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Reactance or acceptance? Reactions towards the introduction of road pricing

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Abstract

We tested the opposite predictions of reactance and dissonance theory, two popular psychological theories, with regard to the responses of car drivers to the introduction of the road pricing. Reactance theory predicts that persons who are convinced that a toll will come are more opposed than less convinced persons. In contrast, dissonance theory expects that convinced persons are more in favour of road pricing than less convinced persons. Aim of the study was to test which theory is more appropriate to explain user reactions towards the toll introduction. We experimentally manipulated the perceived likelihood (low, middle, high and a control condition) of a toll introduction for private cars on German motorways ($N = 140$ car drivers). In accordance with the predictions of dissonance theory, results revealed clearly that convinced persons about a definite introduction of road pricing developed more positive attitudes towards road pricing than less convinced persons, i.e., the strength of conviction about the introduction of road pricing has a strong effect on the attitudinal evaluation of road pricing. The implications are discussed.

Keywords: Road pricing; Acceptance; Reactance; Dissonance theory

1. Introduction

Meanwhile, an extensive literature demonstrates the low public acceptability of (urban) road pricing schemes (e.g. Jakobsson et al., 2000; Schade and Schlag, 2000, 2003b; Jaensirisak et al., 2005; Fujii et al., 2004). Concerning factors determining the degree of acceptability, in particular personal attitudes, expectations, perceptions and subjective evaluations about road pricing have been investigated. Among these, variables like negative outcome expectations, perceived unfairness, negative social norms and perceived infringement on freedom have been identified as important determinants (for a comprehensive overview see Schade and Schlag, 2003a). Socio-economic factors like income revealed a clearly lesser and rather unsystematic impact on acceptability than did attitudinal factors (Jaensirisak et al., 2005). Although various suggestions are available about how to improve the acceptability of road pricing (e.g. Schlag and Teubel, 1997; Jones,

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2003), it seems evident that in most cases road pricing schemes have to be implemented against the majority of voters and car drivers. In addition, generally people have no (direct) control over the decision to implement road pricing. This raises an important question: how will persons and in particular concerned car drivers react to the (planned) introduction of road pricing? Either, will persons respond with even stronger negative attitudes, rejection or reactance towards such proposals or will they adapt to new situation and develop actually more positive attitudes because they have to accept the inevitable?

Unfortunately, there is not much data available to answer these questions. In *Bergen* public opinion has shifted from strong opposition before implementation to almost majoritarian support in the after situation (Tretvik, 2003). Larsen (1988) reports that a month before the opening of the toll ring, a newspaper poll showed only 13% absolutely in favour, with 54% opposed (33% indifferent). Within a year, however, 50% were in favour and only 36.5% opposed. The remaining 13.5% were either indifferent or did not have any opinion.

In the year before the implementation of the *Oslo* toll ring, 70% of the city's population were negative towards the toll ring. When the system had been operative for one year this opposition had been reduced to 64%. In 1998 this figure was 54%. The share being very negative has decreased from 40% to 17% during the same period. The share being positive to the toll system has steadily increased during the period, from 30% before the toll system opened to 46% in 1998.

Attitude surveys about the *Trondheim* toll ring indicated decreased opposition after implementation (Tretvik, 2003). In April 1991, about 70% of the respondents objected to the toll ring. In December 1991, two months after implementation, the negative share had dropped to below 50% (Fig. 1). In succeeding opinion polls during the summer of 1992 and 1993, the negative share constituted about 35%, while the proponents share dropped slightly from about 37% in 1992 and to about 32% in 1993. The remaining respondents stated their indifference. The latest poll, from September 1994, indicated less support, with a negative share of 43% and a positive share of 29%.

Similar results have been observed in *London* (Transport for London, 2004). Before charging in late 2002 40% rejected congestion charging (40% support) whereas after charging in 2003 just 25–30% still rejected congestion pricing (now 50–60% support). On the other hand Raux and Souche (2003) report a remarkable exception: a failure of a tolling scheme in France due to public resistance. The northern boulevard périphérique of *Lyon* has been a privately managed toll road infrastructure which opened in 1997. From the outset, it was vehemently rejected by motorists. There was a movement to boycott the new road accompanied by weekly demonstrations at the toll barriers. These prevented users from paying and occasionally even led to the destruction of the barriers. Finally, the local authority repurchased the road which is now managed by a public corporation. The toll was considerably reduced and limited to a main central tunnel.

A typical *ad hoc* explanation for the observed shifts from negative attitudes before to rather positive attitudes after implementation of road pricing is that this is caused by the benefits (improvements) which have occurred after tolling has been introduced (Odeck and Brathen, 2002). However, this answer is neither satis-

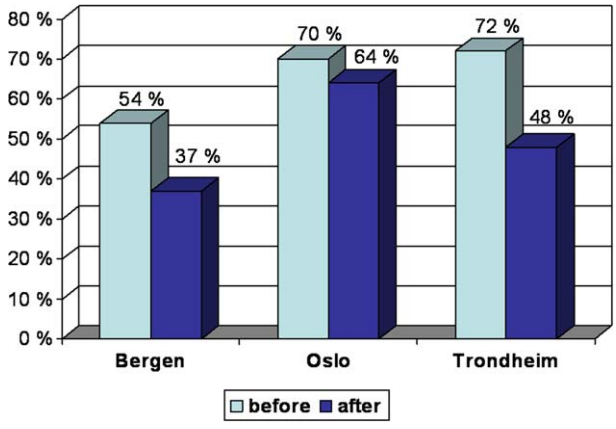

Fig. 1. Negative attitudes before and after (one year of) opening of urban tolls in Norway (adapted from Odeck and Brathen, 2002, 256).

fying nor sufficient. Firstly, it is an *ex post* explanation which is not experimentally validated. Secondly, although the general assumption may be partially correct there may be other even more important reasons which could cause the observed attitude changes. Alternative explanations, mainly derived from two psychological theories will be elaborated in the following section.

2. Theoretical background

There are two popular social–psychological theories which make opposite predictions regarding the attitudinal evaluations and reactions towards the introduction of road pricing.

According to *cognitive dissonance theory* (Festinger, 1957), there is a tendency for individuals to seek consistency among their cognitions (i.e., beliefs, opinions). Dissonance theory postulates that when there is an inconsistency between attitudes or behaviours (dissonance), people are motivated to reduce or to eliminate the dissonance because these inconsistencies cause discomfort. In the case of a discrepancy between attitudes and behaviour, it is most likely that the attitude will change to accommodate the behaviour. Two factors affect the strength of the dissonance: the number of dissonant beliefs, and the importance attached to each belief. Dissonance can be eliminated by reducing the importance of the conflicting beliefs, acquiring new beliefs that change the balance, or removing the conflicting attitude or behaviour. According to dissonance theory the introduction of road pricing evokes feelings of cognitive dissonance. However, this is only the case, if the introduction is inescapable. On the one hand people favour the status quo without road pricing. On the other hand people perceive that in the future this commitment cannot be maintained any longer because the introduction of road pricing is inevitable. This causes cognitive dissonance. A devaluation of road pricing in terms of negative attitudes would not be an effective strategy to reduce cognitive dissonance in the long run. In contrast, the only effective option to reduce dissonance would be to develop more positive attitudes towards road pricing, i.e., cognitive dissonance theory predicts, the more likely the introduction of road pricing the more positive should attitudes become towards road pricing.

Opposite predictions are derived from *reactance theory* (Brehm, 1966). Reactance theory states that if a behavioural freedom is threatened, individuals will experience an adverse state of arousal called reactance. They will try to reduce the arousal by restoring the threatened freedom. This can be done by cognitive reorganisations, for instance to evaluate the eliminated alternative more positively, whereas the attractiveness of the forced (chosen) alternative is devaluated (Brehm, 1976). If people are not allowed to decide whether road pricing should be introduced or not (e.g. via referenda), which many should perceive as an illegitimate restriction of personal freedom, this should lead to feelings of psychological reactance. This could result into a decreased attractiveness of road pricing and an increased attractiveness of the status quo without road pricing.

To explore the question about how persons (in particular car drivers) will respond to the introduction of road pricing we used the fact, that persons hold different convictions whether road pricing will be really implemented. Reactance and dissonance theory result – with regard to the strength of conviction – into opposite predictions concerning the evaluation of road pricing.

Reactance theory predicts that persons who are convinced that road pricing will be implemented evaluate road pricing more negatively than less convinced persons. Convinced persons should experience more reactance because they perceive an immediate infringement of personal freedom. This should lead to a strong motivation to decrease the attractiveness of road pricing and to restore the status quo. Less convinced persons should expect only a minor restriction of personal freedom and thus they should experience less reactance. They should be motivated to decrease the attractiveness of road pricing to a lesser extend.

In contrast, dissonance theory predicts that convinced persons should be more in favour of road pricing than less convinced persons. More convinced persons should experience stronger cognitive dissonance than persons who are less convinced about the introduction of road pricing. The most effective way to reduce dissonance would be to increase the attractiveness of road pricing and to decrease the status quo whereas less convinced persons should be less motivated to increase the attractiveness of road pricing.

The opposing predictions of reactance and dissonance theory regarding the evaluation of road pricing have been tested in a empirical study. This has been done by experimentally manipulating the perceived probability (low, medium, high and a control condition) of the toll introduction for private cars on German Autobahnen. In the high probability condition we induced via an introductory text a strong conviction about an imminent

introduction of road pricing on German Autobahnen. In the medium condition we provided a mixed picture with pro and cons towards the forthcoming introduction. In the low probability condition we presented mainly arguments against a close introduction of road pricing. In the control condition we provided no additional information. This experimental manipulation enabled us to identify whether the strength of conviction about the introduction of road pricing really influences the attitudinal evaluation of road pricing. We tested the following hypotheses:

1. *Hypothesis 1*: The evaluation of road pricing (toll) depends on the strength of conviction about the introduction of road pricing. (A) Dissonance theory predicts that convinced persons should be more in favour towards road pricing than less convinced persons. (B) Reactance theory predicts that persons who are less convinced should be more in favour of road pricing than convinced persons.
2. *Hypothesis 2*: Road pricing will be differently evaluated in the experimental conditions (low, medium, high and control condition). (A) Dissonance theory predicts that road pricing will be evaluated more positively in the high probability condition compared to the low, medium or control condition. Reactance theory predicts the opposite: the higher the perceived probability the more road pricing should be evaluated negatively.

3. Method

3.1. Participants and experimental design

The survey was carried out from January to February 2005 in Dresden, Germany. Respondents were mainly contacted at several petrol stations and all persons are (active) car drivers. The sample consists of 140 persons (41 female and 99 male) aged between 19 and 69 years (mean age: 38.6 years). Mean distance travelled per year 22 900 km. Sixty seven persons were member of an automobile club (ADAC). The study is based on a one-factorial variance-analytical design with four levels (low, medium, high probability, control condition). The assignment to the four different experimental conditions is shown in Table 1.

3.2. Procedure

Depending on the experimental condition, we provided via an introductory text different information about the likelihood of a close introduction of road pricing on German Autobahnen.[1] In the high probability condition we presented solely arguments which suggested an imminent introduction of road pricing for all cars on German Autobahnen. It was stated that after the successful introduction of the distance-based heavy goods vehicles (HGV) toll on 1st January 2005 the introduction of a comparable toll for all cars would be already decided "behind the scene". There would be no way back. In the medium probability condition we provided a more mixed picture about the likelihood of a close introduction. Arguments in favour of a close introduction were presented like the successful HGV toll as well as arguments against it like the rejection of the toll by influential stakeholder groups (industry, motorist organisations). In the low probability condition we presented only arguments against a close introduction like technical difficulties, resistance by lobby groups and politicians and privacy problems. In the control condition we did not provide any additional information. Respondents were randomly assigned to the four conditions. After the experimental manipulation all respondents had to answer the same questions. All items were operationalised by a five-graded scale (−2 absolutely disagree, −1 disagree, 0 neither/nor, 1 agree, 2 strongly agree). Here, we measured the attitudinal evaluation of road pricing (two items), the importance of personal freedom (one item), the perceived infringement of freedom (one item) and motivations (intentions) to defend or restore this freedom (three items). In order to identify the success of the experimental manipulation we included two items which measured the strength of conviction

[1] Which was in so far easy, as the introduction of the German distance-based heavy goods vehicles (HGV) toll on 1st January 2005 led to a high media coverage of road pricing in general at that time.

Table 1
Assignment of respondents to the four experimental conditions (*N*)

Group	Sex		∑
	Female	Male	
High probability	9	25	34
Medium probability	10	22	32
Low probability	9	25	34
Control condition	13	27	40
∑	41	99	140

about the introduction of road pricing. Parts of the items have been adapted from a similar study by Greitemeyer et al. (2001).

4. Results

Manipulation check. In order to determine conviction values about the introduction of road pricing we calculated the combined mean values for the two items "convinced that road pricing will come" and "introduction of road pricing is very likely". Mean values and standard deviants are shown in Table 2. Both items correlate significantly high ($r = .88$; $p < .01$).

The experimental manipulation was successful because we found a significant difference between the experimental conditions in the expected direction ($F[3,136] = 3.08$; $p = .03$). Post hoc comparisons showed that in detail significant differences exist between the high probability group and the low probability group ($T[1,66] = 7.51$; $p < .01$) and between the high probability and the control group ($T[1,72] = 6.93$; $p < .01$). Other differences did not become significant.

Hypothesis 1: To verify the validity of hypothesis 1 we divided the sample into two sub-samples (median split with the above conviction value). The first group (values $< .5$) consists of persons with a *lower value of conviction* concerning the introduction of road pricing ($N = 56$). The second group (values > 1.5) holds a *higher value of conviction* ($N = 47$), i.e. persons are much more convinced about a toll introduction. We then compared both groups regarding the attitudinal evaluation of road pricing. The attitudinal scale was compiled from two items: "*to evaluate the toll positively*" and "*to be in favour for the toll introduction*" ($M = -.63$; $\mathrm{Sd} = 1.37$). Both items correlate significantly high ($r = .87$; $p < .01$). We found a highly significant difference between both groups concerning the evaluation of the toll ($F[1,101] = 17.09$; $p < .00$), i.e. more convinced persons hold much more positive attitudes towards the toll ($M = .09$; $\mathrm{Sd} = 1.45$), than less convinced persons ($M = -1.14$; $\mathrm{Sd} = 1.14$). Thus, predictions made by dissonance theory are confirmed.

Hypothesis 2 states, that the toll will be differently evaluated in the experimental conditions which is confirmed by the data ($F[1,139] = 3.96$; $p < .01$). Again, as predicted by dissonance theory, the toll is much more positively evaluated in the high probability condition than in the low or control condition (Fig. 2). However, overall the evaluation of the toll is still slightly negative even for the convinced persons.

Post hoc comparisons showed that significant differences exist between the high probability group and the low probability group ($T[1,66] = 2.49$; $p < .01$), between the high probability and the control group ($T[1,72] = 3.36$; $p < .01$) and between the medium and the control group ($T[1,70] = 1.94$; $p < .06$). Other differences did not get significant.

Table 2
Reported strength of conviction about the introduction of road pricing

Group	Mean (*M*)	Standard deviation (Sd)
High probability	1.18	.93
Medium probability	.86	1.13
Low probability	.46	1.22
Control condition	.51	1.20

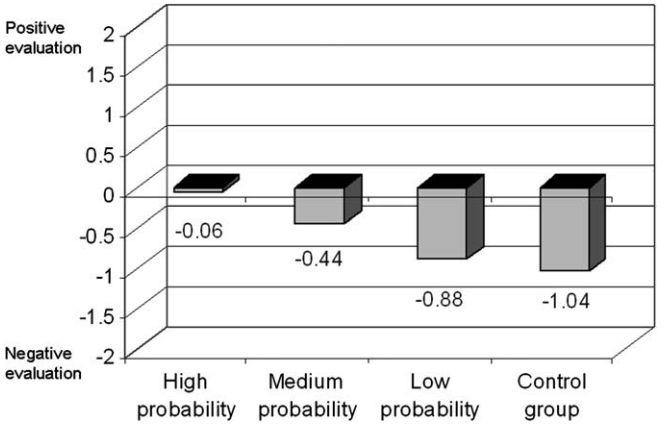

Fig. 2. Differences in the evaluation of the toll depending on the experimental condition (mean values).

Table 3
Additional evaluations of road pricing depending on experimental condition

Items	Control condition	Low probability	Medium probability	High probability	MANOVA
	M	*M*	*M*	*M*	
Outcome expectations (personal advantages)	−1.15	−1.29	−.75	−1.06	n.s.
Social norms	−.90	−1.07	−.50	−.53	$F[3,136] = 2.70$; $p = .03$
Perceived unfairness	−.15	−.53	−.09	−.41	n.s.
Negative emotions/anger	.37	.15	−.28	−.29	$F[3,136] = 2.38$; $p = .07$
Personal importance of free use	1.00	.53	.16	.06	$F[3,36] = 4.28$; $p = .01$
Perceived infringement of freedom	.68	.12	.00	−.44	$F[3,136] = 4.29$; $p = .01$
Motivations (intentions) to defend or restore personal freedom					
• To take action against the toll	−.42	−.50	−.69	−1.18	$F[3,136] = 3.04$; $p = .03$
• To evade the toll	1.12	.62	.50	.12	$F[3,136] = 3.89$; $p = .01$

Finally, we compared the differences of additional variables between the four conditions (see Table 3). Results revealed only in the case of outcome expectations (personal advantages following the toll) and perceived unfairness no significant differences between the experimental groups. All other items showed significant differences. Respondents of the control and low probability condition report stronger social norms against the toll than persons from the medium und the high probability condition. The same holds true for negative emotions like anger which are reported significantly lower from medium/high condition. Persons from the control/low probability groups state a higher importance of toll free use of Autobahnen and a stronger infringement of freedom than persons from the medium/high probability groups. Last but not least, respondents from the medium/high probability condition report significantly lower levels of motivation to restore personal freedom compared to the control/low probability condition. In sum, these results show strong evidence for the predictions of dissonance theory.

5. Discussion

The results of the present study revealed clearly that persons with a strong conviction about a definite introduction of road pricing exhibit much more positive attitudes towards road pricing than persons who are less certain about a close introduction. To explore whether the strength of conviction about the introduction of

road pricing is cause or effect of its attitudinal evaluation we manipulated experimentally the perceived likelihood of road pricing introduction. Results showed that persons who got the impression that the introduction of road pricing is almost inescapable do not only develop more positive attitudes towards road pricing. In addition they perceive only weak social norms against the toll and they state lower negative emotions like anger. Furthermore they report lower levels of infringement of freedom and they state a weaker motivation to restore personal freedom than persons who got the impression that the introduction of road pricing is rather uncertain. Thus, the strength of conviction about the introduction of road pricing has a strong effect on the attitudinal evaluation of road pricing.

The attitudinal reactions towards the introduction of road pricing follow almost exclusively the predictions of dissonance theory. In contrast, the opposing assumptions of reactance theory have been rejected, i.e., people tend to cope with unavoidable events by increasing its attractiveness, in order to maintain a consonant cognitive belief system. The motivational state of dissonance which is evoked by road pricing is reduced by increasing its attractiveness. This is much more effective than to resist against an inevitable measure by holding even stronger negative attitudes towards it.

To our knowledge this is the first study which provides an empirically based alternative explanation to the frequently observed attitude shifts after the implementation of road pricing. Generally, this has been ascribed to the benefits which have occurred after road pricing has been introduced (Odeck and Brathen, 2002). However, the above results suggest, that the positive effect of benefits on attitude change might be overestimated and at least partially explained by cognitive dissonance reductions.

Opposition and active resistance against the implementation of road pricing is – as shown in Lyon – in individual cases still possible. However, specific conditions must be met in order to produce active protest (e.g. perceived distributive and procedural injustice, perceived gains and losses of participation, collective identification processes, etc.) (Klandermans, 1997; Stürmer and Simon, 2004). Normally people attempt to adapt to the new situation as soon as no real alternative is available. This seems to apply even to areas where people did not make own decisions. Overall, the present study demonstrates how psychological theories and applications can usefully contribute to the investigation of traffic related problems.

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