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Impact of transport pricing on quality of life, acceptability, and intentions to reduce car use: An exploratory study in five European countries

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Abstract

This paper examines how a transport pricing policy aimed to reduce car use may affect individuals' Quality of Life (QoL), to what extent this policy is acceptable to the public and if people intend to change car use when the policy is implemented. Also, comparisons were made amongst five countries (Austria, Czech Republic, Italy, The Netherlands and Sweden). An internet survey among 490 respondents showed that a stringent measure, i.e., doubling costs of car use, hardly affects people's general QoL. Respondents are unsure whether they would accept the policy and whether they intend to change their car use if the policy is implemented. Respondents from The Netherlands and Sweden are more pessimistic about the QoL consequences of the policy, think the policy is less acceptable and are less inclined to reduce car use than respondents from the Czech Republic, Italy and, to a lesser degree, Austria. Implications and recommendations for developing, adjusting or supplementing QoL measurement instruments and policies are discussed to ensure effective and efficient policy making.

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Keywords: Quality of Life; Sustainability; Transport pricing policy; Car use

1. Introduction

It is widely acknowledged that the current transport system is not sustainable in the long term, especially given the many environmental problems caused by traffic and transport (Geurs and Van Wee, 2000; Greene and Wegener, 1997; OECD, 1997). To overcome collective problems, such as environmental pollution and traffic congestion, reductions in car use are needed. Generally, it is accepted that sustainable development implies balancing environmental, social and economic qualities now and in the future (OECD, 1996; WCED, 1987). While instruments to assess economical and environmental indicators are available, social indicators lack such unambiguous assess-

ment. One way to approach the assessment of social qualities is by the concept of Quality of Life (QoL). Since sustainability implies a balance between environmental, social and economic qualities, policies that seriously decrease individuals' QoL can hardly be called sustainable (Shafer et al., 2000; Steg and Gifford, 2005). This study examines how a transport pricing policy aimed at reducing car use may affect individuals' QoL in five European countries, to what extent this policy is acceptable to the public and whether people intend to change car use if the policy is implemented.

There is some form of agreement about the concept of QoL. First, most researchers agree that it is a much encompassing construct (Cummins, 2000; Hagerty et al., 2001; Stewart and Ware, 1992; Ware et al., 1981). Second, QoL is perceived to be a reflection of how well individual needs and values are fulfilled in various fields of life (Diener, 1995; Diener et al., 1999). In general, social scientists refer to QoL as well-being. In this case, well-being is either conceptualized

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Table 1
A typology of QoL indicators (Delhey et al., 2002)

	Objective	Subjective
Individual level	Objective living conditions (e.g. income)	Subjective well-being (e.g. income satisfaction)
Societal level	Quality of society (e.g. income distribution)	Perceived quality of society (e.g. perceived income distribution)

Table 2
Description of 22 QoL indicators (Poortinga et al., 2004)

Indicator	Description
Comfort	Having a comfortable and easy daily life
Material beauty	Having nice possessions in and around the house
Status, recognition	Being appreciated and respected by others
Aesthetic beauty	Being able to enjoy the beauty of nature and culture
Security	Feeling attended to and cared for by others
Money, income	Having enough money to buy and to do the things that are necessary and pleasing
Partner and family	Having an intimate relation. Having a stable family life and having good family relationships
Health	Being in good health. Having access to adequate health care
Social justice	Having equal opportunities and having the same possibilities and rights as others. Being treated in a righteous way
Leisure time	Having enough time after work and household work and being able to spend this time satisfactorily
Change, variation	Having a varied life. Experiencing as many things as possible
Freedom	Freedom and control over the course of one's life, to be able to decide for yourself, what you do, when and how
Privacy	Having the opportunity to be yourself, to do your own things and to have a place for your own
Environmental quality	Having access to clean air, water and soil. Having and maintaining a good environmental quality
Identity, self-respect	Being able to enjoy natural landscapes, parks and forests. Assurance of the continued existence of plants and animals
Social relations	Having good relationships with friends, colleagues and neighbours. Being able to maintain contacts and to make new ones
Spirituality, religion	Being able to live a life with the emphasis on spirituality and/or with your own religious persuasion
Education	Having the opportunity to get a good education and develop one's general knowledge
Safety	Being safe at home and in the streets. Being able to avoid accidents and being protected against criminality
Nature, biodiversity	Being able to enjoy natural landscapes, parks and forests. Assurance of the continued existence of plants and animals and maintaining biodiversity
Challenge, excitement	Having challenges and experiencing pleasant and exciting things
Work	Having or being able to find a job and being able to fulfil it as pleasantly as possible

as the objective living conditions of a person or the way a person perceives these conditions, i.e., the subjective living conditions. Most scholars would agree that both objective and subjective indicators should be studied (Felce and Perry, 1995; Kim and Cho, 2003; Marans, 2003; Ormel et al., 1997). Delhey et al. (2002) include another dimension to categorise research on life quality, namely research focussing on QoL indicators at an individual or societal level. This categorization provides a simple matrix to explain what is covered by well-being (see Table 1). Research on QoL in relation to sustainable transport mainly focused on objective indicators (see for example Geurs and Van Wee, 2003; Gilbert and Tanguay, 2000), whereas subjective QoL has been studied far less frequently. Therefore, in this paper, we focus on *subjective* well-being, which refers to individuals' cognitive and affective evaluations of their lives (Diener, 2000; Steg and Gifford, 2005).

A list of 22 QoL indicators has been proposed to examine QoL in relation to sustainability. This list is based on research and theories on values and needs in relation to sustainable development (Gatersleben, 2000; Poortinga et al., 2004). It has been developed to examine QoL consequences of environmental policies and/or environmental conditions

now or in the future by assessing to what extent these policies and/or changes would affect these 22 indicators. It is believed that these QoL indicators point at aspects of QoL that are important to consumers and that they reflect the three main dimensions of sustainability (i.e., economic, social and environmental). Travelling is important to consumers and therefore, this list can be of help when assessing effects of transport conditions and/or policies on subjective well-being. The list proved to be useful in assessing the importance of QoL aspects and changes in QoL resulting from environmental policies in different domains including travel behaviour and car use (Gatersleben, 2000, Chapter 5; Poortinga et al., 2004). Table 2 provides an overview of the 22 QoL indicators.

Various studies revealed that the extent to which people evaluate the 22 QoL indicators as important to their lives depends on individual characteristics, such as gender (Poortinga et al., 2001), household type (Poortinga et al., 2001; Gatersleben, 2000), and income (Gatersleben, 2000). These differences in importance imply that to what extent sustainable transport policies affect QoL may vary between groups, differing in sociodemographics, such as age, income, or cultural differences or values and beliefs.

Table 3
Sample characteristics for five countries

	Age					Gender		
	<i>N</i>	<i>M</i>	<i>SD</i>	Min–max	Missing	Male (%)	Female (%)	Missing (%)
Austria	94	41.2	10.6	25–65	3	40.4	58.5	1
Czech Republic	106	35.3	12.2	20–66	1	51.9	47.2	1
Italy	71	38.6	13.1	23–70	2	49.3	49.3	1
The Netherlands	150	35.7	13.3	17–72	0	48.3	51.0	1
Sweden	69	44.2	11.9	25–67	2	59.4	37.7	2

The way in which policies affect individual QoL may vary for different types of policy measures, such as whether policies focus on behavioural change versus technical energy-saving measures (Gardner and Stern, 1996) or the difference between pull ('rewards') versus push ('punishments') measures (Steg and Vlek, 1997; Stradling et al., 2000). For example, a study aimed at evaluating future scenarios with respect to household energy consumption (Poortinga et al., 2003) revealed that characteristics of energy-saving measures were strongly related to people's acceptability of these measures, i.e., technical improvements were preferred over behavioural changes and home energy-saving measures were more acceptable than were transport energy-saving measures. This may well be because these measures affect individual QoL differently. However, it is not known yet how different policies may affect QoL.

Groups may vary in evaluating perceived QoL changes for different types of policy measures. A study by Poortinga et al. (2003) showed differences in acceptability of technical and behavioural energy-saving measures for groups differing in age, household type, income and environmental concern. For example, technical measures were relatively less acceptable for low-income respondents than for high-income respondents. Technical measures often require an initial investment which low-income groups might not be able to afford. This suggests that QoL of low income groups will probably be more negatively affected by this measure than QoL of high income groups (see also Black, 2000). A study by Jakobsson et al. (2000) revealed similar results for acceptability of road pricing. Lower income groups evaluated road pricing as less acceptable than high income groups because it affected their perceived freedom and justice negatively. As shown in Table 2, freedom and justice are important indicators for QoL.

In general, policies that seriously affect individual freedom to move by car are not acceptable to the public (Steg and Vlek, 1997; Jakobsson et al., 2000). Policy makers seem reluctant to implement such policies, for it is believed that such measures will reduce individuals' QoL (Marans, 2003). However, there is little empirical evidence to support this statement. Negative changes in one QoL aspect may be compensated by positive changes in other QoL aspects. Therefore, it is important to assess the extent to which policies aimed at reducing car use may affect judged QoL.

The first aim of this study is to examine how a transport pricing policy aimed at reducing car use may affect individuals' QoL. The second aim is to examine to what extent this transport pricing policy is acceptable to the public and if people are inclined to change car use when such a policy is implemented. The third aim is to explore group differences by examining whether differences exist in perceived QoL changes, acceptability and intention to change car use among groups from different nationalities.

2. Method

2.1. Procedure and respondents

This study was part of a larger project (i.e., 'ASsess Implementations in the Cities of Tomorrow' or 'ASI') that focused on how to assess changes in QoL resulting from the implementation of transport policies. In 2004/2005 an e-mail survey started in five different countries (i.e., Austria, Czech Republic, Italy, The Netherlands and Sweden). The survey comprised questions to assess the effect of a specific transport pricing measure, i.e., doubling the price of car use, on QoL and intention to change car use. Also, the study examined to what extent this policy was acceptable to the public. Questionnaires were distributed by e-mail: acquaintances, family, students and colleagues of the ASI team members were sent a link to the questionnaire with the request to fill out the questionnaire on the web and to send the link to as many other persons as possible (snowball effect).²

This study analyzes the full dataset of the survey. A total of 490 respondents returned the questionnaire, of which 94 were from Austria, 106 from Czech Republic, 71 from Italy, 150 from The Netherlands, and 69 from Sweden. The response rate is not known because the 'snowball effect' method was used. Forty-five percent of the respondents were male and 55% were female. Respondents' age ranged from 17 to 72 years ($M = 38.2$ and $SD = 12.75$). Descriptives for age and gender per country are shown in Table 3.

² Convenient samples may be not fully representative for countries. This should be kept in mind when interpreting results. However, social demographics (i.e., income, gender and age) were not significantly related to perceived QoL-changes.

2.2. Measures

Quality-of-Life effects (QoL). Respondents were asked to indicate which consequences the following transport pricing policy would have for their QoL:

‘Imagine that the government doubled the price of car use. Increasing the cost of parking, fuel levies, transport pricing measures, and increases in insurance costs would mean that for each car you use you would pay 100% more than you currently do.’

For each of the 22 QoL indicators (see Table 2) responses were given on a seven-point scale ranging from –3 ‘would decrease dramatically’ to 3 ‘would increase dramatically’. Also, respondents gave an overall judgement about perceived QoL changes on the same response scale (‘All things considered, to what extent would this policy affect your overall quality of life?’).

Acceptability. Respondents indicated to what extent they think the transport pricing policy is acceptable to them. In this study acceptability was defined as ‘the absence of resistance to the implementation of transport policies’. The following questions measured acceptability: ‘If this policy was implemented...’:

1. I would protest against it;
2. I would resign myself to it;
3. I would accept it;
4. I would feel that the policy was unfair to me;
5. I would agree with it.

For each item, respondents answered on a 5-point scale ranging from ‘certainly’ (–2) to ‘definitely not’ (2). Scores on acceptability were based on the mean score for the five items after recoding items 2, 3 and 5. The scale could range from –2 meaning people will think the measure is not acceptable at all to 2 meaning that people will think the measure is very acceptable ($M = 0.2$, $SD = 1.17$). The internal consistency of the acceptance scale was high (Cronbach’s $\alpha = 0.90$).

Intention to change car use. Respondents indicated to what extent they would change their behaviour when the transport pricing policy was implemented. Responses were given on a five-point scale ranging from –2 ‘certainly’ to 2 ‘definitely not’ to the following questions: ‘If this policy was implemented, I would...’: (a) drive less, (b) travel more with other transport modes instead of the car, (c) trade my car for a cheaper car, (d) buy a small, more efficient car and (e) get rid of my car. The answer possibility ‘not applicable’ was included as well, because not all respondents travelled by car, owned a car or had a driver’s license ($N = 128$). This category is coded as missing value. Scale scores on intention to change car use were constructed by computing the mean score on these five items. Scores could range from –2 ‘no intention to change car use’ to 2 ‘strong intention to change car use’ ($M = 0.0$, $SD = 0.92$). Cronbach’s α of this scale was 0.81.

Fig. 1. Perceived changes in QoL indicators that change most strongly if prices of car use doubled ($N = 490$).

3. Results

3.1. Perceived changes in QoL

In general, people expected a minor decrease in their overall QoL when the price of car use is doubled ($M = -0.2$). The perceived changes in the 22 QoL indicators separately confirm this result: people expect that most QoL indicators would not change much when the transport measure is introduced. When the 22 QoL aspects are added up and divided by the total number of items, they expect a minor decrease in mean QoL ($M = -0.1$). As may be expected based on these results, both measures are strongly related to one another ($r = 0.74$, $p < 0.001$).

Fig. 1 shows the perceived consequences of this measure for QoL aspects that change most when costs of car use are doubled. Only QoL aspects that change more than (–) 0.5 are included in Fig. 1. For an overview of changes in all 22 QoL aspects, see Appendix A. Some relatively large negative changes are expected for the aspects comfort ($M = -0.9$), money/income ($M = -0.7$), freedom ($M = -0.7$), change/variation ($M = -0.6$), leisure time ($M = -0.5$) and work ($M = -0.5$). There are only three QoL aspects that are perceived to improve, namely environmental quality ($M = 1.2$), nature and biodiversity ($M = 0.9$) and safety ($M = 0.6$).

3.2. Differences in perceived QoL changes between countries

We further examined differences between the five countries in expectations of QoL changes if prices of car use were to increase by 100%. Results showed that the five countries differed in their overall perceived change in QoL ($F(4,472) = 4.61$, $p < 0.001$). Multiple comparisons showed that Swedish and Dutch respondents perceived more negative changes in their overall QoL than did Italian respondents ($p < 0.05$).

Wilk’s Lambda test revealed a significant difference between countries in perceived changes in the 22 life quality aspects ($F(22,88) = 4.57$, $p < 0.001$). Tests of Between-

Fig. 2. Differences between five countries in QoL indicators that are perceived to decrease if the price of car use doubled. Cz = Czech Republic ($N = 106$), NI = The Netherlands ($N = 150$), Au = Austria ($N = 94$), Sw = Sweden ($N = 69$), It = Italy ($N = 71$). Scale ranged from -3 'QoL would decrease dramatically' to 3 'QoL would increase dramatically'.

Fig. 3. Differences between five countries on QoL indicators that are perceived to improve if the price of car use doubled. Cz = Czech Republic ($N = 106$), NI = The Netherlands ($N = 150$), Au = Austria ($N = 94$), Sw = Sweden ($N = 69$), It = Italy ($N = 71$). Scale ranged from -3 'QoL would decrease dramatically' to 3 'QoL would increase dramatically'.

Subjects effects showed that the following fifteen QoL aspects made a significant contribution in explaining this difference: comfort, material beauty, aesthetic beauty, security, money, social justice, change and variation, privacy, environmental quality, social relations, education, safety, nature/biodiversity, challenge and work (see Appendix B for relevant F -values). To ensure the readability of the figures, Figs. 2 and 3 contain only QoL aspects that are included in Fig. 1. For an overview of all significant differences between countries see Appendix B. Fig. 2 shows differences between countries in the evaluation of QoL aspects that are perceived to decrease. Fig. 3 shows the differences between countries in the extent to which they expect positive QoL changes from this policy. In all contrast analyses, a Bonferroni test has been applied to reduce the likelihood of results occurring by chance.

In Fig. 2 it is shown that, in general, respondents from Czech Republic and Italy are less negative about the most important negative QoL consequences (i.e., comfort, money, change, and work) compared to Sweden, The Netherlands and Austria. Contrast analyses showed that the Dutch expect more negative effects from the transport measure for comfort compared to their Italian counterparts ($p < 0.05$). Dutch respondents also anticipate a significantly stronger decrease in the QoL aspect 'money and income' compared to respondents from the Czech Republic ($p < 0.05$). Swedes are more negative about decreases in change and variation compared to the Czechs ($p < 0.05$). Finally, for the QoL aspect 'work', Dutch as well as Austrians anticipate more negative consequences compared to Italians ($p < 0.05$) and Czechs ($p < 0.05$). Respondents from Sweden, The Netherlands and Austria do not significantly differ from one another in these perceived negative consequences. Also, differences between respondents from Italy and Czech Republic in the evaluation of negative perceived QoL effects are not significant.

Fig. 3 shows the changes in the ecologically oriented QoL aspects (i.e., environmental quality and nature/biodiversity). Respondents from the Czech Republic, Austria and Italy are more optimistic than respondents from The Netherlands and Sweden. More specifically, Swedes expect fewer positive changes for environmental quality when prices of car use are doubled compared to Czechs ($p < 0.05$), Austrians ($p < 0.001$) and Italians ($p < 0.001$). Dutch respondents think environmental quality will improve less strongly than do Austrians ($p < 0.05$) and Italians ($p < 0.001$). For the QoL aspect 'nature/biodiversity' similar differences were found, although less extreme. Respondents from Sweden are less positive about changes in this QoL aspect than are respondents from the Czech Republic ($p < 0.001$) as well as Austria ($p < 0.05$). Also, compared to the Dutch, Czechs expect more positive consequences for nature and biodiversity when the transport measure is introduced ($p < 0.05$). For the QoL aspect safety, a similar pattern is shown. Swedish and Dutch respondents expect little or no change in this aspect when prices of car use are doubled ($M = 0.0$ and 0.3). The Swedes anticipate less improvement in this QoL indicator than do respondents from the Czech Republic ($p < 0.001$), Austria ($p < 0.001$) and Italy ($p < 0.01$). The same is true for respondents from The Netherlands; they are less positive on improvements in safety than are respondents from the Czech Republic ($p < 0.001$) as well as from Austria ($p < 0.001$).

3.3. Acceptability and intention to change car use

In general, people do not have strong opinions on the acceptability of the policy ($M = 0.2$). Also, they are not decisive on whether they intend to change their car use if this policy were implemented ($M = 0.0$). Fig. 4 presents the differences in acceptability of the transport measure and

Fig. 4. Differences between five countries in acceptability of the policy measure ($N = 490$) and intention to change car use ($N = 362$) if prices of car use doubled. The scale ranged from '–2' meaning people will think the measure is not acceptable (i.e., acceptability) and are not willing to reduce car use (i.e., intention) to '2' meaning that people will think the measure is very acceptable and are willing to reduce car use.

intention to change car use as a result of doubling prices for car use in the five countries.

Univariate analysis of variance shows that the five countries differ significantly from one another in mean acceptability judgements ($F(4,461) = 3.78$, $p < 0.01$). Contrast analysis revealed differences between Austria and The Netherlands only. Respondents from Austria evaluated the policy as more acceptable than did the Dutch ($p < 0.01$). Also, differences between countries were found in intention to change car use when prices of car use are doubled ($F(4,357) = 6.23$, $p < 0.001$). Contrast analysis revealed that Dutch respondents are less inclined to change their car use compared to Czechs ($p < 0.01$), Austrians ($p < 0.01$) and Italians ($p < 0.001$).

4. Discussion and conclusions

The first aim of this study was to examine to what extent people's Quality of Life would be affected if the costs of car use doubled. Results of this study show that people expected only a minor decrease in their perceived QoL when costs of car use are doubled, as became apparent from perceived changes in overall QoL as well as from the mean score in perceived changes in 22 specific QoL indicators. This result is surprising: even a stringent measure, such as doubling costs of car use, seems hardly to affect people's general well-being. This result may be explained by assuming that respondents use a compensatory decision-making model (Steg and Gifford, 2005; Greenwald and Leavitt, 1984). Some aspects deteriorate while others improve and therefore negative changes are compensated by positive ones. The policy is reducing the amount of money people have at their disposal that indirectly influences QoL aspects such as comfort, work and material beauty in a negative way. However, these negative changes may well be compensated by aspects that are influenced positively by the transport measure (e.g.,

environmental quality, nature, safety). When people's subjective well-being is hardly affected by transport measures such as the one in this study, policy makers may be less reluctant to implement policies to reduce car use for reasons of possible QoL reductions. Furthermore, if respondents base their QoL judgements on a compensatory decision making model, policy makers should understand which QoL aspects are especially affected and how some aspects may be influenced positively so as to ensure overall perceived changes in QoL are positive.

The mean score in perceived changes in 22 QoL indicators shows a strong relationship with people's overall judgment of perceived QoL changes. Thus, the QoL instrument seems to provide a valid indicator for evaluating QoL changes. It reveals how people think they will be affected by certain policies and which QoL indicators are responsible for this evaluation. For example, the QoL aspect 'comfort' is perceived to be affected most negatively when prices of car use are doubled. To reduce this negative consequence, policy makers could focus on increasing this QoL aspect by making other transport modes more comfortable or subsidizing environmentally efficient cars. Also, they could focus more strongly on the perceived positive consequences of this measure, for example by providing information about the expected percentage of reduction in CO₂ gases (i.e., environmental quality) so as to make people judge the policies more positively. Therefore, policies could be supplemented by additional (compensating) measures based on the outcomes of such an evaluation.

The second aim of this study was to examine whether doubling prices of car use would be accepted by the public and whether people intend to change car use if the pricing policy is implemented. The results are not unequivocal in this respect. In general, people indicate that they do not know how they would react when the policy is implemented. It might be that people have trouble imagining the behavioural consequences if a policy like this was actually implemented. This may be facilitated by describing policy measures in more detail, for example by making calculations of the exact increases in travel costs. Future research should focus on the effects of more specific and concrete transport (pricing) policies on acceptability and behavioural intentions.

The third aim of this study was to explore group differences between five European countries. Results showed some interesting differences between countries in perceived changes in life quality if costs of car use doubled. A general tendency is shown: respondents from The Netherlands and Sweden are more pessimistic about the consequences of the transport pricing policy than are respondents from the Czech Republic and Italy. First, Dutch and Swedes are more negative about the possible negative consequences of the policy on their life quality compared to Czechs and Italians. Second, they are less positive about the effects of doubling the prices of car use on QoL aspects that would

improve. Austrian respondents are most ambiguous in this respect: they react in a similar way as Dutch and Swedish respondents with regard to their evaluation of the negative outcomes, i.e., they are rather pessimistic about the negative consequences of the policy on their QoL. However, together with Czech and Italian respondents, they are more positive about the positive consequences of the transport measure than are respondents from Sweden and The Netherlands. The optimistic and negative view with regard to perceived QoL changes is partly translated into the evaluation of the acceptability of the transport pricing policy and intention to change car use as a result of the policy. Dutch respondents evaluated the policy measure as less acceptable than did respondents from the other countries. Austrians evaluate the policy as rather acceptable compared to Dutch and Swedish. The intention to change car use and travel in a more environmentally friendly way is lowest for Dutch and Swedish respondents.

It is difficult to compare results of differences between countries with other studies. To the best of the authors' knowledge, no studies have been published that examined environmental and/or transport policies related to QoL, acceptability and intention to reduce car use for the countries included in this study. One study on environmental behaviour also revealed that Italians are rather environmentally friendly compared to other EU-countries (i.e., France, Germany, Portugal and the UK; Lévy-Leboyer, 1996). However, the present study was conducted in different EU countries. No studies were published on related subjects, such as environmental attitudes, QoL and/or environmental or transport behaviour, in which all five mentioned countries were included.

Furthermore, results of the between countries comparisons are rather explorative because the snowball method used in this study may not yield representative samples. For this reason results on differences between countries should be interpreted with some care. This study does show that the differences found between countries are not due to differences in income, age and gender. Further research should focus on *how* these differences in countries could be explained, because sustainable transport may imply different things in different countries. For example, differences in social and physical structures of countries, such as the transport and land use system, quality of various travel modes, or level of congestion, will affect car dependency of those countries. Reductions in car use may have more significant consequences for QoL for countries that have poor public transport systems, that are more strongly confronted with congestion problems, or in which urban sprawl is extensive. Also, this study only focused on one general transport pricing measure as a case in point. It would be useful to study QoL changes, acceptability and intentions to change car use in different countries in relation to other policy measures to examine whether results may be generalised for other transport policies. For example, instead of introducing a push-measure,

i.e., a measure directed at making car use less attractive, it is also possible to evaluate QoL consequences of a pull-measure, aimed at improving alternatives for car use, or combinations of these two. Research shows that push-measures are less acceptable than pull-measures (Gatersleben, 2000; Steg and Vlek, 1997). Differences in perceived changes for people's QoL could be an explanation for these outcomes. Replication of results of the present study with the focus on concrete and different types of (transport) policies may be promising directions for future research.

The results of this study are highly relevant for practitioners, i.e., policy makers, officials, politicians and decision makers, because it reveals how policies may affect QoL, behavioural intentions and how acceptable policies are. Transport policies will be less acceptable, less feasible and less effective if they have significant negative impacts on QoL (Steg and Gifford, 2005). Based on studies like the one reported here, recommendations may be made on how to adjust or supplement policies to prevent or compensate negative QoL effects. Knowing how specific aspects may be influenced positively will help ensure a positive evaluation of overall QoL by people and may enhance policy acceptability. This will facilitate the implementation of sustainability policies and guarantee effective and efficient decision making.

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Appendix A

Perceived changes in 22 QoL indicators ($N=490$).

Appendix B

Mean perceived changes in 15 QoL indicators for five countries ($N=490$)^{a,b}

	Comfort	Material beauty	Aesthetic beauty	Security	Money	Social justice	Change	Privacy	Environment	Social relations	Education	Safety	Nature	Challenge	Work
Cz	−0.8	0.2	0.5	0.9	−0.4	0.1	−0.3	−0.2	1.2	0.0	−0.1	1.1	1.2	−0.1	−0.2
Nl	−1.1	−0.7	0.3	0.0	−0.9	−0.4	−0.7	−0.2	1.0	−0.4	−0.2	0.3	0.8	−0.4	−0.6
Au	−0.9	−0.3	0.4	−0.2	−0.8	−0.4	−0.6	−0.5	1.5	−0.4	−0.3	0.9	1.1	−0.1	−0.8
Sw	−1.1	−0.1	0.2	0.0	−0.9	−0.3	−0.8	−0.7	0.7	−0.5	0.0	0.0	0.5	−0.3	−0.6
It	−0.5	0.2	0.9	0.3	−0.5	0.1	−0.4	−0.1	1.6	0.0	0.3	0.6	1.0	0.0	−0.2
$F(4,485)^c$	2.51*	14.92***	4.07**	19.67***	3.23*	5.81***	2.85*	5.21***	8.49***	5.41***	5.78***	17.93***	6.40***	3.52**	6.26***

Tests of Between-Subjects effects.

^a Scale ranged from −3 'QoL would decrease dramatically' to 3 'QoL would increase dramatically'.

^b Cz = Czech Republic ($N=106$), Nl = The Netherlands ($N=150$), Au = Austria ($N=94$), Sw = Sweden ($N=69$), It = Italy ($N=71$).

^c The five countries differed significantly on all mentioned aspects in this table (F -values included in this Appendix). No significant differences were found in expected changes in the QoL indicators status, family, health, leisure, freedom, identity and spirituality. These are not included in the table.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

References

- Black, W.R., 2000. Socio-economic barriers to sustainable transport. *Journal of Transport Geography* 8 (2), 141–147.
- Cummins, R.A., 2000. Objective and subjective quality of life: an interactive model. *Social Indicators Research* 52 (1), 55–72.
- Delhey, J., Böhnke, P., Habich, R., Zapf, W., 2002. Quality of life in a European perspective: the Euromodule as a new instrument for comparative welfare research. *Social Indicators Research* 58 (1–3), 161–175.
- Diener, E., 1995. A value based index for measuring national quality of life. *Social Indicators Research* 31 (2), 107–127.
- Diener, E., 2000. Subjective well-being: the science of happiness and a proposal for a national index. *American Psychologist* 55 (1), 34–43.
- Diener, E., Suh, E.M., Lucas, R.E., Smith, H.L., 1999. Subjective well-being: three decades of progress. *Psychological Bulletin* 125 (2), 276–302.
- Felce, D., Perry, J., 1995. Quality of life: its definition and measurement. *Research in Developmental Disabilities* 16 (1), 51–74.
- Gardner, G.T., Stern, P.C., 1996. Environmental problems and human behavior, second ed. Allyn and Bacon, Needham Heights.
- Gatersleben, B.C.M., 2000. Sustainable household metabolism and quality of life: examining the perceived social sustainability of environmentally sustainable household consumption patterns. Doctoral dissertation University of Groningen, Department of Psychological, Pedagogical and Sociological Sciences, Groningen, The Netherlands.
- Geurs, K.T., Van Wee, G.P., 2000. Environmentally Sustainable Transport: Implementation and Impacts for The Netherlands for 2030. RIVM, Bilthoven, The Netherlands.
- Geurs, K.T., Van Wee, G.P., 2003. Sustainability impact assessments: the role of land use/transport interaction models. Paper presented at the Framing Land-Use Dynamics Conference, Utrecht, The Netherlands, April 16–18, 2003.
- Gilbert, R., Tanguay, H., 2000. Sustainable transportation performance indicators project. Brief review of some relevant worldwide activity and development of an initial long list of indicators. The Centre for Sustainable Transportation, Toronto, Ontario, Canada.
- Greene, D.L., Wegener, M., 1997. Sustainable transport. *Journal of Transport Geography* 5 (3), 177–190.
- Greenwald, A., Leavitt, C., 1984. Audience involvement in advertising: four levels. *Journal of Consumer Research* 11 (1), 581–592.
- Hagerty, M.R., Cummins, R.A., Ferriss, A.L., Land, K., Michalos, A.C., Peterson, M., Sharpe, A., Sirgy, J., Vogel, J., 2001. Quality of life indexes for national policy: a review and agenda for research. *Social Indicators Research* 55 (1), 1–96.
- Jakobsson, C., Fujii, S., Gärling, T., 2000. Determinants of private car users' acceptance of road pricing. *Transport Policy* 7 (2), 153–158.
- Kim, M., Cho, K.O., 2003. Quality of life among government employees. *Social Indicators Research* 62/63 (1–3), 387–409.
- Lévy-Leboyer, C., Bonnes, M., Chase, J., Ferreira-Marques, J., Pawlik, K., 1996. Determinants of pro-environmental behaviours: a five-countries comparison. *European Psychologist* 1 (2), 123–129.
- Marans, R.W., 2003. Understanding environmental quality through quality of life studies: the 2001 DAS and its use of subjective and objective indicators. *Landscape and Urban Planning* 65 (1–2), 73–83.
- OECD, 1996. Towards sustainable transportation. OECD Publications, Paris.
- OECD, 1997. Towards Sustainable Transportation. The Vancouver Conference. OECD Publications, Paris.
- Ormel, J., Lindenberg, S., Steverink, N., Vonkorff, M., 1997. Quality of life and social production functions: a framework for understanding health effects. *Social Science and Medicine* 45 (7), 1051–1063.
- Poortinga, W., Wiersma, G., Steg, L., Vlek, C., Noorman, K.J., Moll, H., Schoot Uiterkamp, T., 2001. Expected quality of life impacts of experimental scenarios for sustainable household energy use. Unpublished manuscript. Centre for Environmental and Traffic Psychology, University of Groningen, Groningen.
- Poortinga, W., Steg, L., Vlek, C., Wiersma, G., 2003. Household preferences for energy-saving measures: a conjoint analysis. *Journal of Economic Psychology* 24 (1), 49–64.
- Poortinga, W., Steg, L., Vlek, C., 2004. Values, environmental concern, and environmental behavior: a study into household energy use. *Environment and Behavior* 36 (1), 70–93.
- Shafer, C.S., Lee, B.K., Turner, S., 2000. A tale of three greenway trails: user perceptions related to quality of life. *Landscape and Urban Planning* 49 (3–4), 163–178.
- Steg, L., Gifford, R., 2005. Sustainable transportation and quality of life. *Journal of Transport Geography* 13 (1), 59–69.
- Steg, L., Vlek, C., 1997. The role of problem awareness in willingness-to-change car use and in evaluating relevant policy measures. In: Rothengatter, J.A., Carbonell Vaya, E. (Eds.), *Traffic and Transport Psychology. Theory and Application*. Pergamon, Oxford, pp. 465–475.
- Stewart, A.L., Ware, J.E. (Eds.), 1992. *Measuring Functioning and Well-being: The Medical Outcome Study Approach*. Duke University Press, Durham, NC.
- Stradling, S.G., Meadows, M.L., Beatty, S., 2000. Helping drivers out of their cars. Integrating transport policy and social psychology for sustainable change. *Transport Policy* 7 (3), 207–215.
- Ware, J.E., Brook, R.H., Davies, A.R., Lohr, K.N., 1981. Choosing measures of health status for individuals in general populations. *American Journal of Public Health* 71 (6), 620–625.
- World Commission on Environment and Development, WCED, 1987. *Our Common Future*. Oxford University Press, Oxford.