers (Ardiç et al., 2013).

Kilometerheffing was discussed in the public sphere between 2005 and 2010. During this period, the policy continuously received media coverage but the media attention for the policy frequently changed, reflecting changes in the prominence of the policy on the political agenda. The sample included news articles published in the two weeks around five major policy events (one week before and one after the event) during which media attention for the

³ Road pricing policy was an issue in around 33 news articles per month on average in five newspapers analyzed in this article (see section 3.2).

policy peaked (see Table 1). 280 news articles were selected from the digital newspaper archive LexisNexis, using a search string comprising all the name variations used for Kilometerheffing in the Dutch language.

Table 1: Major Policy Events in Kilometerheffing Policy Process (Ardic et al., 2013a)

Date	Policy event
30.04.2005	Major Dutch policy actors (Nouwen Committee) agreed on Kilometerheffing
08.09.2005	National transport policy document (Nota Mobiliteit) was announced, which delayed implementation of Kilometerheffing
05.02.2007	Kilometerheffing was included in the coalition government agreement
13.11.2009	Kilometerheffing, as a final proposal, was sent to parliament
18.03.2010	Kilometerheffing was removed from the political agenda

The coding procedure was conducted as part of a larger project on the role of the media in road pricing policy process. The coding scheme included six frames (see Ardiç et al., 2013, 2015). Frames are defined “as attributes that describe aspects of an object” such as a road pricing policy (McCombs and Ghanem 2001, p. 78). This section explains part of the coding procedure, involving issue and tone frames, used in this study. Paragraphs of news articles were taken as the unit of analysis. All issue frames in a paragraph were determined, each of which indicated a different aspect of the Kilometerheffing proposal such as the impact of Kilometerheffing on people’s financial situations. Each paragraph was evaluated individually, but issue frames present in several paragraphs were recorded only once per news article. The tone of each issue frame, which can be positive, negative, mixed or neutral, was determined in a news article after reading all the paragraphs in the news article which included this issue frame. Finally, the space allocated to each issue and tone frame was measured. “Words” were taken as the unit of space allocation. The number of words used for each frame was counted. The results were multiplied by “2” for the front page news articles and “1” for the middle page news articles (see Adriaansen et al. (2010) and Vliementhart et al. (2008) for similar applications) as front-page news is more likely to attract readers’ attention. However, we note that visual cues related to news (e.g. pictures and headlines), which may also increase readers’ attention, were not coded.

To assess the reliability of the coding procedure, the principal investigator and another coder independently coded 10% of the sample. The percentage agreement was 72% for the issue frame. The score increased to 95% after discussion between coders regarding the discrepancies. Such discussion is recommended by Garrison et al. (2006) for multifaceted coding schemes such as the one used in this study. For instance, the issue frame had 33 categories (see Ardiç et al. (2013) and (2015) for all the other variables and rules). The Kappa agreement was used (in addition to percentage agreement) to test the reliability of tone frame to eliminate chance agreement, which was likely as this frame had only four categories. The Kappa agreement score was 0.59 for the tone frame. These scores are considered satisfactory by Ardiç et al. (2013 and 2015), based on insights from Banerjee et al. (1999), Landis and Koch (1977), Lombard et al. (2002) and Rourke et al. (2000) (see Ardiç et al. (2013) and (2015) for justification of the selected reliability procedure and detailed information about its application).

3.3. Survey

The survey was conducted by TNS NIPO (The Dutch Institute for Public Opinion Research and Market Research) using computer/assisted self-interviewing. Respondents (N=705) were randomly sampled from their database which is representative of the Dutch population. The ratios of male and female respondents in our sample were 50.1% and 49.9% respectively. The ratio of respondents aged between 18 and 34 was 22.7%, between 35 and 49 was 28.5% and over 50 was 48.6%. The ratios of low, middle and high educated respondents were 27.8%, 41.2%, and 30.8% respectively⁴. At the beginning of the survey, respondents were randomly assigned brief descriptions of one of two Kilometerheffing designs: one with price variation according to vehicle type, and the other one without. After reading this information, respondents proceeded to fill out the survey questions about the proposal (see Appendix 1).

⁴ The ratios of these categories in the Dutch population in 2012 are as follows: The ratios of male and female are 49.2% and 50.8% respectively. The ratio of respondents aged between 18 and 34 was 26.4%, between 35 and 49 was 29.1% and over 50 was 44.5%. The ratios of low, middle and high educated respondents are 27.2%, 39.7%, and 33.1% respectively (NIPO TNS 2012).

3.3.1. Dependent variables: attitudes and beliefs

In the survey, we used 7 attitude scale items in total to measure three constructs: *Attitude towards Kilometerheffing*, *belief about the financial impact of Kilometerheffing* and *belief about the impact of Kilometerheffing on environment-congestion*. Respondents were asked to indicate the degree to which they agreed with the presented items on a 7 point-scale ranging from “totally disagree” (1) to “totally agree” (7). Table 2 presents the items used to measure each of these constructs. The internal reliability of the items used for each construct is measured by Cronbach’s alpha test. Cronbach’s alpha coefficients greater than 0.70 are considered satisfactory (Nunnally and Bernstein 1994). Since the coefficients of all the constructs were above 0.70 (see Table 2), we summed the scales of items to create scale measures⁵.

Table 2
Scale measures and their items

Scale measures	Cronbach’s alpha	Scale items
Attitude towards Kilometerheffing	0.94	I find the proposed measure acceptable
		It is good that this measure is introduced
Belief about financial the impact of Kilometerheffing	0.73	I think that the proposed measure will bring financial benefits to me
		This measure will make me financially worse off
Belief about the impact of Kilometerheffing on environment-congestion	0.86	I think that the proposed measure will be effective in decreasing congestion level
		I think that the proposed measure will improve air quality
		I expect that the proposed measure will lower noise level.

3.3.2. Independent variables: news exposure

News exposure can be defined as the extent to which readers encounter specific news content (Slater 2004). There is no agreed measure in the media effect research. There are a few widely used measures, but no measure is a priori superior. The first one is “self-reports” in which readers report the extent to which they are exposed to specific news content. Recall errors may play a role in this measure. The second one is “experimental manipulation” in which researchers determine the extent to which readers are exposed to

⁵ Scores of the scale item “*I think that the proposed measure will bring financial benefits to me*” were recoded in reverse order before being summed with scores of the scale item “*This measure will make me financially worse off*”.

particular news content. The effect of such exposure may however be different than exposure experienced in natural settings. The last measure is to estimate exposure from the content analysis of newspapers. This exposure measure can produce only “the likelihood” of exposure and provides no information about the extent to which readers pay attention to this estimated exposure (Yanovitzky and Greene 2009).

In this study, 6 news exposure variables were produced by combining a global self-report measure which indicated the extent to which readers read specific newspapers, and the amount of space allocation given to certain topics and tone (negative or positive) in these newspapers. Table 3 lists these news exposure variables. In the survey, how often respondents read the five newspapers (*De Telegraaf*, *Algemeen Dagblad*, *de Volkskrant*, *Trouw* and *NRC Handelsblad*) was measured with a 5 points-scale ranging from “never” (1) to “daily” (5). The amount of space allocation devoted to specific news content about Kilometerheffing in these newspapers was determined by conducting content analysis on news articles (see section 3.2). The amount of mixed and neutral space allocation (for each issue and newspaper) was equally divided between the positive and negative space allocation variables.

Table 3
News exposure variables

Topic of variables	Name of variables
Kilometerheffing	Exposure to positive Kilometerheffing news content
	Exposure to negative Kilometerheffing news content
The impact of Kilometerheffing on people's financial situations	Exposure to positive news content about the impact of Kilometerheffing on people's financial situation
	Exposure to negative news content about the impact of Kilometerheffing on people's financial situation
The impact of Kilometerheffing on environment-congestion	Exposure to positive news content about the impact of Kilometerheffing on environment-congestion
	Exposure to negative news content about the impact of Kilometerheffing on environment-congestion

Exposure to positive Kilometerheffing news content for each respondent was calculated in two steps. Firstly, the positive space allocation for Kilometerheffing in each newspaper was multiplied by the frequency this newspaper was read by this respondent to obtain exposure to positive news content of each newspaper. Then, we summed the

exposure to positive news content of the five newspapers by this respondent. *Exposure to negative Kilometerheffing news content* was calculated using the same method.

We repeated a similar procedure to calculate the four news exposure variables related to *the impact of Kilometerheffing on people's financial situation* and *the impact of Kilometerheffing on environment-congestion*. Positive and negative space allocation variables used for the calculation of *the impact of Kilometerheffing on environment-congestion* variable were the sum of the space allocation for three issues: impact on congestion, impact on air quality and impact on noise. In the calculation of *the impact of Kilometerheffing on people's financial situation*, positive and negative space allocation variables for this issue are used.

3.3.3. Control variables

We controlled for three groups of variables in the regression models estimated. These variables are reported to be related to both our independent (news exposure) and dependent (attitudes and beliefs about Kilometerheffing) variables in past research and likely to bias our estimates if not controlled. Firstly, socio-demographic variables (e.g. age, gender, and social class) explain variations in attitudes towards road pricing across individuals (see Gehlert et al. 2011; Jaensirisak et al. 2005). Selective exposure and attention to news might also bear similar characteristics across these groups as these variables represent groups which share roughly similar interests, abilities and experiences (Perse, 2001). Secondly, people might selectively attend to messages in the news about Kilometerheffing in line with their values (Stern and Dietz, 1994). Amongst all types of values, egoistic and biospheric values (see section 2) are predictive of attitudes and beliefs about road pricing policies (Jakovcevic and Steg, 2013; Steg et al., 2012). Thirdly, the mobility patterns of individuals (e.g. car ownership, kilometers driven) and design characteristics of the scheme (e.g. price variation based on vehicle type) are predictive of attitudes and beliefs about a road pricing policy (see Gehlert et al., 2011; Jaensirisak et al. 2005). These variables can also affect the extent to which people attend to news about Kilometerheffing (or particular aspects) since the personal relevance of

Kilometerheffing (or particular aspects) may change according to the mobility patterns of individuals.

Individual values are latent variables. They were measured by the value scale developed by de Groot and Steg (2008) and Steg et al. (2012) based on the value theory developed by Schwartz (1992). The scale has been validated by various studies (e.g. de Groot and Steg 2008; Jakovcevic and Steg 2013; Steg et al. 2011; Steg et al. 2012). Following Schwartz (1992) and Steg et al. (2012), respondents indicated the extent to which these values were important “as a guiding principle in their lives” on a 9 point scale ranging from -1 ‘opposed to my values’, 0 ‘not important’ to 7 ‘extremely important’. The reliability of the value scale was satisfactory. The Cronbach’s alpha of value scale was 0.75 for egoistic value and 0.87 for biospheric value (see Table 4). Since Cronbach’s alpha coefficients greater than 0.70 are considered satisfactory (Nunnally and Bernstein 1994), we summed the scales of items to create two value scales: *egoistic* and *biospheric*. Table 5 lists the rest of control variables, socio-demographic and mobility control variables, with their types and response scales.

Table 4
Scale measures and their items

Scale measures	Cronbach’s alpha	Scale items
egoistic	0.75	social power
		wealth
		authority
		influence
		ambitious
biospheric	0.87	preventing pollution
		respecting the earth
		unity with nature
		protecting environment

Table 5
Socio demographic and mobility control variables

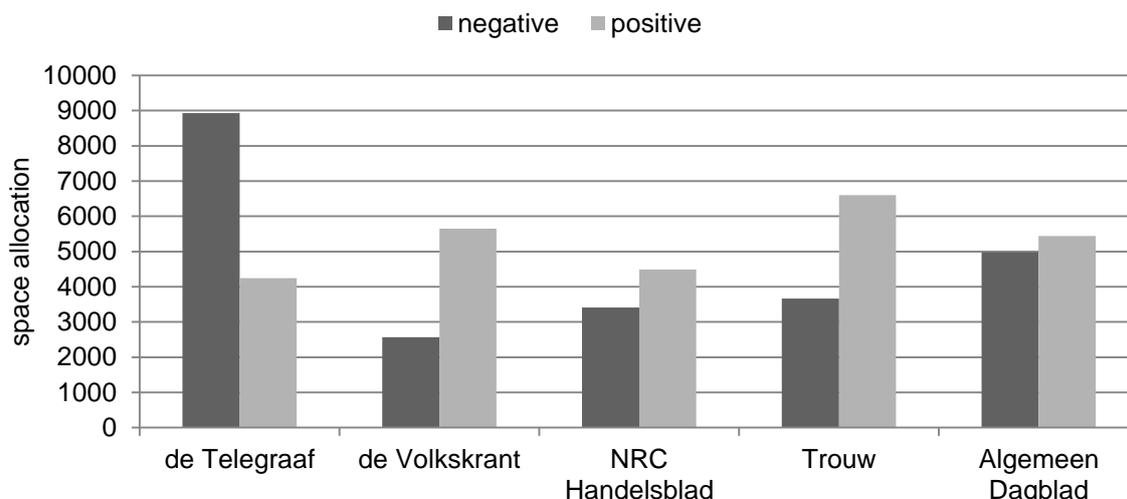
Name of variable	Type of variables	Response scale
Age	continuous per year	
Gender	dummy	0 male, 1 female
Social class ¹	ordinal	1 low, 2 middle and 3 high
Kilometers driven per week	continuous per kilometer	
Number of cars owned	count	from 1 (no car) to 6 (6and more)
Kilometerheffing with price variation (vehicle type)	dummy	0 without price variation based on vehicle type, 1 with price variation based on vehicle type

¹ Social class variables are transformed into two dummy variables with low social class as reference groups.

4. Results

Around 64% (n=452) of the respondents in our survey read at least one of the five newspapers analyzed. Among the newspaper readers (N=452), *De Telegraaf* (n=280) had the highest number of readers and *Trouw* (n=70) the lowest. The great majority of the readers of each newspaper also read one of the other newspapers (60% of *De Telegraaf* readers (n=168), 80% of *de Volkskrant* readers (n=130), 88% of *NRC Handelsblad* readers (n=180), 87% of *Trouw* readers (n=61) and 79% of *Algemeen Dagblad* readers (n=174)). In total, 53% (N=238) of the newspaper readers read more than one newspaper and 31% (N=139) of them were exposed to both right-leaning (*De Telegraaf*, *Algemeen Dagblad* or *NRC Handelsblad*) and left-leaning (*Trouw* or *de Volkskrant*) newspapers.

Figure 1 presents the space allocation of positive and negative news about the Kilometerheffing proposal for the five newspapers. The space allocation for the proposal is highest in *De Telegraaf*, followed by *Algemeen Dagblad* and *Trouw*. *De Telegraaf* has the highest amount of negative space allocation compared to the other newspapers and is also the only newspaper which allocates more space to negative news than positive news. *Trouw* has the highest amount of positive space allocation for the proposal. To summarize, all of the newspapers provided both positive and negative space allocation for Kilometerheffing but to a varying extent. The extent that a respondent is exposed to negative or positive Kilometerheffing news content depends on which newspaper(s) (and how often) s/he reads.

Fig.1: The tone frame across newspapers**Table 6: Regression model explaining the attitudes towards Kilometerheffing¹**

	Stand. Beta Coef.	t value	Sig.
(Constant)		5,358	0,000
Age	0,102	2,723	0,007
Number of cars owned	-0,082	-2,193	0,029
Kilometers driven per week	-0,185	-5,012	0,000
Kilometerheffing with price variation	0,096	2,749	0,006
Biospheric value orientation	0,188	5,196	0,000
Exposure to negative Kilometerheffing news content	-0,213	-2,983	0,003
Exposure to positive Kilometerheffing news content	0,195	2,703	0,007
Adjusted R2		0,143	0,000
N		705	

¹ The initial version of model controlled for three variables (social class, gender (female) and egoistic value orientation). The final model presented above excludes these variables as they were insignificant in the initial model.

The result of the regression model in Table 6 confirms Hypothesis 1. While exposure to negative news about Kilometerheffing is significantly negatively associated with attitudes towards Kilometerheffing, exposure to positive news about Kilometerheffing is significantly positively associated with attitudes. Based on this result, we can argue that exposure to negative news affects attitudes negatively and positive news affects attitudes positively. However, it is widely agreed, as mentioned in section 2, that individuals might selectively attend news which confirms their pre-existing attitudes. Therefore, the model result may also mean that people with negative attitudes towards previous road pricing proposals selectively

attend to negative media content while those with positive attitudes attend positive media content.

Table 7: Regression models explaining beliefs about the financial consequences of Kilometerheffing on one's own financial situation ¹

	Stand. Beta Coef.	t value	Sig.
(Constant)		10,965	0,000
Age	-0,125	-3,284	0,001
Kilometers driven per week	0,263	7,375	0,000
Egoistic value orientation	0,103	2,855	0,004
Biospheric value orientation	-0,113	-3,121	0,002
Exposure to negative news content about the impact of Kilometerheffing on people's financial situation	0,047	0,846	0,398
Exposure to positive news content about the impact of Kilometerheffing on people's financial situation	-0,029	-0,516	0,606
Adjusted R2		0,131	0,000
N		705	

¹ The initial version of model controlled for three variables (social class, gender (female), number of cars owned and Kilometerheffing with price variation). The final model presented above excludes these variables as they were insignificant in the initial model.

Table 8: Regression models explaining beliefs about the impact of Kilometerheffing on environment-congestion ¹

	Stand. Beta Coef.	t value	Sig.
(Constant)		5,529	0,000
Age	0,093	2,482	0,013
Number of cars owned	-0,081	-2,172	0,030
Kilometers driven per week	-0,154	-4,175	0,000
Biospheric value orientation	0,222	6,130	0,000
Exposure to negative news content about the impact of Kilometerheffing on environment-congestion	-0,178	-2,034	0,042
Exposure to positive news content about the impact of Kilometerheffing on environment-congestion	0,235	2,688	0,007
Adjusted R2		0,142	0,000
N		705	

¹ The initial version of model controlled for three variables (social class, gender (female), egoistic value orientation and Kilometerheffing with price variation). The final model presented above excludes these variables as they were insignificant in the initial model.

Table 9: Regression models explaining the moderation effect of egoistic value ¹

	Stand. Beta Coef.	t value	Sig.
(Constant)		15,376	0,000
Age	-0,129	-3,378	0,001
Kilometers driven per week	0,267	7,461	0,000
Egoistic value orientation	0,103	2,859	0,004
Biospheric value orientation	-0,112	-3,076	0,002
Exposure to negative news content about the impact of Kilometerheffing on people's financial situation	0,038	0,664	0,507
Exposure to positive news content about the impact of Kilometerheffing on people's financial situation	-0,017	-0,293	0,770
Negative news content about the impact of Kilometerheffing on people's financial situation X egoistic value orientation	-0,023	-0,362	0,718
Positive news content about the impact of Kilometerheffing on people's financial situation X egoistic value orientation	0,085	1,336	0,182
Adjusted R2		0,133	0,000
N		705	

¹ The initial version of model controlled for three variables (social class, gender (female), number of cars owned and Kilometerheffing with price variation). The final model presented above excludes these variables as they were insignificant in the initial model.

Table 10: Regression models explaining the moderation effect of biospheric value ¹

	Stand. Beta Coef.	t value	Sig.
(Constant)		15,577	0,000
Age	0,087	2,302	0,022
Number of cars owned	-0,081	-2,172	0,030
Kilometers driven per week	-0,151	-4,093	0,000
Biospheric value orientation	0,216	5,975	0,000
Exposure to negative news content about the impact of Kilometerheffing on environment-congestion	-0,195	-2,212	0,027
Exposure to positive news content about the impact of Kilometerheffing on environment-congestion	0,266	2,980	0,003
Exposure to negative news content about the impact of Kilometerheffing on environment-congestion X biospheric value orientation	0,169	1,917	0,056
Exposure to positive news content about the impact of Kilometerheffing on environment-congestion X biospheric value orientation	-0,183	-2,055	0,040
Adjusted R2		0,139	0,000
N		705	

¹ The initial version of model controlled for three variables (social class, gender (female), egoistic value orientation and Kilometerheffing with price variation). The final model presented above excludes these variables as they were insignificant in the initial model.

Tables 7 and 8 explain the beliefs about the financial consequences of Kilometerheffing on one's own financial situation and the beliefs about the impact of Kilometerheffing on environment-congestion respectively. Tables 9 and 10 test how value strength (egoistic and biospheric) moderates the relationship between news and beliefs about these two aspects of Kilometerheffing. Overall, model results support hypotheses 2, 3 and 4. Below after presenting the results we elaborate on our findings in the light of concerned literature:

Table 7 confirms Hypothesis 2 that exposure to news (both positive and negative) about the impact of Kilometerheffing on people's financial situation is not associated with people's beliefs about the consequences of Kilometerheffing on their own financial situation. Table 8 confirms Hypothesis 3 that exposure to positive news about the impact of Kilometerheffing on environment-congestion is significantly positively associated with beliefs about this issue while exposure to negative news about this issue is negatively associated with people's beliefs about this issue. Tables 9 and 10 support Hypothesis 4 that biospheric values strength moderates the association between news about the impact of Kilometerheffing on environment-congestion and beliefs about this issue whereas egoistic value strength does not moderate the association between news about the impact of Kilometerheffing on people's financial situation and one's beliefs about the consequences of Kilometerheffing on one's own financial situation. Although the moderation effect of egoistic value is not significant, egoistic value strength is positively associated with beliefs in Table 9. It means that for people who are exposed to an average amount of positive and negative news, the stronger the egoistic values people hold, the more they believe that they will be worse off as a result of Kilometerheffing implementation.

These results mainly support the findings of Boomgaarden et al. (2011), McCombs (2004) and Soroka (2002b) who show that news and attitudes are not associated when the issue is one's personal economic situation but that they are related for environmental issues. This indicates that whether or not attitudes/beliefs and news exposure are associated are

determined by the degree of personal experience with the issue featured in the news and the degree of reliance on news to form attitudes/beliefs about this issue. Values moderate the association between beliefs and news which touches upon these values. But this moderation effect depends on the issue featured in the news, namely the extent to which people rely on news to form their attitudes/beliefs about this issue. Furthermore, the results are in line with findings in the literature which investigate the relationship between attitudes/beliefs and the tone of news (see for instance Zaller 1992; Boomgaarden et al. 2011; De Vreese and Boomgaarden 2006a; Perse, 2001). The direction of attitudes/beliefs and tone of news change in the same direction (e.g. the higher the amount of exposure to negative news, the more negative the attitudes). However, we would like to highlight some findings which deserve further elaboration below.

Biospheric value strength negatively moderates the association between exposure to positive news about the impact of Kilometerheffing on environment-congestion and beliefs about this issue. For people with average biospheric values, exposure to positive news is positively associated with beliefs about the impact of Kilometerheffing on environment-congestion. Similarly, for people who are exposed to an average amount of positive news, biospheric value strength is positively associated with beliefs. However, for people with strong biosphere value, exposure to positive news is negatively associated with beliefs about the impact of Kilometerheffing on environment-congestion. It could mean either that exposure to positive news content about this issue backfires on people with strong biospheric values, or that people with strong biospheric values selectively avoid exposure to positive news about the impact of Kilometerheffing on environment-congestion. This finding contradicts the findings of past research. Studies, mostly in agreement, report that news affects attitudes in the same direction as the tone of the news or people selectively attend news which confirms their pre-existing attitudes (see for instance Zaller 1992; Boomgaarden et al. 2011; De Vreese and Boomgaarden 2006a; Perse, 2001). Some caution, therefore, is required in the interpretation of this finding as the finding may be an idiosyncrasy of this sample. If for the moment we assume it to be a true effect in the population, this reverse

association between the direction of attitudes and tone frame of news might be explained by social judgment theory. This theory states that the more an issue touches people's strong values, the more people elaborate on the information about this issue, and the more they are resistant to any information inconsistent with their beliefs. It is even likely that information leads to an effect opposite to that intended if the issue touches one's strong values (Dainton and Zelley 2005). In our case, Dutch environmental lobbies were moderately positive about the introduction of road pricing policy and Kilometerheffing, but they also believed that road pricing policy cannot deal with solving all environment problems (they saw road pricing policy as a supportive measure). They were in favor of more radical measures (see for example ANP, 2009). We might expect that people with strong biospheric values may have a similar way of thinking as the environmental lobbies. As such, exposure to "too" positive news (in their view) about the impact of Kilometerheffing on environment-congestion may backfire on these people and affect them negatively. Or, such people intentionally avoid positive news about this issue.

5. Conclusions

This study investigates the association between news and attitudes/beliefs about Kilometerheffing at the individual level, in other words, the extent to which the amount of news exposed by an individual corresponds with the attitudes and beliefs s/he has. Our findings show that news and attitudes/beliefs about road pricing policies are associated not only at the aggregate level, as shown by the study of Winslott-Hiselius et al. (2009), but also at the individual level. This means that not only the higher the amount of negative news in the media, the higher the number of people who have negative attitude towards road pricing policies (an aggregate level association), but also that the higher the amount of negative news an individual reads, the more negative his/her attitude is towards road pricing policies (individual level association). Our findings, furthermore, show that the significance and direction of association (in parallel with or opposite to the tone of news - negative or positive) change according to the issue featured in the news and to the strength of the individual's values.

Our findings indicate that whether or not the association between attitudes/beliefs and news exposure is significant is related to the degree of personal experience with the issue featured in the news and the degree of reliance on news to form attitudes/beliefs about this issue. More precisely, news and beliefs are not associated for an issue with high personal experience (and low media reliance) such as the impact of road pricing policies on one's own financial situations. In contrast, they are associated for the issue with low personal experience (and high media reliance) such as its impact on environment-congestion. The findings of past research (e.g. Boomgaarden et al. 2011, McCombs 2004; Soroka 2002b) which investigated the association between news and beliefs about environmental issues and one's personal financial situation, confirm our findings. However, road pricing policies have various aspects which might differ in people's media dependence (e.g. privacy violation, operational cost of the system). The research into the association between news and beliefs about these aspects might provide additional insights. We furthermore suggest comparing two countries, one where road pricing policies are implemented and one where it is not implemented, because in countries which have implemented road pricing, people's media reliance on news about road pricing policies is expected to be much lower than in countries where no road pricing policies have been implemented.

Secondly, our study shows that individual values moderate the association between beliefs and news which touches upon these values, although this moderation effect depends on the issue featured in news, namely the extent to which people rely on news to form their attitudes/beliefs about this issue. The individual value structure affects the association between news and attitudes/beliefs because individuals become highly involved in processing messages which touch upon their values and respond to such messages differently (Perloff 2003). For instance, in this study we found that biospheric value strength negatively moderates the association between exposure to positive news about the impact of Kilometerheffing on environment-congestion and beliefs about this issue. It means either that exposure to positive news content about this issue backfires on people with strong biospheric values, or that people with strong biospheric values selectively avoid exposure to positive

news about the impact of Kilometerheffing on environment-congestion. We speculated that this finding may be explained by the fact that information may lead to an effect opposite to that intended if the issue touches one's strong values (Dainton and Zalley 2005). However, this finding should be treated cautiously because many studies reported that the tone of news and attitudes/beliefs change in the same direction (see for instance Zaller 1992; Boomgaarden et al. 2011; De Vreese and Boomgaarden 2006a; Perse, 2001).

To summarize, our study is the first one which not only investigates the association between news and attitudes/beliefs about road pricing policies at an individual level, but also analyzes this association in a more comprehensive manner than the study by Winslott-Hiselius et al. (2009), namely across different issues, tone frames and according to the strength of individual values. However, the study shares similar limitation with the aforementioned study: it cannot show whether or to what extent the association between news and attitudes/beliefs is the result of the effect of news on attitudes/beliefs or selective exposure. This is because the analysis is drawn on cross-sectional data and thus lacks adequate evidence of the temporal precedence of our independent variables (news exposure) over our dependent variables (attitudes and beliefs). Studies using a longitudinal research design might properly address the effect of news on attitudes and beliefs about road pricing policies. We suggest that future studies conduct a panel survey before and after policy events related to road pricing policies, and additionally analyze the news content on the policy during these policy events. However, it is important to note that such research is complicated by the fact that the policy process is usually very difficult to predict and often encounters unexpected developments. Such 'before and after' research is frequently applied to analyze the effect of news on attitudes during elections and referendums, and in these cases important dates are known well in advance, which is convenient for planning the data collection process. Experimental studies can also properly demonstrate a causal link between news exposure and attitudes. But, these studies do not use actual media content, but alternative frames (e.g. the impact on road pricing policies on environment-congestion) which are "represented by a single presentation of a sentence or two" (Kinder, 2007, p. 156).

In addition, we have estimated separate models for attitudes and beliefs. However, some scholars argue that “an individual forms or changes an attitude by reviewing their beliefs about the attitude object” while others state that “they simply remember their prior evaluation of the object and adjust this in light of the new information provided” (Rosenberg 2001, p.10877). Future studies may build more comprehensive models to estimate attitudes towards road pricing policies by considering these alternative perspectives on attitude formation process. Finally, although we controlled for a number of confounding variables in our analysis some variables such as interpersonal communication, exposure to other forms of mass media (e.g. TV programs) and the political ideology of respondents (left vs. right: position in relation to government interventions in economic and social affairs) are not included. These variables might affect the relation between news exposure and attitudes (and beliefs) (Perse, 2001). The inclusion of these variables in models may reveal more conclusive results.

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Appendix 1: Questionnaire

In the questionnaire, no question was asked about respondents' age, gender, and social class in the questionnaire. The information about these variables was already available in the database of the TNS NIPO (The Dutch Institute for Public Opinion Research and Market Research). After reading one of two (randomly assigned) descriptions about Kilometerheffing below, respondents proceeded to fill out the survey questions.

Description-1: Please imagine the following situation: The government is planning to abolish car purchase tax and annual road tax and to introduce Kilometerheffing instead of these taxes. The idea behind this measure is to charge car drivers per kilometer driven, instead of ownership of vehicles. The charge per kilometer is to vary according to vehicle type and the

time of driving. Cleaner vehicles (vehicles which emit relatively little CO2 emissions) will pay lower level of charge per kilometer. The charge per kilometer will be lower outside peak hours than in the rush hour. Car drivers thus will be encouraged to drive outside peak. They will pay less when they drive outside peak hours.

Description-2: Please imagine the following situation: The government is planning to abolish car purchase tax and annual road tax and to introduce Kilometerheffing instead of these taxes. The idea behind this measure is to charge car drivers per kilometer driven, instead of ownership of vehicles. The charge per kilometer is not to vary according to vehicle type, but according to the time of driving. Cleaner vehicles (vehicles which emit relatively little CO2 emissions) will be charged as much as other vehicles. But, the charge per kilometer will be lower outside peak hours than in the rush hour. Car drivers thus will be encouraged to drive outside peak. They will pay less when they drive outside peak hours.

How many cars are there in your household?

No car <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 and more <>

How many kilometers do you drive per week? Consider a normal (working-) week (make a prediction if you do not know the answer)

_____ kilometers

Below are 16 values. For each value, an explanation is given about the meaning of the value. Please indicate how important each value is to you as a guide in your life. Your scores can range from -1 to 7. The higher the score is, the more important the value is as a guidance in your life.

The meaning of the scores is as follows:

-1 means that the value is against your principles.

0 means that the value is not important; it is not relevant as a guide in your life.

4 means that the value is important;

7 means that the value is extremely important to you as a guide in your life.

Normally you are not expected to assign 7 to more than two values. Please try to make a distinction between the values as much as possible by assigning them different scores.

Respecting the earth: live in harmony with other species

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Social power: control over other people, dominance

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Unity with nature: feel connected with nature

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely

important

Wealth: material possessions, money

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Authority: the right to lead or to exert power

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Protecting environment: conservation of environmental quality and nature

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Influence: have an influence on people and events

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Preventing pollution: protect natural resources

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

Ambitious: hardworking, ambitious, striving

Against my principles -1 <>, 0 <>, 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> extremely important

We would like to learn your opinion about the proposed Kilometerheffing scheme.

I find the proposed measure acceptable.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

It is good that this measure is introduced.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

I think that the proposed measure will bring financial benefits to me.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

This measure will make me financially worse off.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

I think that the proposed measure will be effective in decreasing congestion level.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

I think that the proposed measure will improve air quality.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

I expect that the proposed measure will lower noise nuisance.

Totally agree 1 <>, 2 <>, 3 <>, 4 <>, 5 <>, 6 <>, 7 <> totally disagree

How often do you read the following newspapers?

De Telegraaf: never 1 <>, 2 <>, 3 <>, 4 <>, 5 <> daily

Volkscrant: never 1 <>, 2 <>, 3 <>, 4 <>, 5 <> daily

NRC Handelsblad: never 1 <>, 2 <>, 3 <>, 4 <>, 5 <> daily

Trouw: never 1 <>, 2 <>, 3 <>, 4 <>, 5 <> daily
 Algemeen Dagblad: never 1 <>, 2 <>, 3 <>, 4 <>, 5 <> daily

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