Chapter 4

Acceptability and perceived effects

Explaining differences in acceptability before and acceptance after the implementation of a congestion charge

Abstract

A field experiment was conducted in Stockholm where a congestion charge trial was introduced in 2006. Respondents completed a questionnaire before and after the trial. Acceptance of the congestion charge was higher after the trial as opposed to its acceptability judgments before the trial. Respondents believed the charge had more positive consequences (viz., decreasing parking problems, congestion, and pollution) and less negative consequences (viz., financial cost increases) after the trial than they had expected beforehand. Furthermore, we examined the relative importance of various beliefs for the acceptability of the congestion charge before and after it was implemented. Results are that before the implementation of the charge acceptability was significantly related to beliefs about the expected consequences for one's own car use and financial costs, whereas acceptance after the trial was related to beliefs about the perceived consequences for one's own car use and parking problems. These results indicate that acceptance of the congestion charge had increased because people experienced positive consequences of the charge. This conclusion is discussed in the broader context in which the Stockholm trial took place.

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Introduction

In the past decades, car ownership and car use has increased rapidly (e.g., OECD, 2001). As a result, various car-related problems are manifested, in particular in urban areas, such as congestion, parking problems, noise hinder, and air pollution. Authorities try to find effective strategies to reduce these problems. Economists generally belief that road pricing, which is a specific type of transport pricing policies implying that car users are directly charged for using roads in general or for using particular roads or areas, is an effective strategy to reduce car-related problems (e.g., Small & Gomez-Ibañez, 1998; Ubbels & Verhoef, 2007). However, road pricing schemes are not easily accepted by the public (Jones, 1991a; 2003; Schade & Schlag, 2003), and hence not implemented on a large scale.

Despite low acceptability levels, road pricing schemes have been implemented in and around a few cities. A few studies examined differences in public support for road pricing schemes before and after their implementation. In the 1980s and 1990s, toll rings were implemented around some Norwegian cities, including the three largest cities in Norway: Oslo, Bergen and Trondheim. The acceptability of these toll rings increased during their implementation, although a year after the opening a majority still opposed to the toll rings in Bergen, Oslo and Trondheim (Odeck & Bråthen, 1997; Odeck & Bråthen, 2002; Tretvik, 2003). In 2003, the city council in London implemented a congestion charge around the London city centre. A majority of the Londoners supported the congestion charge a year after its implementation, while beforehand a majority opposed to the charge (TfL, 2004). Similarly to the London charge, a congestion charge was implemented in 2007 in Stockholm. Public support for this congestion charge increased during a seven-month trial period preceding the implementation of the charge (Stockholmförsöket, 2006; Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009d). So, there is some evidence that public support for road pricing schemes can increase after they are implemented.

However, public support for road pricing schemes does not always increase after their implementation. For example, in Copenhagen, Denmark, no differences were found in the acceptability of a toll charge before and after a transport pricing experiment (Gehlert & Nielsen, 2007). In Lyon, France, the local authorities and operator of an implemented toll scheme were forced to decrease toll levels significantly and to limit the tolling area, due to public resistance (Raux & Souche, 2004).

The studies described above examined changes in acceptability of road pricing schemes, but did not thoroughly and systematically examine factors that could explain why changes in acceptability did or did not occur. Many have proposed that the acceptability of road pricing increases over time if people experience positive effects of road pricing (e.g., Jaensirisak et al., 2005; Odeck & Bråthen, 1997; 2002; Rienstra et al., 1999; Schade & Schlag, 2000; Schlag & Teubel, 1997; Tretvik, 2003; Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009b), but empirical evidence is lacking. In this paper, we aim to examine if increasing public support for road pricing schemes can be explained by the experience of positive effects of these policies during its implementation, irrespective of the negative effects that people will experience as well. More specifically, we aim to examine factors that explain differences in public support before and after the congestion charge for traffic entering or leaving the city centre of Stockholm during a 7 months trial in 2006. Previous studies showed that the congestion charge in Stockholm was

more acceptable after the trial period than beforehand (Stockholmförsöket, 2006; Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009c). In this study we aim to understand why public support increased during the trial period of the congestion charge in Stockholm.

The Stockholm trial

Design of the Stockholm trial

In 2007, the national government in Sweden decided to permanently implement a national congestion tax in Stockholm. Preceding this decision, a full-scale trial was conducted in Stockholm from January 3 till the July 31 2006 (Vägverket, 2006). The charge was constructed as a national (congestion) tax. A municipal tax was not possible for legal reasons. In the remaining of this paper we refer to the full trial as 'the congestion charge'. Officially, the main objective of the congestion charge was threefold: a reduction in congestion, increase in accessibility and improvements in environmental quality (see, Stockholmförsöket, 2005; 2006).

During the trial, motorised vehicles were charged each time they passed a charging point (either entering or leaving the city centre), with the exception of evenings, nights, Saturdays, Sundays, public holidays, and the day before a public holiday. The charge was differentiated to time of the day. Table 4.1 provides an overview of the charge level. Some vehicles were excluded form the charge, such as motorcycles, taxis, emergency vehicles, and vehicles using fuel with low emission levels (for a complete overview see Vägverket, 2006).

The city of Stockholm is built on 14 islands, which are connected via bridges. Eighteen control points were built where all passing traffic was registered (see Figure 4.1). To enable register vehicles two methods were used; number plates were photographed (both front and rear) or laser detection for on board vehicle detection. The charge could be paid via automatic direct debit, via the Internet (either by credit card, charge cards or Internet banking), at banks, or cash at some shops and kiosks. Direct payment at the control points was not possible. Automatic payment was the most common payment method.

As part of the Stockholm trial, public transport was extended (primarily implying more busses and bus stops) from October 2005. Public transport was running more frequently, mainly during rush hours, 16 new bus lines to the city centre and 14 new express busses were introduced. In addition, 1,500 additional parking places were created near stations.

Table 4.1. Overview of charge level at specific time of the day

Time of day		Charge
from	till	
06.30	06.59	10 SEK[a]
07.00	07.29	15 SEK
07.30	08.29	20 SEK
08.30	08.59	15 SEK
09.00	15.29	10 SEK
15.30	15.59	15 SEK
16.00	17.29	20 SEK
17.30	17.59	15 SEK
18.00	18.29	10 SEK
18.30	06.29	0 SEK
Maximum charge: 60 SEK per day per vehicle		

[a] SEK = Swedish crown; 1 SEK ≈ 0.11 Euro (January 2006)

Source: Stockholmförsöket, 2005

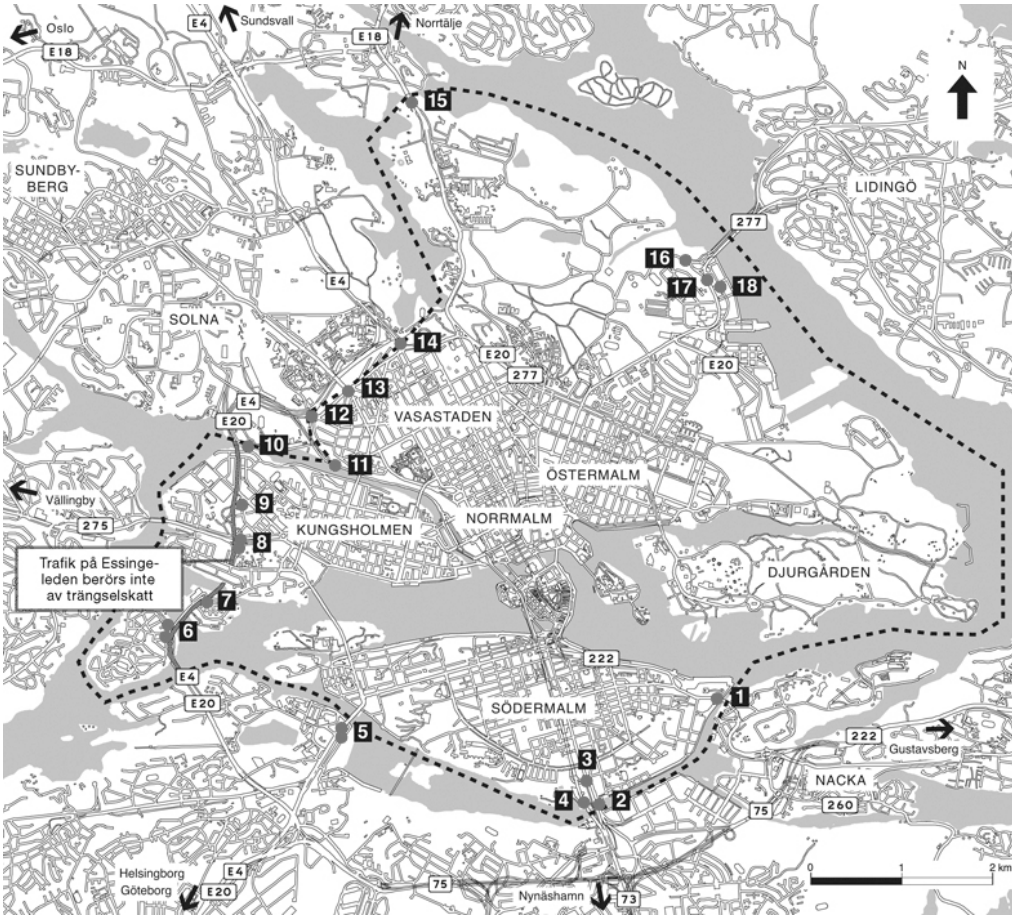

Figure 4.1 Stockholm's congestion charge zone, the numbers refer to 18 control points
Source: www.stockholmsforsoket.se

The Stockholm Council aimed to communicate the congestion charge widely to the public (Vägverket, 2006). To achieve this objective, information was provided by means of flyers, posters, meetings, signs on busses and parking meters, letters, meetings (e.g., in shopping centres), and commercials on radio and television. In addition, information was provided on a website, and a customer service was available for all questions. Also, monthly reports were published on-line presenting changes in car use and other transportation modes, congestion, and the general attitude towards the congestion charge (see also, Gudmundsson, Ericsson, Hugosson, & Rosqvist, 2009).

Context of the Stockholm trial

A long and intense debate preceded the Stockholm trial, starting in the 1970s. In 1992, a final agreement on a package of measures to control car traffic in Stockholm, the so-called 'Dennis Package', was made between three political parties, that is the Social Democrats, the

Conservatives and the Liberal party. However, this plan was never realised. The Dennis Package collapsed in 1997, mainly due to lack of public support and unstable political agreements (Ahlstrand, 1998; 2001). Five years later, a new agreement was made on transport pricing in Stockholm. The Social Democratic government and their supporting parties, the Left Party and the Green Party, agreed on a congestion charge trial shortly after the elections in 2002. However, the start of the trial was yet again, delayed due to a court appeal related to which contractor to use for the technical system. Eventually, the trial started on January 3, 2006.

After the agreement in 2002, the role of the Social Democrats was the topic of intense debate. Preceding the elections, the Social Democrats had stated that they would not implement road tolls, that is, taxes on the use of specified (parts of) roads. However, in order to be able to form a coalition with The Green Party, they agreed on the congestion tax. This lead to strong negative reactions from the public and in the media (Isaksson & Richardson, 2009b), which affected the general opinion on the congestion negatively for a long time. The general opinion of the public and in the media remained negative until the start of the trial in 2006. However, during the trial, both the media as the public became more positive about the congestion charge (Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009a). Shortly after the trial had finished, general elections took place in Sweden at September 17, 2006. At the same day, a referendum was held among inhabitants of Stockholm city and of inhabitants of 15 out of the 25 municipalities of the county of Stockholm. People living in Stockholm city and the municipalities of the County of Stockholm could vote 'yes' or 'no' to making the congestion charge permanent. With regard to the municipalities it was up to each one to decide whether or not they were going to take part in the referendum. In addition, the inhabitants of Stockholm city only, could indicate 'yes' or 'blank' to some extra statements (i.e., concerning the allocation of revenues). A small majority, 51.3%, of the inhabitants of Stockholm city voted 'yes' at the referendum and 45.5% voted 'no'. A minority (39.8%) of the people living in municipalities of the county of Stockholm voted in favour of the congestion charge, while here 60.2% voted 'no' (for further information see www.stockholmsforsoket.se). After the referendum, the Swedish parliament agreed on the permanent implementation of the congestion charge. On August 1, 2007, the congestion charge was re-introduced in Stockholm city.

Acceptability and acceptance judgements

Both acceptability and acceptance of road pricing schemes reflect an attitude towards these schemes (e.g., Bamberg & Rölle, 2003; Eriksson et al., 2006, 2008; Gärling et al., 2008; Jakobsson et al., 2000; Schade & Schlag, 2000). Attitudes are a psychological tendency that is expressed by evaluating a particular entity (such as road pricing schemes), with some degree of favour or disfavour (Eagly and Chaiken, 1993, 2007). The difference is that acceptability refers to the attitude on road pricing schemes before their implementation, whereas acceptance refers to the attitude on road pricing schemes after their implementation (Gärling et al., 2008). Acceptability is thus defined as the tendency to evaluate a road pricing scheme with some degree of favour or disfavour before it is implemented. Acceptance is defined as the tendency to evaluate a road pricing scheme with some degree of favour or disfavour after its implementation.

Attitudes are determined by people's beliefs about the consequences of the object at stake, which can be an event, a person, a type of behaviour, or a road pricing scheme (e.g., Ajzen,

1991; Eagly & Chaiken, 1993). Beliefs are defined as the subjective probability that an object has a certain outcome. The outcome of an object can be judged to be favourable, neutral or unfavourable, referring to the valence of a belief. For instance, one may believe that road pricing will lead to increasing costs (an unfavourable outcome), and that congestion and pollution levels will reduce (a favourable outcome of road pricing). Beliefs can change over time, for example as a result of changes in the context (Schwarz, 2007), experience, or as a result of merely thinking about an object (Tesser, 1978). Changes in beliefs will result in a change in attitudes (Ajzen, 1991). Hence, if people's beliefs about the consequences of road pricing schemes changes over time, their attitudes towards the scheme will probably change as well.

It can be assumed that traffic situations change after the implementation of a road pricing scheme. Also, it is likely that beliefs about consequences of road pricing scheme differ before and after their implementation, because consequences can never be fully predicted beforehand. Therefore, differences in acceptability and acceptance of road pricing schemes are likely to occur because beliefs about the consequences of a scheme have changed (cf., Gawronski & Bodenhausen, 2006b). More specifically, it can be expected that if acceptance of a road pricing scheme is higher than its acceptability, people's may belief that the occurrence of favourable consequences has become more likely. Or, acceptance of road pricing is higher than acceptability when the occurrence of unfavourable consequences has become less likely.

People may re-consider how important various consequences of road pricing schemes are to them after the implementation of the relevant scheme. In other words, they may re-evaluate the relative importance of various consequences of road pricing schemes. As a result, the acceptability of a road pricing scheme may be predicted by different beliefs about the scheme's consequences than its acceptance after the implementation (cf., Gawronski & Bodenhausen, 2006a). For example, the acceptability of a road pricing scheme may be low mainly because people expect their travel costs to increase. However, after the implementation of the scheme, travel costs may be considered to be less important than it was beforehand. Instead, people may consider the improved air quality to be most important for the acceptance of the scheme. In this example, acceptability of the scheme would be most strongly related to beliefs about travel costs, whereas acceptance would be most strongly related to beliefs about the effects of the scheme on air quality. We hypothesise that, as opposed to acceptability judgments, acceptance of a road pricing scheme is more strongly related to favourable or less strongly related to unfavourable beliefs about the scheme's consequences.

In conclusion, two aspects are relevant to understand differences in acceptability and acceptance of a road pricing scheme. First, differences in the beliefs about the likelihood that favourable and unfavourable consequences of road pricing schemes occur before and after its implementation should be examined. Second, it should be studied which beliefs about the effects of road pricing schemes are relatively most strongly related to their acceptability and acceptance judgments. In the present study, we examined both these aspects with respect to the trial with a congestion charge in Stockholm. In the next section, specific beliefs about the congestion charge that are relevant for the Stockholm case are discussed.

Beliefs about consequences of the congestion charge in Stockholm

The official objectives of the congestion charge trial in Stockholm was to decrease congestion, to improve the environmental quality, and to increase the accessibility in the city

centre of Stockholm (see, Stockholmförsöket, 2005; 2006). If people do not expect road pricing schemes to achieve their objectives, public support for these schemes is low (e.g., Gaunt et al., 2007). So, beliefs about the consequences of the congestion charge in terms of its objectives, that is congestion, environmental quality and accessibility, will be relevant for the acceptability and acceptance of the Stockholm congestion charge. Therefore, we focused on beliefs about three likely consequences of the charge, that is, beliefs about the consequences of the congestion charge for congestion, parking problems (both reflecting the accessibility of the city centre), and pollution. Reductions in congestion and parking problems, and increasing environmental quality are probably considered as favourable consequences of the charge, because they improve the general quality of life in cities.

A few months before and during the trial, public transport in and around Stockholm was extended and improved, to facilitate car users to replace their car trips by public transport. For those intending to replace car trips by trips by public transport or for regular users of public transport, an increase in the use of public transport may be an unfavourable consequence if this also means that public transport will become overcrowded. On the other hand, an increase in the use of public transport may be favourable to others, because it is an indication that car use decreased, and as a consequence, the quality of life Stockholm may increase. In any respect, beliefs about the consequences of the congestion charge on the crowdedness of public transport may affect the acceptability and acceptance of the congestion charge, and are therefore included in this study.

Next, the congestion charge can affect driving behaviour or the travel costs of car drivers, that is, car drivers may decide to drive less or they have to pay the charge. In general, reductions in driving behaviour and increases in travel costs are perceived as an infringement on one's freedom (cf., Brehm, 1972; Jakobsson et al., 2000), and consequently, these are unfavourable consequences of road pricing schemes.

Car users find road pricing less acceptable than non-car users (Jaensirisak et al., 2005), which may be explained by differences in beliefs about the consequences of road pricing. For example, it is very likely that beliefs about consequences of the congestion charge on one's own car use and travel costs differ between car users and non-car users. Also, car users tend to believe that congestion and pollution are less problematic for society than do non-car users (Rienstra et al., 1999), suggesting that their beliefs about the consequence of a congestion charge for congestion and pollution will probably differ as well. So, the extent to which inhabitants of Stockholm use their car can be expected to be related to the acceptability and acceptance of the congestion charge, and to their beliefs about the consequences of the congestion charge.

In this study, we included six beliefs about the consequences of the congestion charge in Stockholm that probably differ in the extent to which they are considered as favourable: beliefs about the consequences of the congestion charge for congestion, parking problems, pollution, crowdedness in public transport, one's own car use, and travel costs. First, we will compare if the valence of beliefs about the consequences of the congestion charge differs before and after the trial period. Second, we study how beliefs about the consequences of the charge are related to acceptability before and acceptance judgments after the trial period. We are particularly interested in the relative importance of beliefs about favourable and unfavourable outcomes for people's acceptability and acceptance judgments, as to study which beliefs are most salient for these judgements. We will control for the influence of the extent to which people use their car,

because the amount of car use probably affects the acceptability, acceptance and beliefs about the consequences of the congestion charge.

Hypotheses

We assume that the acceptance of the congestion charge in Stockholm is higher than its acceptability, in line with previous studies. Based on the reasoning above, we test two hypotheses to explain why acceptance of the charge is higher than its acceptability. First, we expect that inhabitants of the Stockholm region believe that the occurrence of consequences differs before and after the trial period. More specifically, we hypothesise that, as opposed to before the implementation of the charge, inhabitants of the Stockholm region believe that it is more likely that favourable consequences and less likely that unfavourable consequences will occur. Second, we expect that the relative importance of beliefs about the consequences of the charge differ for acceptability and acceptance levels. We hypothesise that acceptance is, compared to acceptability judgements, more strongly related to favourable or less strongly related to unfavourable beliefs about the consequences of the charge, when the extent to which people use their car is controlled for.

Method

Respondents and procedure

In December 2005, a questionnaire was mailed to a random sample of 1,000 inhabitants of the Stockholm municipality, that is, people living in the city of Stockholm. The addresses were randomly drawn from the public driving license records, implying that all respondents were 18 year or older and had a driving license. A reminder was sent out two weeks later to those who had not responded (viz. 350 people). The questionnaire was completed and returned by 444 respondents. Of these, 54.3% indicated that they would be willing to participate in a second study. These respondents received a second questionnaire in August 2006. It was stressed that this questionnaire should be completed by the same person who had completed the first questionnaire. After two weeks, a reminder was sent to those respondents who had not responded to the second questionnaire. The second questionnaire was completed and returned by 152 respondents (34%). Eight respondents were excluded form the analyses because their sex and year of birth did not correspond in both studies. In addition, one respondents was excluded, because this respondent estimated the costs of the congestion charge above the maximum amount per week (viz., 60 SEK per vehicle per day, see Table 4.1). Analyses were conducted with the 143 (44 female and 99 male) remaining respondents. The number of people living outside the city centre of Stockholm was slightly overrepresented in our sample: in Stockholm 69% of the population lives outside the city centre, whereas this was the case for 87% in our sample. Car use in our sample is relatively high, a majority indicated to make more that 75% of their trips by car both before (in December 2005) and after (in August 2006) the trial period.

Drop out of respondents is common in longitudinal studies (Abrahamse, Steg, Vlek, & Rothengatter, 2007). To test whether the drop out was selective, we examined whether respondents who completed both studies systematically differed from the respondents who

Table 4.2 Socio-demographics and number of trips with various modes for first (December 2005; N = 444) and second sample (August 2006; N = 143)

	Sample Dec 2005 N = 444		Sample Aug 2006 N=143		
Gender					t (415) = -0.27
% men	67.0 %		69.0 %		
% women	28.4 %		31.0 %		
missing	4.6 %		0.0 %		
Year of birth					t (413) = -0.06
before 1946	34.6 %		33.1 %		
between 1946 and 1956	21.7 %		26.1 %		
between 1956 and 1966	19.9 %		21.8 %		
after 1966	19.2 %		19.0 %		
missing	4.6 %		0.0 %		
Highest finished educational level					t (412) = -2.11*
primary school	14.3 %		9.2 %		
high school	33.3 %		35.2 %		
higher vocational/ university	45.7 %		53.5 %		
other	2.3 %		2.1 %		
missing	4.4 %		0.0 %		
Income level (annual, gross)					t (310) = -2.32*
less than 200.000 SEK	9.2 %		4.9 %		
between 200.000 – 299.000 SEK	18.9 %		19.7 %		
between 300.000 – 399.000 SEK	23.1 %		32.4 %		
more than 400.000 SEK	20.8 %		24.6 %		
missing	27.9 %		18.3 %		
Employment status					t (411) = 2.74*
in paid employment	67.0 %		78.2 %		
not in paid employment	28.4 %		21.1 %		
missing	4.6 %		0.7 %		
Percentage of trips made by different modes of transport, as indicated in December 2005[1]					
	M	(SD)	M	(SD)	
car	61.5	(38.2)	61.9	(38.3)	t (429) = -0.17
motorised transport (except car)	1.0	(8.2)	0.8	(7.6)	t (429) = 0.48
public transport	23.3	(31.2)	22.0	(30.3)	t (429) = 0.60
non-motorised transport	9.0	(19.5)	6.7	(20.2)	t (429) = -0.46
other modes	1.0	(8.5)	1.9	(12.2)	t (429) = -1.64

* p≤ .05

participated in the first study only on socio-demographics, travel behaviour, acceptability of the congestion charge, and beliefs about its consequences. Compared to respondents who participated in the first study only, respondents who completed both questionnaires had a higher income and educational level and were more likely to be in paid employment (Table 4.2)[1]. The percentage of trips made by various transportation modes, including car, and the number of days respondents would have to pay for the congestion charge when following their daily routine did not differ between both respondents groups, neither did their judgments of the acceptability of the congestion charge.

Questionnaires

Questionnaire December 2005

The questionnaire started with a short introduction of the Stockholm trial. Thereafter, the respondents were asked to indicate how many days they would have to pay the charge in order

to continue with their daily routine (46.3% 1–5 days a week, 8.2% once in a fortnight, 19.5% once a month). Next, they were asked to estimate how much they expected to pay during a typical week when the charge would be implemented (M = 53.2 SEK), which reflects their beliefs about the consequences of the charge for their travel costs. Moreover, respondents indicated the percentage of their trips they made by car, motorised transport except the car, public transport, non-motorised transport, and other transportation modes before the charge was implemented (December 2005; see Table 4.2). The percentage of trips made by car was included in the analyses to control for car use.

The second part of the questionnaire was aimed at measuring respondents' beliefs about the congestion charge. Respondents first listed three negative and three positive consequences of the congestion charge. These open questions were included to ascertain that respondents considered the pros and cons of the congestion charge seriously, and that the respondents would include these considerations in their evaluation of the congestion charge. Furthermore, respondents indicated, on a 7-point Likert scales ranging from very unlikely (1) to very likely (7), the extent to which they thought that the congestion charge would result in a decrease in their own use of the car (M = 2.3; SD = 1.95), pollution levels in the city centre (M = 3.8; SD = 1.86), and congestion in the city centre (M = 3.7; SD = 1.83). Moreover, they indicated to what extent they expected that parking a car in the city centre would become easier (M = 3.5; SD = 1.87), and that busses, undergrounds and commuter trains would become more crowded (M = 5.5; SD = 1.77). Respondents considered it rather unlikely that their own car use would be affected and they did not expect congestion, pollution and parking problems to decrease very much. However, respondents did consider it rather likely that public transport would become more crowded.

Acceptability was measured with a single item. Respondents were asked to indicate how acceptable the congestion charge was to them on a 7-point Likert scale ranging from very unacceptable (1) to very acceptable (7) (M = 2.6, SD = 2.2).

In the last part of the questionnaire, respondents indicate their socio-demographic background (year of birth, sex, educational level, income, employment status) and whether or not they were willing to participate in a second study.

Questionnaire August 2006

The second questionnaire comprised basically the same questions as the first questionnaire. The relevant questions were rephrased to assess beliefs about experienced consequences instead of beliefs about expected consequences of the congestion charge. For instance, 'how likely do you think it is that congestion levels in the city centre will reduce if the congestion charge is implemented?' was rephrased as 'did congestion levels in the city centre reduce after the congestion charge was implemented?'. Moreover, in the last part of the second questionnaire, respondents indicated their sex and year of birth in order to check whether the same respondent completed both questionnaires.

Acceptance of the congestion charge was measured in the same way as its acceptability. In line with previous studies on the Stockholm congestion charge, acceptance of the congestion charge (M = 3.2, SD = 2.3) was significantly higher than its acceptability (M = 2.6, SD = 2.2; $t(140) = 4.4$, $p < .001$) (Stockholmförsöket, 2006; Winslott-Hiselius et al., 2009). Acceptance is below average, indicating that a majority opposed to the congestion charge after it was implemented.

Table 4.3 Means, standard deviations and paired t-test of acceptability, expected effects before (December 2005) and perceived effects after (August 2006) the implementation of the congestion charge (N=143)

	Before trial December 2005 M (SD)	After trial August 2006 M (SD)	t	df
Beliefs about consequences of the charge on				
- congestion [1]	3.7 (1.96)	4.9 (1.96)	7.6 ***	137
- parking problems [1]	3.3 (1.81)	3.7 (2.06)	2.7 **	134
- pollution [1]	3.7 (1.98)	4.6 (1.95)	5.2 ***	135
- own car use [1]	2.2 (1.83)	2.4 (2.02)	1.0	143
- travel costs [2]	49.4 (70.11)	39.6 (63.84)	-2.1 *	125
- crowdedness in public transport [1]	5.6 (1.69)	5.3 (1.66)	-1.5	131

* p≤ .05; ** p≤ .01; *** p≤ .001

[1] scores could range from 1 (very unlikely) to 7 (very likely)

[2] scores could range from 0 to 300 SEK

Results

First, we examined the differences between respondents' belief about the consequences of the congestion charge before (December 2005) and after (August 2006) the charge was implemented. Table 4.3 shows the means and standard deviations of respondents' beliefs about the consequences of the charge on congestion, parking problems, pollution, crowdedness in public transport, one's own car use, and travel costs before and after its implementation. Also, results of paired t-test are given. After the trial, respondents believed congestion, parking problems and pollution decreased more than they believed before the charge was implemented. Respondents indicated that they believed their travel costs had increased somewhat less after the charge was implemented than they had expected beforehand. No differences were found between the extent to which respondents expected to reduce their car use before the trial period and the extent to which they had reduced their car use after the trial period. Moreover, beliefs about the consequences of the charge on the crowdedness of public transport did not significantly differ before and after the implementation of the charge.

Next, we examined the relative importance of beliefs about the consequences of the congestion charge for its acceptability and acceptance levels. We calculated partial correlations coefficients, controlling for the percentage of car trips made[2]. Before the trial with the congestion charge in December 2005, acceptability was higher when respondents believed that congestion ($r = .50$, $p<.001$), parking problems ($r = .42$, $p<.001$), pollution ($r = .50$, $p<.001$), and their own car use ($r = .43$, $p<.001$) would decrease, when the percentage of trips made was controlled for. Acceptability was slightly lower when respondents believed their travel costs would increase ($r = -.17$, $p = .057$), when the percentage of trips made was controlled for. No significant correlation was found between the acceptability of the congestion charge and respondents' beliefs about the consequences of the charge for the crowdedness in public transport.

After the trial in August 2006, acceptance was higher when respondents believed that congestion ($r = .46$, $p<.001$), parking problems ($r = .48$, $p<.001$), pollution ($r = .45$, $p<.001$), and their own car use ($r = .27$, $p<.01$) had decreased, and acceptance was lower when they believed that public transport had become more crowded ($r = -.19$, $p<.05$), when the percentage of car trips made was controlled for. Acceptance was not significantly correlated to beliefs about travel costs of the charge when the percentage of trips was controlled for.

Table 4.4 Regression analysis of percentage of car trips and beliefs about the consequences of the congestion charge on acceptability before the trial in December 2005 (N=143)

Model	β	t	p	F	p	df1, df2	R^2
Step 1				14.14	.000	1, 133	.10
Percentage car trips	-.31	-3.76	.000				
Step 2				14.03	.000	7, 127	.44
Percentage car trips	-.08	-1.16	.250				
Beliefs about consequences of the charge for							
- congestion	.27	1.83	.070				
- parking problems	.04	0.34	.733				
- pollution	.16	1.09	.276				
- own car use	.28	3.72	.000				
- travel costs	-.16	-2.23	.027				
- crowdedness in public transport	-.09	-1.20	.233				

Table 4.5 Regression analysis of percentage of car trips and beliefs about the consequences of the congestion charge on acceptance after the trial in August 2006 (N=143)

Model	β	t	p	F	p	df1, df2	R^2
Step 1				5.60	.020	1, 107	.05
Percentage car trips	-.22	-2.37	.020				
Step 2				8.35	.000	7, 101	.37
Percentage car trips	-.10	-1.04	.301				
Beliefs about consequences of the charge for							
- congestion	.14	0.95	.345				
- parking problems	.25	2.28	.025				
- pollution	.14	1.02	.310				
- own car use	.25	2.91	.004				
- travel costs	-.03	-0.38	.705				
- crowdedness in public transport	-.08	-0.91	.364				

Next, the relative importance of six beliefs about the consequences of the congestion charge for its acceptability was examined, controlling for the extent to which respondents use their car. Therefore, two regression analyses were conducted. First, a regression analysis was conducted to examine which beliefs about the expected consequences of the charge predicted its acceptability in December 2005, before the charge was implemented. Variables were entered in two steps, to control for the extent to which respondents use their car (Table 4.4). In the first step, the percentage of trips made before the trial was included as predictor of the acceptability of the congestion charge, which explained 10% variance in acceptability. Acceptability was lower when respondents made more trips by car (β = -.31, p<.001). Next, beliefs about the consequences of the charge for congestion, parking problems, pollution, one's own car use, travel costs, and crowdedness in public transport were included in the model as well. This model explained 44% of the variance in acceptability, with the six beliefs about the consequences of the congestion charge explaining 34% additional variance in acceptability. Only beliefs about the consequences of the charge for one's own car use and travel costs contributed uniquely and significantly to the explanation of the variance in acceptability of the charge. Acceptability was higher when respondents believed their own car use would decrease (β = .28, p<.001) and when they believed that their travel costs would not increases much (β = -.16, p<.05).

Next, following the same procedure, a regression analysis was conducted to examine the

relationship between the acceptance of the congestion charge and respondents' beliefs about the consequences of the charge in August 2006, after its implementation (Table 4.5). The percentage of trips made by car after the trial explained 5% in variance of the acceptance of the charge (β = -.22, p<.05). When beliefs about the consequences of the charge for congestion, parking problems, pollution, one's own car use, travel costs, and crowdedness in public transport were entered in the second step, an additional 32% of variance in the acceptance of the charge was explained. Beliefs about the consequences of the charge for one's own car use and parking problems contributed uniquely and significantly to the model only. Acceptance was higher when respondents believed their own car use (β = .25, p<.01) and parking problems (β = .25, p<.05) had decreased.

Discussion

This study aimed to explain why acceptance of the congestion charge in Stockholm was higher after its implementation in 2006 than its acceptability beforehand. We hypothesised that acceptance of the charge would be higher than its acceptability levels, because people have more favourable or less unfavourable beliefs about the consequences of the congestion charge after the trial than beforehand. Indeed, we found that respondents considered it more likely that congestion, parking problems, and pollution had decreased after the implementation of the charge than they had expected beforehand, which suggests that respondents had more favourable beliefs about the charge. Also, after the implementation of the congestion charge, respondents believed that their travel costs had increased less than they expected before the trial, which indicates that respondents also had less unfavourable beliefs about the charge. So, our first hypothesis was confirmed: respondents believed that the congestion charge had more favourable (i.e., less congestion, parking problems, pollution) and less unfavourable effects (i.e., less increases in travel costs) after the congestion charge had been implemented than was expected beforehand.

A regression analysis revealed that acceptability of the congestion charge was lower when respondents believed their travel costs would increase, while the perceived travel costs after the charge were not significantly related to acceptance judgements. As reported above, we also found that the increase in cost was not believed to be as large as respondents had expected beforehand. This suggests that travel costs of the charge were important for acceptability judgements before the congestion charge was implemented, but not for its acceptance afterwards. So, as expected, acceptance of the charge was less strongly related to unfavourable consequence than acceptability judgements. Furthermore, regression analysis shows that the congestion charge was more acceptable when respondents believed that it had become easier to find a place to park, when other beliefs and the percentage of car use were controlled for. Therefore, as expected, our results also indicated that acceptance of the charge was more strongly related to favourable consequence than acceptability judgements. These results are irrespective of the extent to which people use their car. This indicates that instead of focussing on the unfavourable consequences of the charge (i.e., increased travel costs), favourable consequences of the charge (i.e., decreasing parking problems) were more predictive of acceptance as opposed to the acceptability of the charge, providing support for our second hypothesis. Moreover, perceived reductions in parking problems appeared to be relatively more important for acceptance levels of the charge than other positive effects that

were perceived (e.g., reductions in congestion and pollution). Apparently, our respondents were more concerned about parking problems than about congestion or pollution levels.

Both acceptability and acceptance of the charge were higher when respondents believed their own car use would or had been decreased. Apparently, those who can and are willing to decrease their car use find the congestion charge more acceptable. This indicates that people may perceive some feasible alternatives for their car trips. This suggests that providing alternatives for car trips is an important part of the total strategy. In Stockholm, public transport was improved and expanded as part of the trial, which resulted in a 4% increase in public transport use (Miljöavgiftkansliet, 2006). Car users may have perceived alternatives for their car trips, which may explain why acceptance of the charge was higher that its acceptability (see also, Kottenhoff & Brundell-Freij, 2009).

Overall, this study suggests that the acceptance of the congestion charge in Stockholm is higher than its acceptability, because people had more positive and less negative beliefs about the consequences of the charge after the trial. Our results are in line with previous studies on the actual effects of the congestion charge. During the trail, the number of cars entering the zone decreased with 22% on weekdays between 6.30 am and 6.30 pm, and as a result, congestion and pollution levels decreased (Eliasson, Hultkrantz, Nerhagen, & Rosqvist, 2009; Stockholmförsöket, 2006). Also, the number of parking places had increased in the inner city of Stockholm. Hence, it is likely that our respondents actually experienced positive consequences of the congestion charge, which may explain why they had more positive beliefs about the congestion charge after it was implemented. Moreover, we found that the travel costs did not increase as much as expected beforehand, which suggests that the less negative effects were experienced that respondents had expected. So, it seems plausible to assume that acceptance levels were higher than acceptability levels because of positive experiences and/or more realistic perceptions of the effects of the congestion charge during the trial period.

On the basis of our study, we cannot be sure about the causal relationship between respondents' acceptability, acceptances and beliefs about the consequences of the charge. For example, one could argue that people who find the charge unacceptable stress unfavourable consequences of the charge, rather than the other way around. However, our results also indicate that respondents believed that the charge had more positive effects and less negative effects after the trial period than they expected beforehand. Therefore, they did not merely focus more strongly on positive and less strongly on negative effects after the trial period, but they were also more positive/less negative about the consequences of the charge. Consequently, we assume that acceptability and acceptance judgements were determined by people's beliefs about the consequences of the charge instead of the other way around. Future studies are needed to examine this assumption.

Results of this study should be interpreted with some care. First, our sample was not fully representative of the Stockholm population, which may have affected the external validity of our study. Overall, the mean acceptance scores in our sample were low in comparison to the results of the referendum. This can be explained by the overrepresentation of people living outside the city centre of Stockholm, who had lower acceptance scores than people living inside the city centre. Also, respondents hardly reported (intentions to) reduce their own car use, which are often people who find road pricing schemes unacceptable (Jakobsson et al., 2000). Apparently, respondents who evaluated the charge as not very acceptable were somewhat more strongly motivated to fill out our questionnaires. Perhaps they thought that expressing their opinion in a

questionnaire would influence decision making process of the charge. We cannot exclude the possibility strategically answering by respondents. However, even though our sample may be somewhat more sceptical towards the charge, we still found evidence that acceptance of the charge was higher than acceptability, because people were more positive (and less negative) about the effects of the charge. Also, we were particularly interested in changes in and relationships between variables, and not in the absolute score on the key variables. We have no reason to believe that relationships between variables would be different in a representative sample, or that relationships would be different when strategic answering would have been impossible. Of course, our conclusions remain tentative until our study has been further validated.

Second, all inhabitants of Stockholm faced the congestion charge, and as a consequence, we could not compare the results with a control group. Therefore the context in which the trial took place should be taken into account when interpreting the results. Isaksson and Richardson (2009a) argue that the central strategy that was followed in Sweden was aimed at overcoming public resistance and meeting political needs. The central strategy comprised the trial and a referendum. Inhabitants of Stockholm were 'forced' to undergo the congestion charge for 7 months, and in return, were given the power to make the final decision in the referendum. With respect to road pricing, the combination of a trial period followed by a referendum is rather unique. The trial period gave inhabitants of Stockholm the opportunity to experience the positive consequences of the congestion charge, as we have shown in this study. The referendum was likely to give inhabitants of Stockholm the feeling that fair procedures were followed, which is an important precondition for the acceptability of policies (Tyler, 2000). Having a referendum about a road pricing scheme without a trial period may result in a rejection of the scheme, because the benefits of road pricing would not have been experienced. For example, residents of Edinburgh, Scotland, voted against the implementation of a road pricing scheme in 2005 (see also, Gaunt et al., 2007). One explanation for this rejection in Edinburgh is that the referendum was held without a preceding trial period, and thus, residents could not experience the potential positive effects of a road pricing scheme. So, experiencing the positive consequences of a road pricing scheme in combination with the referendum seems to have contributed to the acceptance of the congestion charge in Stockholm.

Another important factor in Stockholm was the information given to the public. One important source of information was the official website of the Stockholm council on which reports were published by the authorities, stressing the positive effects of the congestion charge in particular. A second important source of information was the Swedish mass media. The opinion of the mass media on the congestion charge shifted from generally anti to relatively pro congestion charge during the trial (Winslott-Hiselius, Brundell-Freij, Vagland, & Byström, 2009e). The public received much information about positive effects of the congestion charge. The positive information combined with personal positive experiences with the congestion charge can explain why acceptance of the charge was higher than its acceptability.

We showed that experiencing positive consequences of a road pricing scheme is one important factor for its acceptance. Our results suggest that when the experience of positive consequences is lacking, acceptance of road pricing will not be high, and may even be lower than its acceptability levels before the implementation. Therefore, road pricing schemes can best be implemented when the likelihood of positive effects is high, such as in areas with significant problems. On the basis of our data we cannot indicate whether acceptance levels will

increase when positive experience are perceived on an individual and/or on a collective level. This is an important topic for future research.

In conclusion, effective road pricing schemes can be acceptable when people experience the benefits of a scheme. The Stockholm trial is a good example of a road pricing scheme that is both effective in achieving its goals and acceptable to the public. The results give cause to optimism, because it shows that road pricing can be an acceptable instrument to change transport behaviour (e.g., see Eliasson et al., 2009) and effectively decrease problems at the same time. There is no guarantee that implementing road pricing will be acceptable and effective in every situation. However, making sure that people have the opportunity to gain positive expectations, and when possible, positive experiences with road pricing schemes is one important factor for securing public support.

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[1] Income, educational level and employment status were not systematically correlated to acceptability, acceptance, and beliefs about the consequences of the congestion charge, which is in line with other studies (e.g., Jaensirisak et al., 2005; Ubbels, 2006). Therefore, we assume that the differences found between both respondents groups did not affect our results.

[2] The higher the percentage of trips respondents made by car, the lower were their acceptability ($r = -.32$, $p < .001$) and acceptance levels ($r = -.23$, $p < .01$) for the congestion charge. Before the congestion charge (December 2005), bivariate correlation coefficients indicate that the higher percentage of trips respondents made by car, the more they expected their travel costs to increase ($r = .29$, $p < .001$), and the less likely they considered it that congestion ($r = -.24$, $p < .05$), parking problems ($r = -.24$, $p < .05$), pollution ($r = -.24$, $p < .05$), and their own car use ($r = -.24$, $p < .05$) would decrease. No statistically significant correlation was found for the percentage of trips made by car and the expected effects on the crowdedness of public transport. After the congestion charge (August 2006), the higher the percentage of car trips made by car, the more respondents perceived travel costs had increased ($r = .39$, $p < .001$), the less they had decreased their own car use ($r = -.36$, $p < .001$), and the less they perceived decreases in pollution levels ($r = .22$, $p < .05$). No statistically significant correlations were found for the percentage of trips made by car and the expected effects on congestion levels, parking problems and the crowdedness of public transport.