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PSYCHOLOGICAL RESISTANCE AGAINST ATTEMPTS TO REDUCE PRIVATE CAR USE

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Abstract—The aim of the research was to investigate the effects of information, feedback and commitment on car use and attitudes related to car use. In a field experiment ($N = 350$) users of private automobiles in The Netherlands monitored their travel behavior for four consecutive two-week periods. The participants received information and individual feedback about the effects of their car use on the environment and/or on their own finances. Information on public transport applicable to their situation was provided as well. Moreover, a subset of the participants committed themselves to reduce their mileage. Separate and combined effects of self-monitoring, environmental feedback, financial feedback, and commitment were analyzed. Effects on travel *behavior* turned out to be absent. Effects on *attitudes* were in some cases opposite to what was expected from a theoretical point of view as well as what was considered desirable from a policy point of view. The underlying psychological processes are discussed in terms of the social dilemma, dissonance reduction and reactance. Consequences for information campaigns are discussed. © 1998 Elsevier Science Ltd. All rights reserved

INTRODUCTION

Traffic and transportation are serious causes of environmental pollution. Therefore, it is desirable to reduce the amount of car use or to shift it to more environmentally acceptable forms. One objective of the present environmental policy of the Dutch government is to reduce private car use. The governmental environmental strategy is, with the help of mass media information campaigns, to increase public support for more structural measures leading to, among others, a decline of private car use. In other countries, comparable campaigns have been carried out (e.g. 'The Clean Air Campaign' in Pennsylvania, U.S.A., in 1994).

Since the car is perceived as a symbol of one's independence, attempts to reduce private car use often evoke psychological resistance (Marsh and Collet, 1986; Van Vugt *et al*. 1995). The aim of the project was to investigate what changes in car use and related attitudes, as well as the underlying psychological processes, can be aroused by providing intensive, individually directed persuasive information about the negative consequences of private car use. It focuses on the two types of arguments on which the Dutch policy to reduce car use is based: (1) the negative collective environmental consequences, and (2) the financial consequences for the individual (Van Kreveld, *et al*., 1993; Tertoolen, 1994; Tertoolen and Verstraten, 1995).

Some of the most pressing problems, including environmental pollution resulting from car use, can be characterized as *social dilemmas*. These are defined by two properties. First, each individual receives in the short term more advantages from socially defecting behavior than from socially co-operative behavior, regardless of what others do. Second, in the long term all individuals experience more disadvantages if all defect than if all co-operate (Dawes, 1980).

Car use provides the individual driver with a number of immediate advantages: it appears to be a cheap form of transportation, it creates feelings of freedom and independence, and it is efficient and convenient. However, it results in serious collective disadvantages, e.g. traffic congestion and traffic accidents, and in the long run heavy pollution leading to serious damage to the environment. According to Dawes (1980), two crucial factors may lead people to co-operate in a social dilemma situation. First, people must think about and come to understand the nature of

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the dilemma, so that moral, normative and altruistic concerns as well as external pay-offs can influence behavior. Second, people must have some reason for believing that other people will not defect for, although differences in pay-offs may always favor defection no matter what others do, absolute pay-off is higher if others co-operate.

The Dutch government aims to influence the choice of travel mode mainly by changing the pay-off structure and by providing, via the mass media, information about the necessity to reduce automobile use. However, this policy is not very effective (e.g. Algemene Rekenkamer, 1991). Research results show that the Dutch population is nevertheless concerned about the deterioration of the environment (NEPP 2, 1993). So, actual behavior and attitudes seem to be inconsistent. For that situation the theory of *cognitive dissonance* (e.g. Aronson, 1988; Cooper and Fazio, 1984; Festinger, 1957; Golob *et al.*, 1979) applies. Cognitive dissonance is defined as inconsistency between attitudes or between attitudes and behavior. Cognitive dissonance, or a threat of it, creates an unpleasant psychological tension. If a person believes that preservation of the environment is desirable but is still driving a car, the person is engaged in attitude-discrepant behavior. Cognitive dissonance is experienced especially if the inconsistency is stressed, e.g. by mass-media campaigns. The dissonance, being psychologically uncomfortable, will motivate the person to try to reduce it by either decreasing car use (behavioral change) or by making attitudes to the undesirable effects of car use less negative (attitude change).

Moreover, if information campaigns or structural measures restrain the freedom experienced by the individual, *psychological reactance* (Brehm, 1966) may occur. Reactance is a motivational state directed toward the re-establishment of those free behaviors which have been eliminated or are threatened to be so. Reactance will lead to an increased desire for these behaviors, which can lead to a 'contrary way of thinking and acting'. Thus, certain measures or influence attempts may have effects opposite to those intended.

The present research deals with the consequences of giving the respondents tailor-made information about the effects of their own transportation behavior by stressing the necessity of reducing their automobile use, by encouraging the participants to use alternative means of transportation more often, and by providing them with relevant information on those alternatives. Aims of the research were to investigate:

1. the effects of psychological influence methods aimed at decreasing automobile use, and
2. the effects of these methods on the perceived discrepancy between actual automobile use and attitudes towards it.

The main study was prepared by some pilot studies. In one of them, a survey of 418 car users, speed, comfort and independence were mentioned as the most important advantages of car use (see Fig. 1).

Environmental and cost consequences of car use — the two main aspects of the transportation policy in The Netherlands and of the mass media campaigns associated with it — were of little interest to them. Also, in other research (e.g. Rogers and Storey, 1987; Wallack, 1981), it has been shown that the effects of information campaigns on the reduction of automobile use are either quite small or non-existent. This led to the aim of the present research: to improve our understanding of the psychological processes responsible for that negative outcome.

METHOD

Subjects

The subjects were 350 gasoline car users in the urban area of Gouda, The Netherlands. They were chosen at random from the telephone directory and requested by telephone to participate in a study to "gain a better insight into transportation behavior". Those selected were the only main car users in their families, who drove between 10 000 and 30 000 kilometres a year and whose work-related travel was less than 20% of this distance.

Procedure

Gouda is a medium-sized city in the most densely populated part of The Netherlands. It has two railway stations, several bus services and a bicycle-friendly infrastructure which offer acceptable alternatives to car use. The experimental treatment consisted of stimulating respondents to restrict their car use by providing them with information on its negative environmental and/or financial

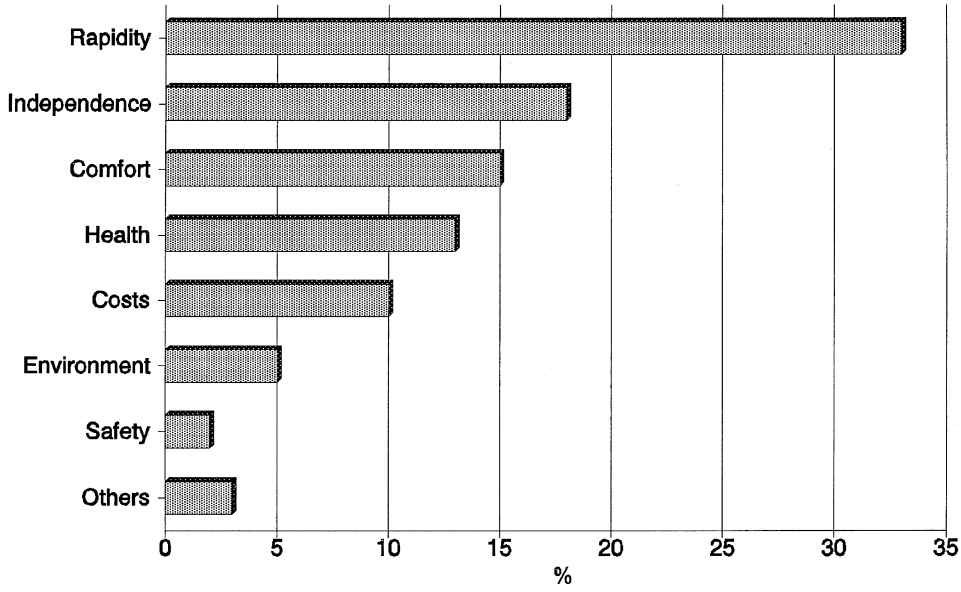

Fig. 1. Most important aspects in relation to car use, as mentioned by the participants in a preliminary study ($N = 418$).

consequences, by requesting them to monitor their car use and by giving them feedback on its negative consequences.

By a random procedure, the respondents were assigned to one of the five treatment conditions. Four were experimental conditions, one was a control condition (Table 1). In the first condition, information on the Environmental effects of car use was presented to the respondents (condition E). In the second condition, the respondents were informed on the financial Costs of car use (condition C). In the third condition, both types of consequences, environmental as well as financial, were provided (condition EC). The respondents in the fourth condition received no information of either type (condition N).

The subjects in these four experimental conditions monitored their transport behavior for eight consecutive weeks. For each trip they registered travel modes and mileage in a detailed trip diary. After every two-week period the subjects in conditions E, C and EC had a person-to-person talk with the researcher's assistant, in which she provided them with feedback about the consequences of their own car use during the preceding two weeks. These consequences were the pollution for the environment (condition E), or the fixed and variable costs for them personally (C), or both (EC). In condition N, the respondents received no feedback. Experts advised on how to determine these consequences in an accountable way. Withholding feedback from the subjects in condition N made it possible to determine the effects of feedback.

In these four experimental conditions, but not in the fifth condition, the respondents were also provided with information about costs and schedules of train and bus services related to their situation and with other alternatives for their use of a car, such as taxis and bicycles.

The fifth condition was a Control Condition (CC), in which the subjects did not monitor their transport behavior or receive feedback. This condition made it possible to determine possible changes in attitudes and behavior due to causes other than the experimental manipulations (e.g. changes in fuel prices, seasonal changes).

Table 1. Design of the field experiment: the four experimental conditions of the 2×2 factorial design and the single control condition

		Self-monitoring		No self-monitoring
		Cost information	No cost information	No cost information
Self-monitoring	Environmental information	EC	E	
Self-monitoring	No environmental information	C	N	
No self-monitoring	No environmental information			CC

In all five conditions, the experimental period was preceded and followed by completing questionnaires on attitudes concerning car use and the environment. These attitudes and some self-reported travel behaviors were measured on Likert scales. General environmental awareness was defined as the mean score on nine of these scales. Attitude change was determined by repeated measurement of the same attitudes.

In the four experimental conditions, the subjects' ability to forecast their own mileage, a measure supposedly reflecting awareness of one's own travel behavior, was determined by subtracting their actual mileage in the first two weeks of the study period from their self-reported expected mileage in this period. The relationship of this measure to some questionnaire outcomes will be determined.

On the pre-test questionnaire, the subjects were also requested to indicate whether they would be prepared to reduce their mileage for eight weeks. Those subjects in the four experimental conditions who gave a positive reply were asked to commit themselves to reducing their car use during the study period. (In condition CC, nothing was done with an affirmative answer.) Commitment to reducing mileage,* presence of a catalytic converter,† and gender were measured on dichotomous scales.

Analysis

All analyses were controlled for the effects of subjects' gender and age, commitment to reduce mileage, and presence of a catalytic converter. In ANCOVAs with repeated measures designs with only the four experimental conditions involved, these variables were used as covariates. In ANOVAs with full design (as depicted in Table 1), the values of the dependent variables were replaced by their standardized residuals; these were derived from regression analyses with the four covariates as predictors. For more details on ANOVAs including both a factorial design and a single control condition (CC), we refer to Winer (1971).

In three multi-step regression analyses with dummy coding, analysis of the models of interest was preceded by steps to eliminate the influence of the four covariates. In two of these regression analyses, we also controlled for the effects of the pre-test values of the dependent variable. Multi-step regression analysis with dummy coding in the last step was used to gain insight into the influence of environmental or cost awareness and respondents' ability to forecast their own mileage on their general environmental awareness, approval of environmental policy of the government, and conditional willingness to reduce their own mileage. More information about regression analysis with dummy coding can be found in Pedhazur (1982).

RESULTS

Effects of feedback and information on cost concern and car use

Table 2 shows the mean distance in kilometres driven by the respondents in the four experimental conditions during the four consecutive two-week periods. It suggests the existence of within-subjects effects between period 1 and the other three periods, possibly caused by seasonal influences. However, after controlling for influence of the four covariates, no significant within-subjects effects could be found. Apparently, none of the instruments used caused a decrease in car use.

In all four experimental conditions the pre- and post-test values of frequency of contemplating own car costs were compared. After controlling for the four covariates, there was an interaction between providing financial information and the within-subjects factor [$F(1, 199) = 5.55$, $p = 0.02$]. Interestingly, providing financial information *decreased* frequency with which subjects considered their car costs.

Combined effects of feedback, information, and self-monitoring

Information about the environment increased general environmental awareness [$F(1, 252) = 6.43$, $p < 0.05$], but did not affect frequency with which the respondents considered car use as

*In the four conditions in which commitment to reduce was asked, the number of respondents willing to commit themselves ranged from 38 to 43 (57 to 64%).

†At the time of the data collection (1992) about 35% of all cars in The Netherlands were equipped with a catalytic converter.

Table 2. The mean amounts of kilometres travelled in four consecutive two-week periods and in the whole experimental period of the main study. Standard deviations in the two-week periods range from 225 to 271 kilometres ($N = 280$)

Condition	Period 1	Period 2	Period 3	Period 4	Total
E	359	404	395	401	1559
C	367	417	393	427	1604
EC	410	422	428	396	1656
N	357	420	430	425	1632
Mean	373	416	412	412	1613

detrimental to the environment. Financial information, on the other hand, decreased the frequency of considering these harmful effects [$F(1, 260) = 3.15, p < 0.10$]. The marginally significant interaction between environmental and financial information [$F(1, 260) = 3.01, p < 0.10$] makes testing individual contrasts possible. Respondents in condition C turned out to be less concerned about detrimental effects of their car use on the environment than respondents in conditions E and EC [respectively, $F(1, 105) = 4.60, p < 0.05$; and $F(1, 102) = 4.01, p < 0.05$] and respondents in condition N [$F(1, 104) = 6.11, p < 0.05$]. Respondents in conditions E, EC and N did not differ significantly on this variable. So, although environmental information on its own had no effect beyond mere self-monitoring, it appeared to *neutralize* the impact of simultaneously provided financial information.

Another neutralizing effect of giving information was obtained in respondents' estimates of their annual costs of car use. The significant interaction between environmental and financial information led us to test individual contrasts [$F(1, 244) = 4.21, p < 0.05$]. Unlike the combined information in condition EC, mere financial information in condition C caused a higher estimate of car costs than mere self-monitoring in condition N [$F(1, 99) = 14.89, p < 0.01$]. In other words, financial information only leads to higher estimates of car costs if it is not combined with information about the negative environmental consequences of car use. Subjects in both conditions E and EC estimated their car costs as lower than did subjects in condition C [respectively, $F(1, 101) = 6.90, p < 0.01$; and $F(1, 100) = 8.77, p < 0.01$], which further supports this conclusion.

The marginally significant contrast between condition CC and the four experimental conditions [$F(1, 260) = 3.51, p < 0.10$] allowed us to compare the results of condition EC with those of condition CC. This revealed that self-monitoring and combined environmental and financial information decreased the frequency of considering financial consequences of car use [$t(5, 260) = 2.21, p < 0.05$]. This suggests the occurrence of *psychological reactance* (Brehm, 1966).

Receiving environmental information increased subjects' appreciation of the environmental policy of the Dutch government [$F(1, 256) = 11.24, p < 0.01$]. It probably made them better understand the necessity of environmental protection. Emphasizing how costly a car actually is, as was done in conditions C and EC, marginally reduced appreciation of this policy [$F(1, 256) = 2.76, p < 0.10$]. One possible explanation is that the authorities were held responsible for the high costs of driving a car.

General environmental awareness

General environmental awareness was analyzed by multi-step regression analyses with dummy coding. We focus here on the final step, the model of interest.

The pre-test value of general environmental awareness was an important predictor of its post-test value in all conditions (see Table 3). The E-treatment seemed to thwart this strong relation between both test values. The analysis showed that the pre-test value of general environmental awareness in condition E contributed less to its post-test value than in both conditions in which financial information was provided (C and EC), and in condition CC.

In conditions E and EC, ability to forecast own mileage goes together with low general environmental awareness. Only in condition E did the relation between these two variables deviate significantly from conditions N and CC. In other words, self-monitoring on its own was not sufficiently powerful to bring about a realistic view of people's environmental awareness. It seemed to need the addition of dissonance-enhancing information about the environment.

In conditions E and EC, the interaction between pre-test environmental awareness and ability to forecast own mileage goes together with high post-test environmental awareness. In condition E,

Table 3. Regression analyses with dummy coding on general environmental awareness. Overall results and departures with *p*–values above 0.10 are not depicted. Control model: $R^2 = 0.11$, F(4,204) = 6.19. $p = 0.000$. Model of interest: R^2 change = 0.56, F (change) = 16.67, $p = 0.000$. Entire model: $R^2 = 0.68$, F(23 183) = 16.77, $p = 0.000$

Overall results Control model Age Sex Commitment Catal. Converter		Sub-models									
Model of interest		E		C		EC		N		CC	
		β	*p*	*β*	*p*	*β*	*p*	*β*	*p*	*β*	*p*
Pre-test general environmental awareness	Results	0.62	0.000	0.98	0.000	0.89	0.000	0.86	0.000	0.90	0.000
	Departures			> E	0.04	> E	0.05			> E	0.06
		< C	0.04								
		< EC	0.05								
		< CC	0.06								
Ability to forecast own mileage	Results	–1.82	0.001	–1.19	0.12	–0.77	0.04	–0.27	0.51	0.17	0.74
	Departures							> E	0.02	> E	0.009
		< N	0.02								
		< CC	0.009								
Interaction term	Results	2.00	0.000	1.31	0.11	0.79	0.03	0.24	0.57	–0.17	0.75
	Departures					< E	0.06	< E	0.008	< E	0.004
		> EC	0.06								
		> N	0.008								
		> CC	0.004								

this result is marginally stronger than in condition EC, suggesting that financial information weakens the effect of environmental information. Again, only the result in condition E deviated significantly from the results in conditions N and CC.

As Fig. 2 shows, dissonance-enhancing information about the environment led those underestimators in condition E who reported themselves as environmentally well-aware to consider the environment as less important.

Approval of environmental policy of the Dutch government

Approval of the environmental policy of the Dutch government in the control condition (CC) turned out not to be influenced by any of the three predictors of the third step (see Table 4). Mere self-monitoring (condition N) did not lead to significantly different results.

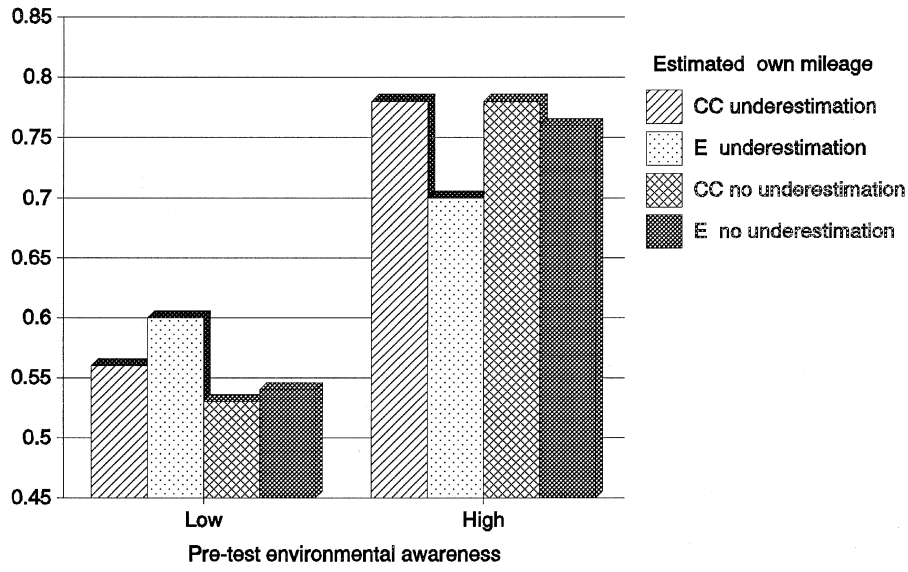

Fig. 2. Post-test environmental awareness as a function of estimator's pre-test environmental awareness and accuracy of estimated own mileage.

Table 4. Regression analyses with dummy coding on approval of the environmental policy of the Dutch government. Overall results and departures with p–values above 0.10 are not depicted. Control model: $R^2 = 0.01$, F(4,206) = 0.69 $p = 0.60$. Pre-test: R^2change = 0.38, F(change) = 128.20, $p = 0.000$. Model of interest: R^2change = 0.10, F(change) = 1.98, $p = 0.01$. Entire model: $R^2 = 0.49$, F(24,187) = 7.59, $p = 0.000$

Overall results											
Control model:											
Age											
Sex											
Commitment											
Catal. Converter	0.15 0.008										
Pre-test value:	0.58 0.000	Sub-models									
Model of interest		E		C		EC		N		CC	
		β	p	β	p	β	p	β	p	β	p
Willingness to use public transport provided it gets less expensive	Results	0.29	0.02	–0.08	0.59	–0.25	0.04	–0.20	0.14	0.05	0.71
	Departures			< E	0.06	< E	0.02	< E	0.009		
		> C	0.06								
		> EC	0.002								
		> N	0.009							> EC	0.09
						< CC	0.09				
Ability to forecast own mileage	Results	–0.40	0.30	0.70	0.14	0.70	0.0001	–0.18	0.45	0.31	0.15
	Departures			> E	0.07	> E	0.01				
		< C	0.07					< C	0.10		
		< EC	0.01					< EC	0.007		
				> N	0.10	> N	0.007				
Interaction term	Results	0.56	0.13	–0.83	0.06	–0.56	0.005	0.11	0.69	–0.16	0.50
	Departures			< E	0.02	< E	0.008			< E	0.10
		> C	0.06					> C	0.07		
		> EC	0.008					> EC	0.05		
				< N	0.07	< N	0.05				
		> CC	0.10								

Unlike the other conditions with self-monitoring included, treatment E enhanced the effect of conditional willingness to use public transport on appreciation of the Dutch environmental policy.

In condition EC, conditional willingness to use public transport decreased sympathy for this policy. This effect was opposite in condition E and differed marginally in condition CC. In condition EC, ability to forecast own mileage enhanced approval of the Dutch environmental policy. This effect was similar in condition C but quite different in both conditions E and N.

The interaction between conditional willingness to use public transport and ability to forecast own mileage led in conditions C and EC to a decrease of approval of the Dutch environmental policy. In condition E, a tendency in the opposite direction is found.

To obtain more insight into the impact of the interaction term in condition E, a comparison was made between the results of corresponding sub-populations in conditions E and CC. Figure 3 shows the results for those subjects who underestimated their mileage and those who did not. Providing non-underestimators with environmental information (condition E) made their conditional willingness to use public transport coincide with their approval of the Dutch environmental policy. For non-underestimators who did not self-monitor and did not receive environmental information (condition CC), conditional willingness to use public transport and agreement with this policy were negatively correlated.

Figure 3 shows the existence of some real die-hards amongst the subjects in condition E. They were not inclined to use public transport irrespective of price. In addition, their low appreciation of Dutch environmental policy was not related with their ability to forecast their mileage.

Conditional willingness to reduce own mileage

Willingness to reduce own mileage if others do the same was analyzed in a similar way. In condition CC, it turned out not to be influenced by any of the three predictors of the third step (see Table 5). But mere self-monitoring made a difference: in condition N, ability to forecast own mileage had a positive correlation with willingness to reduce it if others do the same. On the other hand, the interaction term in this condition had a slightly negative effect on this intention. In condition E, these two predictors had about the same effects.

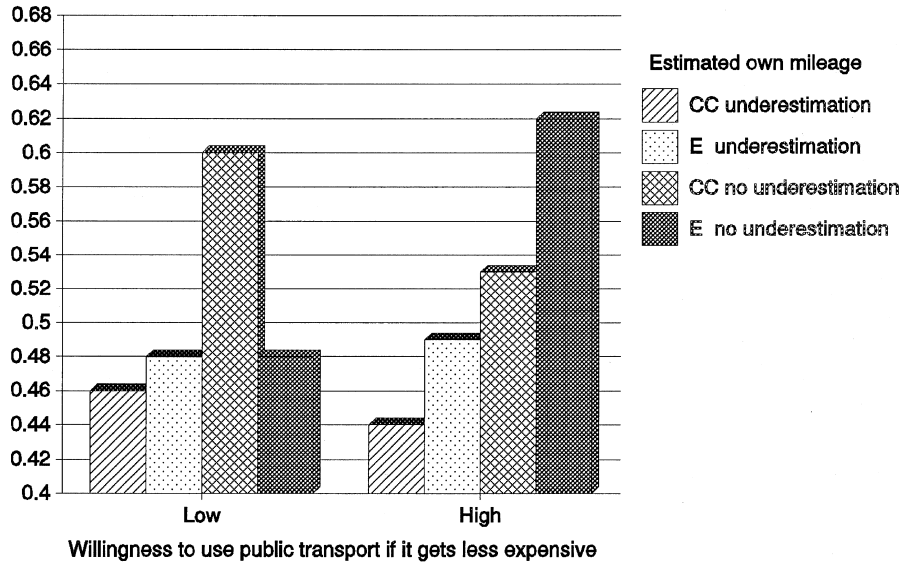

Fig. 3. Approval of the environmental policy of the Dutch government as a function of predictor's willingness to use public transport if it gets less expensive and accuracy of estimated mileage.

The precise nature of the interaction effect in condition E deserves a closer look. Figure 4 depicts the results of those subjects in conditions E and CC who did not underestimate their mileage. In condition E, they were less inclined to a conditional reduction of their car use as they were more prepared to use the cheaper public transport. In condition CC (i.e. without information and self-monitoring), they reacted in the opposite direction.

Figure 4 also shows the results of the subjects with a relatively strong conditional willingness to use public transport. In condition E, willingness to reduce mileage diminished as estimates of own mileage became more realistic while, in condition CC, a better insight into own mileage seems to go together with low car use. These results suggest a dissonance-reduction effect resulting from providing environmental information to specific categories of people.

In condition EC, conditional willingness to use public transport slightly reduced own mileage. This result is somewhat stronger than in condition E and opposite to tendencies in both conditions C and N. This suggests that although environmental information is responsible for this effect, it appears only in combination with providing financial information. This amplifying effect of financial information on the effect of environmental information shows that both kinds of information do not necessarily neutralize each other's effects.

DISCUSSION

In a true field experiment, respondents were approached personally several times during a period of eight weeks and confronted with information about the consequences for the environment and/or the financial costs of their own car use. They recorded all trips made during the full eight weeks that the experiment lasted and received the feedback every two weeks. This relatively intensive and personalized procedure turned out to have virtually no effect on travel behavior. Given this negative outcome, even less effect may be expected from the more superficial, generalized attempts to exert influence by means of mass-media publicity campaigns, which authorities often use to protect the environment (e.g. Weenig, 1991).

Environmental information directed at individuals increased their general environmental awareness, but not their awareness of their own part in pollution. The subjects did not make this link, even though this was specifically pointed out to them in a person-to-person talk.

Those respondents who were relatively environmentally aware before they were exposed to the experimental treatment and who used their car more than they had anticipated, showed a reduction in their environmental awareness. When the discrepancy between attitude (environmental awareness) and behavior (car use) is pointed out, then apparently people are more likely to alter

Table 5. Regression analyses with dummy coding on willingness to reduce one's mileage if others do the same. Overall results and departures with p–values above 0.10 are not depicted. Control model: $R^2 = 0.05$, F (4,209) = 3.04, $p = 0.02$. Pre-test: R^2change = 0.15, F(change) = 38.43, $p = 0.000$. Model of interest: $R^2 = 0.13$, F(Change) = 1.87, $p = 0.02$. Entire model: $R^2 = 0.33$, F(24, 188) = 3.87, $p = 0.000$

Overall results Control model: Age Sex Commitment Catal. Converter	0.13 0.05									
Pre-test value:	0.41 0.000	Sub-models:								
Model of interest:		E		C		EC		N		CC	
		β	p	β	p	β	p	β	p	β	p
Willingness to use public transport provided it gets less expensive	Results	0.14	0.34	–0.18	0.29	0.24	0.09	–0.16	0.30	–0.08	0.59
	Departures					> C	0.06				
				< EC	0.05			< EC	0.06		
				> N	0.06						
Ability to forecast own mileage	Results	0.81	0.07	–0.37	0.50	–0.17	0.49	0.69	0.01	–0.30	0.21
	Departures			< E	0.10	< E	0.06			< E	0.03
		> C	0.10					> C	0.08		
		> EC	0.06					> EC	0.02		
				< N	0.08	< N	0.02			< N	0.008
		> CC	0.03					CC	0.008		
Interaction term	Results	–1.16	0.008	0.36	0.48	0.09	0.69	–0.51	0.10	0.38	0.17
	Departures			> E	0.02	> E	0.01			> E	0.003
		< C	0.02								
		< EC	0.01								
										> N	0.03
		< CC	0.003					< CC	0.03		

their attitude than their behavior, and they tend to excuse themselves for their behavior. These results are of special interest for social dilemma-type problems like transport behavior. We mentioned above the two conditions necessary for co-operative behavior to arise in social dilemmas, as formulated by Dawes (1980). According to the results, elucidating the nature of the social dilemma, as suggested by Dawes, may be assumed to lead the receivers of the message to distrust the possibility that other people will co-operate and therefore exculpate their own responsibility. This situation has the characteristics of a serious social trap.

Communication about the environment may evoke similar effects. Receiving information about the scale of the environmental problems and resulting threats can lead people to claim that others are more guilty than they are themselves (self-enhancing perceptions). Therefore they need not alter their own behavior in a more environmentally friendly direction. Even if the message is formulated so that receivers supposedly cannot avoid its relation to their own individual behavior, it still will not automatically change their behavior. This is supported by predictions from dissonance theory (e.g. Cooper and Fazio, 1984; Festinger, 1957; Golob *et al.*, 1979) that if attitudes and behavior are not in line, attitudes are more likely to change. This can mean that the environment becomes less important for the person, as in the present research. Information about the environment will only cause a change in behavior if: (1) environmentally friendly behavior is not disadvantageous for the individual, (2) valid social norms are positive toward environmentally friendly behavior, and (3) sufficient opportunities to demonstrate environmentally friendly behavior exist.

As mentioned before, a reduction in car use causes disadvantages for the individual, such as a loss of independence. Furthermore, travelling by public transportation is often more expensive than travelling by car, even though the Dutch government continues to point out that the opposite is intended. Also, social norms discourage use of alternative means of transportation. Travelling by train is often associated with older people and those with less financial means, whereas using a car portrays an image of a young, dynamic and financially well-off person. Furthermore, car drivers often do not (want to) consider travelling by alternative means of transportation (e.g. they expect to arrive late for work if travelling by bus, or to arrive at their destination soaking wet if travelling by bike). Under these conditions, information will probably not lead to behavioral

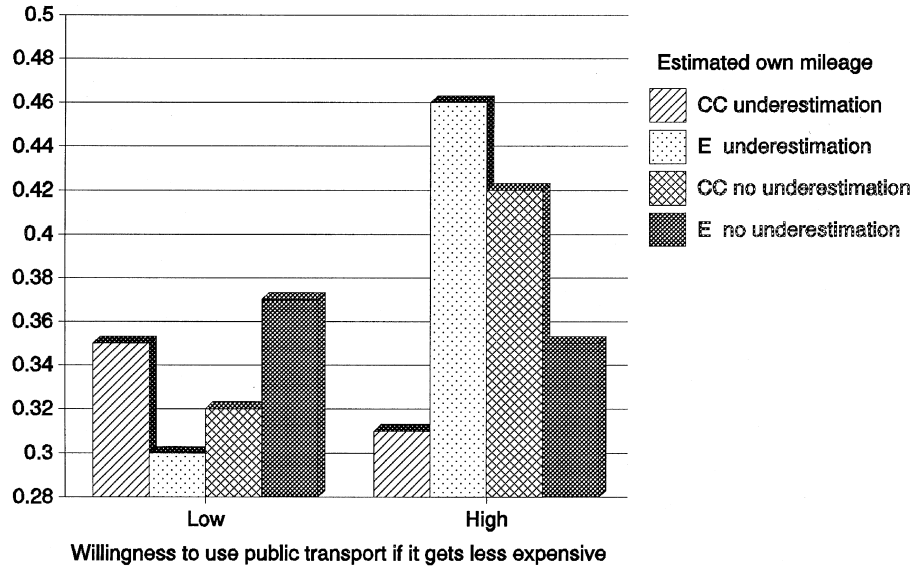

Fig. 4. Willingness to reduce own mileage if others do the same as a function of predictor's willingness to use public transport if it gets less expensive and accuracy of estimated mileage.

change, even though receiving environmental information increases appreciation for current environmental policy. Although the necessity of measures to protect the environment is understood, this understanding is not linked to their own behavior.

Individually relevant information about costs of operating a car leads, according to the present research, to a higher estimate of own car costs. However, awareness that one's own car use has negative consequences, both financially and for the environment, was reduced as result of financial information. Furthermore, current environmental policy as well as the research project were rated lowest by participants who received only information about costs of operating a car. This is interpreted as a form of reactance (Brehm, 1966): car drivers turn against these measures and those who implement them. By showing people how expensive car driving is, the environmental policy is seen to be (partly) responsible for the high expenses and received the lowest rating. Applying financial measures to reduce car use may therefore decrease the popularity of an environmental policy with car drivers.

We assumed that reactance which occurred as a result of feedback of financial costs arose from a motivational state directed towards re-establishment of freedom. Car users may, however, also hold the uncompromising view that they have the right to pollute, for the very reason that they pay excise duty and other taxes. Therefore, reactance could be conceived as a form of protest as well. If taken from such an 'exchange' point of view, other policy measures to decrease pollution (such as an appeal to change behavior) could provoke irritation, since the person has already paid a compensation for the damaging behavior. This would seriously harm the policy strategy 'the polluter pays', which is propagated in The Netherlands to stimulate people to pollute less.

Another result of the present research is that providing information about collective environmental consequences and individual financial consequences of car use simultaneously led to neutralizing effects. The environmental policy of The Netherlands (NEPP 2, 1993; TSP 2, 1990) assumes that the goals set can be achieved best by using a package of measures. It is implicitly assumed that the effects of the various measures will be additive. The present results show that this assumption may not always be correct. Therefore, care is justified in combining different types of measures or information with different kinds of content.

The present research shows that in some cases results of combined financial and environmental information are comparable with results of the control group, i.e. participants who did not receive any information at all and who did not register their transport behavior. For example, higher estimates of car costs resulting from financial information only were cancelled out when environmental information was added. The authorities' message that financial measures are in the interest of the environment often led to contrary notions of the receiver, such as that the money is only

used to improve the state of the treasury or that car drivers already suffer enough. Such a reaction to (proposed) measures can make environmental policy less credible. It can override intended positive effects of publicity campaigns about the environment or even lead to negative effects.

CONCLUSION

The present results suggest that little progress may be expected by requesting individual drivers to voluntarily reduce car use. Some powerful methods of influence available in psychology were used: individually directed feedback, dealing both with environmental and financial consequences, self-registration, and commitment. Nevertheless, no change in actual transport behavior was brought about. These measures proved insufficient to stimulate drivers to leave their cars. The car is too strongly linked to feelings of independence and convenience for that to happen. Drivers hold several positive attitudes linked to various immediate individual advantages of car use, whereas there are only limited negative attitudes linked to the later collective disadvantages of car use. Then, according to dissonance theory, the negative attitudes will change to the direction of the most prominent attitudes. The social dilemma, whereby people do not want to sacrifice for the collective interest more than others do, strengthens resistance to appeals to set a good example and to behave in a desirable way if others do the same. Moreover, as car drivers turned out to be strongly attached to using their vehicles, information campaigns with the aim of decreasing car use could have undesirable side effects as a result of dissonance reduction and reactance.

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