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BEHAVIOURAL RESPONSES TO TRANSPORT PRICING: A THEORETICAL ANALYSIS

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ABSTRACT

This chapter provides a psychological perspective on transport pricing. We first describe to what extent and under which conditions transport pricing may be effective in reducing car use, and consequently, in reducing the problems caused by car use. Next, we review factors influencing the acceptability of transport pricing and provide theoretical explanations for the significance of these factors. The role of policies features as well as individual characteristics will be discussed. We elaborate on the role of justice and fairness, and discuss relationships between (perceived) effectiveness and acceptability of transport pricing. Policy implications and important topics for future research will be highlighted.

INTRODUCTION

Next to technological measures, behavioural changes of individual car users are needed to reduce the problems of car use discussed in the first part of this book. Several policy strategies may be applied to manage car use (see Chapter 15 by Loukopoulos), among which are transport-pricing policies. Prices of car use may be increased (at certain times or places), while costs of the use of environmentally friendly (or: sustainable) modes of transport, such as public transport, may be reduced. Studies revealed that the latter strategy is generally not very effective in the long term. For example, lowering costs of bus use does attract new bus users, but does not result in a reduction in car use, i.e., the new passengers

used to cycle or walk, or stayed at home rather than drove their car (e.g., Claassen and Kropman, 1995; Deslauriers and Everett, 1977). Furthermore, financial rewards for bus travellers appeared to be effective only in the short term; people revert to their initial travel behaviour as soon as the reward ceases (Van Knippenberg and Van Knippenberg, 1988). Increasing costs of car use is supposed to be far more effective in reducing the level of car use (e.g., Gomez-Ibanez and Small, 1994; TfL, 2004). Therefore, we focus on price increases. In the remaining of this chapter, transport pricing is defined as increasing costs of car use (and not purchase costs of cars).

Transport pricing is generally believed to be an effective and efficient way to manage problems resulting from private car use (see Chapter 18 by Ubbels and Verhoef). Especially modelling studies, but also some evaluation studies, revealed that transport-pricing policies may be highly effective in reducing car use and the problems associated with car use. However, transport pricing is not easily implemented due to the lack of public support, i.e., in general, the public thinks transport-pricing measures are not acceptable (e.g., Schlag and Teubel, 1997; Jones, 1998, 2003). This also applies to other policies: Effective policies are generally not acceptable to the public, while policies that are acceptable are generally not effective in reducing problems resulting from car use (Steg, 2003). This places policy-makers in a dilemma: Should they implement unpopular policies, or respect public opinions without solving the problems at stake? Or is it possible to design pricing schemes that are both effective and acceptable? Therefore, it is important to understand which factors affect the effectiveness and acceptability of transport policies, and more specifically, transport pricing. This facilitates the design of policies that may be acceptable and effective. Characteristics of policies (e.g., price level) as well as individual characteristics (e.g., car dependency, car attitudes) may be important in this respect.

This chapter provides a psychological perspective on transport pricing. We first discuss whether transport pricing is indeed effective in reducing car use. We will briefly review studies that have examined the effectiveness of transport pricing. Some of these studies focus on perceived effectiveness (i.e., stated preference), whereas others evaluated actual effectiveness (i.e., revealed preferences). Next, we focus on acceptability of transport-pricing policies, since acceptability is of major importance for implementing effective transport-pricing policies. We discuss factors influencing the acceptability of transport pricing and provide theoretical explanations for the significance of these factors. Furthermore, we elaborate on the relationships between acceptability and effectiveness judgements: Are effective policies indeed not acceptable to the public? Several policy recommendations are discussed, and important open questions that need to be addressed in future research are highlighted.

EFFECTIVENESS OF TRANSPORT PRICING

Various transport-pricing policies may be distinguished, such as fuel levies, road taxes, toll levies, and kilometre charges. Such user charges are generally aimed at making

Table 1: Possible Behavioural Changes Resulting from Transport Pricing

Type of Change	*Specification of Behavioural Changes*
Driving behaviour	Driving style (speed, use of brakes, changing gears)
Travel behaviour	Trip chaining Route choice Time of travel Destination choice (e.g., shopping, recreation) Number of trips (trip suppression) Mode choice (e.g., car, carpool, motorbike, public transport, bicycle, walking)
Vehicle ownership	Type of car (e.g., fuel type, size) Car ownership (number of cars, replacement of car)
Location choice	Choice of residence Choice of workplace

people drive at other times or places, or at reducing the level of car use[1]. By doing so, it is expected that problems associated with car travel discussed in the first part of this book will reduce, e.g., traffic congestion, environmental problems, and threats to urban quality of life, such as traffic safety and noise annoyance. Thus, transport-pricing policies are aimed at reducing problems resulting from car use by changing behaviour of individual car users.

Transport-pricing policies may elicit various types of behavioural changes. Table 1 gives an overview of possible changes. First, people may change their driving behaviour, i.e., adopt more energy–efficient driving styles. Second, people may consider to change their travel behaviour. They may combine trips, use different routes, change the time of travel, or visit other destinations. Furthermore, they may suppress certain trips, or travel with different modes of transport, such as public transport, cycling, walking, or carpooling. These changes are generally relatively easy to accomplish in the short term. Third, changes in vehicle ownership may occur. People may consider to buy a new car or to dispose of their car. The new car may either be smaller or more energy–efficient, but may also be larger or less economical. The latter may occur when, for example, vehicle or road taxes are abolished and incorporated in fuel prices (i.e., variabilisation of car costs), thereby reducing costs of car possession. Fourth, location choices may be affected. People may consider to move residence, or to find another job location. Location choices may have significant effects on travel behaviour because travel distances to various destinations may decrease (or increase) considerably. In general, behavioural changes are not necessarily linked to more economical (or less) car use. For example, pricing policies may well result in an increase in car use for some groups, e.g., high-income groups or individuals who receive reimbursement of their travel expenses

[1] Transport pricing may also be aimed at raising additional revenues; this will not be discussed in this chapter.

may decide to drive more often or to drive during peak hours instead of off-peak hours if congestion levels reduce. Similarly, a reduction in congestion problems may result in an increase of commuting distances for some groups, e.g., when people can afford to move residence further away from work without increasing their travel time.

Changes in car ownership and location choices (especially choice of workplace and residence) will typically occur in the long term. One may assume an ordering in these adaptation strategies (see also Loukopoulos *et al.*, 2004). People may first opt for behavioural changes with lowest behavioural costs (in terms of money, time, effort), e.g., trip chaining (e.g., combine commuting and shopping trips), choosing closer destinations (e.g., shopping close to home), or choosing different routes (e.g., travel via a route that is not tolled). When these changes are not possible or not sufficient, they may opt for changes associated with higher behavioural costs, such as using other modes of transport or suppressing trips. Finally, in the long term, they may consider buying another car or disposing of a car, or even to move home or to look for a job closer to home. Of course, individual differences may exist in behavioural costs of the adaptation strategies. For example, changing the time of travel may be possible for some workers but not for others. To get a complete and comprehensive overview of effectiveness of transport pricing, it is highly important to distinguish between these types of behavioural changes and to take into account short as well as long-term effects of transport pricing. People need time to adjust to new situations, and more significant behavioural adaptations may occur in the long term only. For example, Mogridge (1978) found that during the world oil crisis of the mid-1970s the rise in fuel prices had only a marginal effect on car use in the short term. However, it appeared that behavioural effects were apparent in the long term. People purchased smaller and more economical cars. More generally, price elasticities tend to be higher in the long term compared to short term (e.g., Priemus and Nijkamp, 1994; Wootton, 1999).

Different pricing strategies may result in different behavioural adaptations. For example, a rise in vehicle or road taxes will probably affect car ownership more strongly than route choice, while a kilometre charge may well result in changes in mode choice, but probably not in the purchase of a more energy–efficient car. Furthermore, time-dependent charges are more likely to result in changes in time of travel, while tolling main roads may typically result in changes in route choice.

The extent to which the behavioural changes discussed above will contribute to reduction in the various problems related to car use differs greatly. Changes in route or time of travel may be effective in reducing accessibility problems, but may be counterproductive in attempts to increase quality of urban life. For example, if heavy traffic volumes are spread out in time, community residents may suffer from high levels of traffic noise for a longer period of time. On the other hand, reductions in the level of car use, e.g., by shifting to less polluting modes of transport, changing destinations, residence or workplace, combining trips, or suppressing trips may improve environmental quality, urban quality of life, and destination accessibility. Purchasing new, energy–efficient or

low-emission cars will especially result in reduction of environmental problems and increases in urban quality of life, but will hardly help control congestion problems. People may be even tempted to use their energy–efficient car more often because it is cheaper and more environmentally friendly. Many scholars have stressed the importance of the so-called rebound effect (e.g., Berkhout *et al.*, 2000). Therefore, policymakers should carefully take into account which policy goals should be reached and which behaviour changes are targeted when designing and implementing transport-pricing policies.

Next to changes in collective qualities, such as environmental problems, urban quality of life and accessibility, transport-pricing policies may also have consequences for individual quality of life (e.g., Poortinga *et al.*, 2004; Steg and Gifford, 2005; De Groot and Steg, 2006). Quality of life may be defined as the extent to which important values and needs of people are fulfilled (e.g., Diener, 1995; Diener *et al.*, 1999). Obviously, transport-pricing policies may affect the way and the extent to which people are able to fulfil important values and needs. In general, policymakers seem reluctant to implement policies aimed at reducing car use, such as increasing prices of car use, because it is believed that such measures will reduce individual's quality of life. However, various studies reveal that transport policies may have less negative effects for individual quality of life than expected (De Groot and Steg, 2006; see Steg and Gifford, 2005, for a review). Possible negative quality-of-life effects, such as infringements on freedom, reductions in comfort and increased costs, seem to be partly compensated for by improvements in environmental quality, nature, health, and safety, which are considered to be important for individual quality of life as well. A study by Schuitema and Steg (2005b) also revealed that people take into account effects on environmental quality and congestion when evaluating effects of transport-pricing policies for their lives. People's judgements of whether they would be better or worse off when considering all pros and cons of transport-pricing policies appeared to be most strongly (and positively) related to expected effects on congestion levels and environmental problems, while these judgements were only weakly correlated with the extent to which the pricing policy would affect one's own car use (i.e., car mileage). This implies that respondents expect their overall situation to improve if they think congestion and environmental problems will decrease as a result of transport-pricing policies (see also Schuitema and Steg, 2005a).

Psychologists have primarily studied the expected effects of transport pricing (i.e., they focus on stated preferences). Typically, respondents are asked to what extent they would reduce their car use (e.g., mileage, number of trips) when transport-pricing policies would be implemented, or to what extent these policies would be effective in reducing problems caused by car use. Various studies revealed that, in general, people think transport pricing will not be very effective in reducing car use (e.g., Steg, 1996, 2003; Jakobsson *et al.*, 2000; Loukopoulos *et al.*, 2004; Schuitema and Steg, 2005b) or the problems of car use (e.g., Schlag and Teubel, 1997; Jones, 2003; Schuitema and Steg, 2005a, 2005b), especially because they think car use reductions are hardly feasible

(Jakobsson *et al.*, 2002). People generally assume transport pricing will be somewhat more effective for others (e.g., Steg, 1996). Various group differences were found in perceived effectiveness of transport pricing. In general, low-income groups expect to reduce their car use more than high-income groups do (Jakobsson *et al.*, 2000). Furthermore, transport pricing will affect private and commuter trips somewhat more than business trips (Cavalini *et al.*, 1996; Schuitema *et al.*, 2003). Transport pricing may especially result in a reduction of shopping trips (Jakobsson *et al.*, 2002; Schuitema *et al.*, 2003). Furthermore, transport policies are more likely to result in changes in route choice, destination choice or time of travel, while the amount of kilometres driven or car ownership will hardly be affected (Cavalini *et al.*, 1996; Loukopoulos *et al.*, 2004). Especially, short trips by car will be reduced, e.g., because people cycle to their destination instead of driving (Schuitema *et al.*, 2003).

In sum, stated preference studies reveal that transport pricing will be more effective if people think they can reduce their car use (e.g., this is more likely for private trips and route choice), and if people cannot afford an increase in travel costs (e.g., low-income groups). Surprisingly, people indicate that in general, transport pricing will not be very effective, while various studies reveal that transport pricing may have substantial effects on car use. Prominent examples are the Singapore area licence scheme (a congestion charge) and the London congestion charge (see Small and Gomez-Ibañez, 1998; Santos, 2004; Santos *et al.*, 2004; Verhoef *et al.*, 2004). In Singapore, changes in route choice were most prevalent, but shifts to carpooling and bus use were observed as well, while in London switches to bus use (and taxi's) were more common than changes in route choice (see Santos, 2004; Verhoef *et al.*, 2004). Thus, revealed preferences do not seem to match stated preferences. Several explanations may be given for this finding. First, results of revealed preferences studies may not be easily generalised to other areas. Congestion pricing appeared to be effective in Singapore and London, which both were confronted with serious congestion problems. Moreover, in both cities, the quality of public transport was improved as well, and consequently, for many, feasible alternatives modes of transport were available. Experiencing serious problems and the availability of high-quality public transport may be important preconditions for transport pricing to be effective. Also, the level of price increase is important. In both Singapore and London, charges were relatively high. In contrast, low charges appeared to be less effective (e.g., toll rings in Norway; Tretvik, 2003; Ramjerdi *et al.*, 2004; see also Verhoef *et al.*, 2004). Also, the effectiveness of transport pricing may be substantially decreased when people can evade the measure, e.g., by driving at other times when time-dependent charges are introduced (such as in Trondheim, Norway, where time-dependent urban tolls were implemented; Meland, 1995; Ramjerdi *et al.*, 2004). Furthermore, stated preference methods may elicit strategic answers; people may indicate that transport pricing will not be effective, in the hope it will convince policymakers to not to implement transport-pricing policies. Moreover, people may not think through the consequences of transport-pricing policies, and may not thoroughly consider possible behaviour changes. In general, people are not very accurate in assessing future travel patterns (cf. Jakobsson, 2004).

Pricing policies may have unwanted side effects, resulting in less significant behaviour changes than expected beforehand. This will especially be the case if pricing policies reduce intrinsic motivation to help solve problems related to car use. This so-called 'crowding out' effect (e.g., Frey, 1997, 2003) may especially occur when price changes are high enough to justify behavioural changes. In that case, people may change their car use to save money only, and no longer because they feel intrinsically motivated to contribute to solutions of the problems caused by car use. This may be problematic because intrinsic motivation may more strongly affect behaviour than do monetary incentives (Thøgersen, 2003). Moreover, intrinsic motivation of those not affected by the pricing policies may diminish as well. Thus, pricing policies may be effective only to the extent that financial incentives at least compensate a possible decrease in intrinsic motivation (Frey, 1997; Thøgersen, 2003). In other cases, effects may be weakened, or may even be counter-productive. Transport pricing may give people the feeling that they have a right to drive their car because they have paid for it (Fehr and Falk, 2002). To the authors' knowledge, it has not been demonstrated yet whether the crowding out effect applies to transport pricing, but based on results of previous studies, such effects may be expected.

ACCEPTABILITY OF TRANSPORT PRICING

Lack of public support is an important barrier to the implementation of restrictive transport-pricing policies. Interestingly, policymakers and politicians seem to underestimate the support for policies aimed to reduce car use (e.g., Jones, 1995). A similar misunderstanding is prevalent among car users themselves, who, on average, indicate they find transport pricing more acceptable than does the general public (Steg, 1996). Nevertheless, many politicians are not keen on implementing policies that evoke resistance among the general population. However, some transport-pricing policies are more acceptable than others, and some may even be rather acceptable, at least for some groups. In general, the extent to which transport pricing is acceptable to the public is dependent on individual characteristics as well as on features of the policies themselves. In this section, we will discuss both types of features.

Individual Differences in Acceptability of Transport Pricing

Many (psychological) studies have tried to identify individual factors that affect public acceptability of transport pricing (e.g., Schlag and Teubel, 1997; Jakobsson *et al.*, 2000; Schade and Schlag, 2000, 2003; Schlag and Schade, 2000; Bamberg and Rölle, 2003; Schuitema, 2003; Loukopoulos *et al.*, 2005). The acceptability of transport pricing appears to be related to a wide range of factors. A study by Frey (2003) suggests that problem awareness may be an important precondition for policy acceptability. Acceptability of road pricing in Saas-Fee (Switzerland) appeared to be rather high

(57% supported this policy) because people were aware of the problems caused by car traffic and of possible solutions for these problems in their community. Similar results were found in a study conducted in the Netherlands: transport policies are more acceptable for people high in problem awareness (Steg and Vlek, 1997). Jones (2003) also stresses the importance of problem awareness for enhancing public acceptability for transport pricing (see also Small and Gomez-Ibañez, 1998). Interestingly, Schade and Schlag (2000) found that people who are especially concerned about the environmental problems of car use evaluate transport-pricing policies as more acceptable compared to those who are more strongly concerned about congestion.

Jakobsson *et al.* (2000) found that transport policies are evaluated as less acceptable when they are perceived to be unfair, and when they threaten people's freedom of choice (and thus have negative individual consequences). A study by Bamberg and Rölle (2003) revealed that, besides these factors, perceived effectiveness plays a role as well: acceptability is higher when people believe the policies will be effective in reducing car use (see also Steg, 1996; Schade and Schlag, 2003). Perceived effectiveness appeared to be related to problem awareness: the more people are aware of environmental problems caused by car traffic, the more they think transport pricing will be an effective instrument to reduce car use. Several other studies reported positive relationships between perceived effectiveness and acceptability of transport pricing as well. Jaensirisak *et al.* (2003) found that acceptability is higher if transport pricing benefits individuals as well as society as a whole by, e.g., reducing congestion levels and improving environmental quality. Schade and Schlag (2003) also report that transport pricing is more acceptable if it benefits the individual and reduces collective problems. Similar results were found by Schuitema and Steg (2005a), showing that acceptability of transport-pricing measures is higher if people think their life will not be affected too much, and if people think environmental and congestion problems will actually reduce. They found that the actual rise in travel costs for households was less strongly related to acceptability ratings. People who think transport pricing is acceptable especially stress the positive (collective) consequences of the policies, such as improved environmental quality and reduction in congestion levels, while those who think transport pricing is not acceptable typically focus on negative consequences for themselves (Loukopoulos *et al.*, 2004). From the above, we may conclude that people seem to resist policies that are not effective in solving problems caused by car use. On the other hand, Jakobsson *et al.* (2000) found that policies are not acceptable when they are very effective in changing one's behaviour, thereby seriously affecting individual freedom of choice. This implies that people seem to prefer policies that help solve collective problems resulting from car use that benefit themselves as well, while the policies should not restrict their own freedom of choice.

Various groups may actually benefit from the implementation of transport-pricing policies, for example if congestion levels decrease and accessibility improves. Furthermore, transport-pricing may benefit groups that hardly drive or do not drive, as far as the problems resulting from car use actually reduce, i.e., they will benefit from improved

environmental and urban qualities. Also, people may find ways to evade the charges, and consequently, price increases may not affect them. Thus, some groups may be in favour of transport pricing. However, in general, support of these 'winners' is usually muted (Frey, 2003), and, consequently, politicians assume public support is low.

Trust in governments may also affect policy acceptability: if trust levels are low, public support for policies that reduce individual freedom to move is low as well (Ney *et al.*, 1997). This may well be related to perceived effectiveness: if people do not trust the government, they may think the policies may not be effective as well. Frey (2003) suggests that public participation in the decision-making processes may enhance public acceptability, because it increases public understanding of the need for reducing problems related to car use by introducing transport pricing. This is in line with literature on procedural justice, in which the focus is placed on the fairness of the processes by which decisions and policies are being made: decisions are perceived to be more fair, and consequently, acceptable, if those affected had a say in the decision-making process (Lind and Tyler, 1988; Clayton, 2000).

Processes of distributive justice, i.e., the extent to which various groups are affected by transport-pricing policies (see Clayton, 2000; Schroeder *et al.*, 2003), are also highly relevant for the acceptability of transport pricing. Indeed, fairness seems to be strongly related to acceptability judgements (Jakobsson *et al.*, 2000; Bamberg and Rölle, 2003; Schuitema *et al.*, 2004). For example, Bamberg and Rölle (2003) report a correlation coefficient of 0.80 between perceived fairness and acceptability. This suggests that perceived fairness is of crucial importance of policy acceptability. On the other hand, one may doubt whether respondents interpret fairness and acceptability as different constructs; they may reflect one common underlying construct. This indicates that measures of both constructs should be carefully developed, as to make sure respondents notice the conceptual difference.

Surprisingly, little is known yet about perceived fairness of different types of transport pricing. What is perceived to be fair will likely depend on the prevalent justice principle. Different justice principles may be prevalent, resulting in different fairness judgements. People may strive for equality or equity, or they may think the 'polluter should pay'. Equality refers to aiming for equal rights, privileges, quantities, qualities, etc. This implies that transport price increases should be the same for all (i.e., static pricing measures). Equity means everyone should be affected in the same degree. This suggests that different price levels for different groups may be evaluated as fair, e.g., price level should be lower for frequent travellers (e.g., business travellers) as to make total price increases equitable, or people driving large and heavy cars (more often high-income groups) should pay higher prices because they can afford it. 'The polluter pays' principle implies that price increases should be highest for those who most strongly contribute to the problems. Congestion charging is a prominent example here. Fairness judgements may also be directly related to the extent to which transport policies affect the individual relative to other people: if people think that they themselves are affected disproportionately, policies

may perceived to be unfair. Another (distributive) justice principle that proved to be relevant in the environmental context is environmental justice, which respects the rights of the environment, ecosystems, other species, and future generations (Clayton, 2000). Policies may be perceived as more fair when they protect and guarantee the rights of nature, the environment, and future generations. Environmental justice may be well seen as a special type of distributive justice, by taking into account the extent to which non-human species and future generations are affected by policies. Little is known yet on which justice principle is prevalent for which groups and under which circumstances. Studies typically include quite general measures of fairness, reflecting how fair the introduction of the measure would be (often a single-item measure). More research is certainly warranted into the perceived fairness of different transport-pricing measures and the role of various justice principles in this respect.

This approach makes sense when considering acceptability judgements as attitudes towards transport pricing (e.g., Jakobsson *et al.*, 2000; Schade and Schlag, 2003), i.e., many theorists assume attitudes are based on evaluating perceived consequences of behaviour or situations (e.g., Fishbein and Ajzen, 1975; Ajzen, 1985). To put it differently, attitudes towards transport pricing are believed to be dependent on expected consequences of transport pricing. The more positive (and the less negative) consequences people expect from transport pricing, the more favourable are people's attitudes towards transport pricing, and the more positive people's acceptability ratings.

Alternatively, acceptability judgements may be defined as a specific type of (environmental) behaviour. This approach has been advanced by Stern and his colleagues (Stern *et al.*, 1999; Stern, 2000). They argue that support or acceptability of environmental policies, such as transport pricing, may be defined as non-activist behaviours in the public sphere. Non-activist behaviour affects environmental quality indirectly, by influencing public policies, which may have large effects on environmental qualities because public policies may change the behaviour of many people at once. This implies that theories aimed to explain environmental behaviour may be of particular interest to understand factors affecting public acceptability of transport pricing. Since transport pricing generally implies that people have to give up personal advantages of car use to benefit collective interests, especially theories that explain why people make short-term sacrifices in order to safeguard collective interests seem relevant in this respect, such as the norm-activation model (NAM) (Schwartz, 1977; Schwartz and Howard, 1981) and the value-belief-norm theory of environmentalism (VBN theory) (Stern, 2000).

The NAM (Schwartz, 1977; Schwartz and Howard, 1981) was originally developed to explain altruistic behaviour, but has often been applied in the environmental context (e.g., Dunlap and Van Liere, 1978; Hopper and Nielsen, 1991; Vining and Ebreo, 1992; Bamberg and Schmidt, 2003; Gärling *et al.*, 2003). According to NAM, behaviour occurs in response to personal norms that are activated when individuals are aware of adverse consequences to others or the environment (awareness of consequences or AC

beliefs) and when they think they can adverse these consequences (ascription of responsibility or AR beliefs). Stern and colleagues (Stern *et al.*, 1999; Stern, 2000) proposed the VBN theory, which is in essence an extension of the NAM. Like the NAM, they propose that environmental behaviour results from personal norms, i.e., a feeling of moral obligation to act pro-environmentally. These personal norms are activated by beliefs that environmental conditions threaten things the individual values (awareness of consequences or AC beliefs) that in turn affect beliefs that the individual can act to reduce this threat (ascription of responsibility or AR beliefs). The VBN theory proposes that AC and AR beliefs are dependent on general beliefs on human–environment relations (e.g., Dunlap and Van Liere, 1978; Dunlap *et al.*, 2000) and on relatively stable value orientations. The causal chain proposed in the VBN theory moves from relatively stable and general values, to beliefs about human–environment relations, which in turn are believed to affect specific beliefs on consequences of environmental behaviour and the individual's responsibility for these problems and for taking corrective actions, which affect personal norms, and, subsequently, behaviour.

Stern (2000) explicitly states that the VBN theory can be applied to explain acceptability judgements. VBN theory has been successful in explaining various environmental behaviours, among which willingness to sacrifice and acceptability of environmental policies (Stern *et al.*, 1999; Steg *et al.*, 2005). Of special interest here is the study by Steg *et al.* (2005), which revealed that acceptability of energy policies was indeed related to personal norms, while personal norms were stronger the more people felt responsible for problems related to energy use, which was in turn related to awareness of consequences of problems related to energy use. Further, as expected, awareness of consequences appeared to be related to general beliefs about human–environment relations and to value orientations. The importance of problem awareness has also been stressed by other scholars, as discussed earlier. Other studies also suggest that policies are more acceptable when people are more aware of the (environmental) problems at stake, when they feel more responsible for these problems and when they feel a stronger moral obligation to contribute to the solution of these problems (e.g., Stern *et al.*, 1999; Schade, 2003). Further research is needed to test whether variables identified in the VBN theory are related to acceptability of transport pricing.

Policy Features That Affect the Acceptability of Transport Pricing

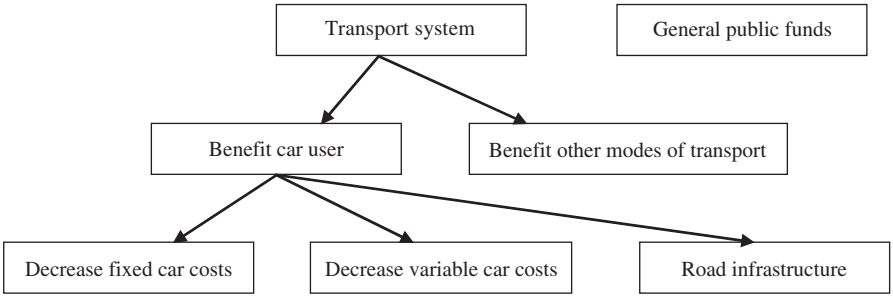
In this section, we discuss policy features that may affect the acceptability of transportation pricing policies, and explain the relation to individual factors influencing acceptability judgements as identified in the previous section, notably perceived effectiveness of policies, the extent to which individual freedom to move is affected, and perceived fairness of policies. Three policy features are discussed: (1) the level of price changes, (2) the extent to which price changes are differentiated, e.g., in time, place, for user groups, and (3) the way revenues are allocated.

Obviously, the level of price changes affects people's freedom to move. Marginal price increases will hardly affect people or may even not be noticed, while many people (especially low-income groups) may not be able to cope with extensive price increases. Not surprisingly, significant price increases are evaluated as less acceptable than are small increases (Schuitema *et al.*, 2003), especially if the policy is not differentiated and people cannot easily evade the measure. Moreover, significant price increases are not believed to be fair, because low-income groups will be afflicted disproportionately. On the other hand, small price increases may not be acceptable as well (Rienstra *et al.*, 1999; Schade and Schlag, 2000), because in that case travel costs will increase without problems resulting from car use being reduced. This implies that price increases are most acceptable when they are sufficiently high to reduce problems resulting from car use, without affecting one's own preferred travel behaviour.

Furthermore, acceptability may depend on the extent to which pricing policies are differentiated. First, pricing measures may be static, i.e., when price increases are similar for all drivers. Examples are flat kilometre or toll charges. Second, price increases may be variable, i.e., they may differ in time (e.g., higher tolls during peak hours) or place (e.g., higher price levels at specific routes, such as cordon charging), according to the level of the problem (e.g., congestion charging) or vehicle type (e.g., higher charges for large and heavy cars), and for different user groups (e.g., different rates for private cars and lorries). Third, dynamic price increases may be implemented, i.e., price levels may change in time or place, according to actual travel conditions (e.g., congestion levels). In case of dynamic pricing policies, at a given time actual price levels may be uncertain. As people prefer certain outcomes above uncertain ones (Kahneman and Tversky, 1984), we may hypothesise that dynamic pricing is less acceptable. In practice, however, actual price levels under dynamic pricing may be quite stable in as far as an equilibrium in travel flows is reached.

Some types of differentiations may be more fair than others, because they affect various groups differently. For example, congestion pricing will affect drivers in congested areas only, and higher tolls during peak hours will strongly affect commuters. Thus, freedom to move of some groups may be seriously affected, while other groups may not be confronted with price increases at all. In as far as people think some groups are affected disproportionately, they may think the policy is unfair.

Finally, revenue allocation may affect acceptability of pricing policies. Several studies revealed the way revenues are used may have important consequences for acceptability of transport pricing. In general, price increases appear to be more acceptable when revenues are spent in a way that benefit the individual directly, e.g., by reducing taxes for owning or using a car (e.g., Jones, 1991; Verhoef, 1996; Schade and Schlag, 2000; Harrington *et al.*, 2001; Lyons *et al.*, 2004) or when revenues are allocated within the same domain, e.g., by improving public transport (Schade and Schlag, 2000; Lyons *et al.*, 2004). In contrast, people more strongly oppose transport pricing when revenues are allocated to general public funds (Verhoef, 1996; Schade and Schlag, 2000).



Source: Adapted from Steg and Schuitema (2003).

Figure 1: Typology of Types of Revenue Use

Figure 1 gives a typology of different types of revenue use (Steg and Schuitema, 2003). First of all, revenues may be allocated within the transport system or to general public funds. Car users evaluate the former to be more acceptable than the latter (Lyons *et al.*, 2004). Within the transport system, revenues may be allocated to benefit car users or to benefit people using other (viz., more environmentally friendly) modes of transport, such as public transport or bicycles. As may be expected, car users prefer the former above the latter (Schuitema and Steg, 2005b). Finally, car users can benefit from revenues by decreasing fixed car costs (e.g., reducing road or vehicle taxes), by reducing variable costs of car use (e.g., reducing petrol duties), or by investments in road infrastructure (e.g., build new roads). Transport pricing is more acceptable if revenues are allocated to reduce fixed and variable costs of car use rather than investing revenues in road infrastructure. In fact, investments in road infrastructure was perceived as unacceptable as allocating revenues to general public funds (Schuitema and Steg, 2005b). This seems to be in contradiction with earlier studies that revealed that investing revenues in road infrastructure was evaluated as rather acceptable. For example, a study by Verhoef (1996) revealed that investment in road infrastructure is one of the most acceptable ways of revenue use. This may be due to the method used to elicit acceptability judgements. Typically, respondents are asked to what extent they think different types of revenue use are acceptable, without explicitly linking revenue use to a specific pricing policy, and, consequently, without making any reference to the fact that respondents' themselves would be charged (e.g., Verhoef, 1996). In contrast, Schuitema and Steg (2005b) asked respondents to judge the acceptability of a specific transport-pricing policy. In addition to this, they explicated how revenues of this policy would be allocated. Thus, respondents realised they had to pay themselves for improvements in infrastructure. This implies that many people may find investments in infrastructure quite acceptable, but only if they do not realise they have to pay for it themselves. These findings highlight the importance of the study design; different designs of the research task

may be interpreted differently, and may elicit different preference judgements. Another explanation for these contradictory findings is the research method followed. Earlier studies followed within subject designs in which every respondent judges all types of revenue allocation (i.e., comparisons are made between mean acceptability scores of various types of revenue use of all respondents). In contrast, Schuitema and Steg (2005b) followed a between-subject design in which each respondent evaluates one type of revenue only (i.e., comparisons are made between judgements of different respondents). In general, between-subject designs are less conspicuous then are within subject designs (see also Hendrickx and Nicolaij, 2004). This finding certainly warrants further study.

In general, it appears that transport-pricing policies are more acceptable if revenues are used to decrease fixed and variable costs of car use and/or car possession. In such cases, on an aggregate level, overall changes in costs of car use may be small or costs may not even change at all. Obviously, this may affect the overall effectiveness of the particular policy. However, costs will likely increase for some groups, and decrease for other groups, depending on the type of transport pricing and revenue allocation. For example, using revenues for decreasing fixed car costs may have relatively more negative consequences for low-income groups than for high-income groups (Verhoef *et al.*, 2004). Still, on an aggregate level, people's freedom to move may hardly be restricted. This may be one of the reasons why people generally prefer these types of revenue use. Returning revenues back to car users may also be perceived to be more fair than the other types of revenue use: the payer will receive something in return. Revenues may be used to compensate those who are affected most, but this will not be an easy task to accomplish. Some will still lose, for example those with no capacity to change, long commutes, few prospects for changing jobs, or tight budgets (Richardson and Bae, 1998).

SUMMARY AND CONCLUSION

Transport-pricing policies are aimed at changing car use, and consequently, reducing problems caused by car traffic. Transport pricing may elicit various behavioural changes that may affect collective qualities differently. Therefore, policymakers should base their selection and design of transport-pricing policies on the policy goal at stake and behavioural changes to be reached. In general, transport-pricing policies will be more effective if price increases are significant, and if feasible alternatives are available.

Policymakers seem generally reluctant to implement stringent transport-pricing policies, for it is assumed that such policies may significantly reduce individual's quality of life. However, empirical evidence for this assumption is lacking. In fact, studies have revealed that quality of life will not be strongly affected when transport pricing is implemented. One reason for this is that people do not only consider individual consequences of transport pricing, but they also take into account effects on environmental qualities and congestion. Overall, people expect to be better off when pricing policies would

reduce environmental and congestion problems. This may well be related to acceptability of such measures, which is confirmed by the positive relationship between perceived effectiveness and acceptability.

Lack of public support is an important barrier for the implementation of transport-pricing policies. Acceptability is dependent on various individual perceptions and motivations. First, acceptability is dependent on the expected consequences of transport-pricing policies. Transport pricing is more acceptable when people think these policies would actually reduce environmental and congestion problems and when it benefits the individual more (which may be related to improved collective quality). This implies that acceptability may increase when the expected individual and collective benefits are clearly communicated. Process and distributive justice are also closely related to acceptability judgements; they affect to what extent policies are perceived to be fair. However, little is known yet about the role of fairness, e.g., why are policies perceived to be fair or not, and which justice principles are prevalent for different groups?

Second, acceptability may be related to moral and environmental concerns. Studies in the environmental field suggest that acceptability of policies is higher if people feel a moral obligation to act in the common good. This will be especially the case if they are aware of relevant problems and when they feel responsible for these problems, which are in turn related to general environmental beliefs and values. This implies that acceptability may increase if people are aware of the problems caused by car use, and when they feel responsible to do something about it. Further research is needed to see whether these results may be generalised to traffic and transport issues.

Various policy characteristics may be related to acceptability of transport pricing. Obviously, significant price increases will be less acceptable than minor ones. However, minor price-increases appear to be not acceptable as well because in that case problems resulting from car use will not be reduced while prices of travel increase; as indicated earlier, perceived effectiveness is an important precondition for acceptability. The extent to which transport-pricing policies are differentiated may also affect acceptability. This is closely related to processes of distributive fairness discussed earlier. Fairness of transport policies may be enhanced via revenue allocation. Revenue allocation appeared to strongly related to acceptability judgements. In general, transport-pricing policies are more acceptable if revenues benefit individual car users rather than the general public. Thus, acceptability of transport pricing may be enhanced by clarifying how revenues are used, and by compensating those who are affected most by the policies, as far as this would not decrease effectiveness of policies. Allocating revenues to road infrastructure appeared to be highly acceptable in some studies, but not acceptable at all in other studies. The design of research tasks and research method followed may be the reason for these conflicting results. Further sophisticated research is needed to clarify the role of revenue use.

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