



Car use: lust and must. Instrumental, symbolic and affective motives for car use

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Abstract

This paper reports results of two questionnaire studies aimed at examining various motives for car use. In the first study, a random selection of 185 respondents who possess a driving licence were interviewed. Respondents were recruited from the cities of Groningen and Rotterdam, The Netherlands. The sample of the second study comprised a random selection of 113 commuters who regularly travelled during rush hours in and around Rotterdam, a region in the west of the Netherlands. First, it was examined which categories of car use motives may be distinguished. As proposed by Dittmar's (1992) [The social psychology of material possessions: to have is to be. Havester Wheatsheaf, Hemel Hempstead, UK; St. Martin's Press, New York] model on the meaning of material possessions, results from both studies revealed that car use not only fulfils instrumental functions, but also important symbolic and affective functions. Second, it was studied to what extent these different motives are related to the level of car use. From the results of study 2, it appeared that commuter car use was most strongly related to symbolic and affective motives, and not to instrumental motives. Third, individual differences in the relative importance of the three categories of motives were investigated. In both studies, most group differences were found in the evaluation of the symbolic and affective motives (and not the instrumental ones). Especially frequent drivers, respondents with a positive car attitude, male and younger respondents valued these non-instrumental motives for car use. These results suggest that policy makers should not exclusively focus on instrumental motives for car use, but they should consider the many social and affective motives as well.

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1. Introduction

The massive use of motor cars causes serious problems for environment quality, the quality of urban life and the accessibility of various destinations. Besides technological solutions, effective solutions for the problems associated with car use require reductions in the volume of car traffic, based on behaviour changes of individual car users (e.g., [Steg and Gifford, 2005](#)). This requires adequate knowledge about motives for car use, as policy measures aimed at managing travel demand will be especially effective when they are directed at significant factors influencing the level of car use.

For a long time, car use was predominately explained through behaviour models that focus on instrumental factors related to car use, such as its speed, flexibility, and convenience. However, the car is much more than a means of transport. **Car use is not only popular because of its instrumental functions. Besides, other motives seem to play an important role, such as feelings of sensation, power, superiority and arousal.** The way people talk about their cars, and the ways cars are advertised make perfectly clear that the car fulfils many of such symbolic and affective functions. In many car advertisements, appeals are made to people's sensitivities to control, power, social status and self-esteem. For many people, the car seems to be a status symbol, people can express themselves by means of their car, driving is adventurous, thrilling and pleasurable. **This implies that the utility of car travel is not only dependent on its instrumental value, but also on symbolic and affective factors.** Some authors have argued that travel is not only derived demand, but may be desired for its own sake, which may result in undirected (car) travel ([Mokhtarian and Salomon, 2001](#); [Mokhtarian et al., 2001](#)). Although various authors did stress that motives having to do with affect and symbolic functions of cars are playing important roles as well (e.g., [Flink, 1975](#); [Sachs, 1983, 1984](#); [Marsh and Collett, 1986](#); [Mokhtarian et al., 2001](#)), the supposed significance of such motives was mainly based on theoretical reasoning. Until recently, little empirical evidence was available on the significance of these non-instrumental factors.

A reason for this may be that symbolic and affective motives were not explicitly studied. Recently, various transport psychologists attempted to study the role of symbolic and affective motives more explicitly, and empirical evidence for the significance of such non-instrumental motives is growing. First, it has been studied how people value various instrumental, symbolic and affective aspects of car use. A study by [Steg et al. \(2001\)](#) revealed that symbolic-affective motives are better expressed when the aim of the research task is not too apparent. If respondents are asked to explicitly evaluate the attractiveness of various car use aspects, they especially mention instrumental aspects. Apparently, they are not likely to admit that symbolic and affective aspects make car use attractive. However, if the research task is rather ambiguous, respondents indicate that especially symbolic and affective aspects make car use attractive. **These results suggest that people might not be willing to admit that using a car fulfils many symbolic and affective functions,**

and that car drivers are inclined to justify and rationalise their behaviour (see also Steg and Vlek, 1997; Tertoolen et al., 1998).

Second, it has been examined to what extent various symbolic and affective motives are related to car use, the use of public transport, willingness to reduce car use and the evaluation of travel demand management strategies. Stradling et al. (1999) examined the relationship between willingness to reduce car use and two affective benefits of driving: being independent and getting a sense of personal identity from driving a car. They found that respondents who more strongly value these affective benefits of driving are less inclined to reduce their car use. They also reported that 17% of their sample anticipate to drive more in the near future. An important reason for doing so is the 'enjoyment of driving'; this reason was given by 29% of those who anticipate to drive more (Stradling et al., 2000). Nilsson and Küller (2000) reported that people who are emotionally attached to their car use drive their car more frequently and evaluate policy measures aimed at reducing car use as less acceptable compared to those who are less emotionally attached to their car. Sandqvist and Kriström (2001) found that people who indicate that car driving enhances the quality of their life are more likely to possess and drive a car. They concluded that people buy and drive cars simply because they like to, and not (only) because they have a real utilitarian need for a car or a practical reason to drive. A study by Jensen (1999) revealed that car use is evaluated positively on many different instrumental and psychological aspects, while only a minority of the Danish respondents have strong positive feelings towards travelling by public transport. Especially regular car drivers evaluate car use very positively. This implies that the car is much more than a means of transport, while psychological values are not strongly connected to the use of public transport. Steg (2003) reported similar results: car use is evaluated very positively by Dutch respondents on many different instrumental as well as symbolic and affective aspects, while judgments of public transport are far less favourable. Strikingly, even respondents who drive very little evaluated car use more favourably than travelling by public transport in nearly every respect. These studies suggest that car use indeed is connected with many symbolic and affect values. Car use might be better explained when these symbolic and affective functions of cars are taken into account too.

The studies described above were all quite explorative, and did not test a theoretical model on motives for car use. A theoretical model may help us to examine the role of various motives for car use more systematically. A relevant theoretical framework may be the model of material possession developed by Dittmar (1992). According to Dittmar (1992), material possessions, such as cars, represent instrumental values as well as by symbolic values. The symbolic values refer to the identity of a person. They are twofold: the expression of the self and a social-categorical expression indicating one's social position or group membership. Moreover, Dittmar contends that the use of material goods fulfils three functions: instrumental, symbolic, and affective. This implies that car use may have an instrumental function (i.e., it enables activities), a symbolic function (i.e., the car is a means to express yourself or your social position), and an affective function in connection with deeper, non-instrumental needs and desires. These functions may be considered as different types of motives for car use. So, three categories of car use motives may be distinguished. Instrumental motives may be defined as the convenience or inconvenience caused by car use, which is related to, among other things, its speed, flexibility and safety. Symbolic or social motives refer to the fact that people can express themselves and their social

position by means of (the use of) their car, they can compare their (use of the) car with others and to social norms. Affective motives refer to emotions evoked by driving a car, i.e., driving may potentially affect people's mood and they may anticipate these feelings when making travel choices.

Interestingly, the three kinds of motives described above are the subject of distinctive psychological theories and models. For example, the theory of planned behaviour (e.g., [Ajzen, 1985](#)) focuses on instrumental motives and a subset of social motives. In short, this theory assumes that behaviour is dependent on people's intention (or: willingness) to act. The intention is dependent on people's attitudes, social norms and perceived behavioural control. For the purpose of our study, especially attitudes and social norms are important. Attitudes reflect the overall evaluation of the particular behaviour, and are based on expectancy beliefs about the likelihood that behaviour results in particular consequences, and of the desirability of those consequences. This measure has widely been used in studies aimed at explaining mode choices and car use (e.g., [Bamberg and Schmidt, 1993, 2001, 2003](#); [Heath and Gifford, 2002](#)). Typically, these studies focused on the instrumental consequences of car use (cf. [Steg et al., 2001](#)). Social norms refer to the perceived social pressure to perform the behaviour, and are based on perceptions of expectations of relevant reference groups concerning the behaviour and the motivation to comply with these reference groups. Other measures of symbolic or social motives stem from the theory of normative conduct ([Cialdini et al., 1991](#)), social comparison theory (e.g., [Festinger, 1954](#); [Masters and Smith, 1987](#)), and self-presentation theory (e.g., [Schlenker, 1980](#)). The theory of normative conduct also focuses on the role of social norms. They distinguish two types of social norms: injunctive norms (comparable to norms as defined by [Ajzen \(1985\)](#)): perceptions of expectations of others) and descriptive norms (i.e., perceptions of what others actually do). Social comparison theory asserts that people continuously compare their opinions, behaviour and possessions with those of others and that people strive to be better off than others are. Self-presentation theory proposes that people try to present themselves in a way that is congruent with their self-image, which implies that people may get a sense of personal identity from driving their car. Finally, scholars have proposed that behaviour may be affect-driven. This implies that people may anticipate emotions that are evoked by car use (or other modes of transport) when making mode choices (cf. [Manstead and Parker, 1995](#)). Dittmar's model on the meaning of material possessions may be operationalised by theoretical concepts and measures based on the theories discussed above, and the resulting model may help to better understand mode choices, and more specifically, car use.

The first aim of this paper is to investigate which categories of car use motives may be distinguished empirically, and to examine whether Dittmar's model can be validated by empirical results. Second, it is investigated to what extent various motives are related to car attachment and car use. The significance of the three motives may vary for different groups. This may have important implications for transport policies, for policies will probably be more effective if they are tuned towards important motives of specific target groups. Therefore, individual differences (i.e., differences between demographic groups) in the evaluation of various car use motives are explored as well. Data from two field studies on the instrumental and symbolic functions of car use will be used to address the research questions. In these studies, different research methods were used, as well as different measures for the relevant variables (i.e., car use and motives for car use), in order to test the robustness of the research findings. Finally, implications for transport policy will be discussed.

2. Study 1

2.1. Method

Study 1 was aimed at examining which categories of car use motives may be distinguished. Moreover, individual differences in the significance of these motives were explored. In total, 185 adults in Groningen and Rotterdam, cities in the north and west of the Netherlands with low and high traffic densities, respectively, were interviewed in 1997. Respondents were selected to have a driving licence. Consequently, the sample is not representative for the Dutch population. This selection procedure resulted in a response rate of 26%; the net response rate was 23% due to missing data. The mean age was 41 years; 61% of the sample was male. Individual questionnaires were administered in a group setting. Respondents completed several tasks aimed at examining the role of various (non)-instrumental motives for car use (see Slotegraaf et al. (1997) and Steg et al. (2001), for a more detailed description). To examine which categories of car use motives may be distinguished, an inductive as well as a deductive approach was followed. Following the inductive (explorative) approach, respondents evaluated the attractiveness of positive car use aspects that appeared from an extensive literature study. It was examined which dimensions underlie these attractiveness judgements by means of an explorative principal components analysis. In the deductive (theory driven) approach, Dittmar's (1992) model of material possessions was tested. Respondents indicated which functions the car fulfils following Dittmar's model. Next, it was examined whether the three functions of car use could indeed be distinguished by means of a confirmative factor analysis. Below, only the measures that were used in the present analyses are described.

Attractiveness of car use aspects. Respondents rated the attractiveness of 33 positive aspects related to car use (see Table 1). They indicated to what extent these aspects make car use attractive on a five points scale, ranging from *totally disagree* [1] to *totally agree* [5]. These aspects were selected based on an extensive literature study on psychological motives for car use (see Slotegraaf et al., 1997).

Functions of car use. Respondents evaluated 15 items reflecting the three meanings of material possession as distinguished by Dittmar (1992, see Introduction). Five items reflected that car use has mainly an instrumental meaning, five items reflected the symbolic function of car use, while the other five items referred to the affective function of car use (see Table 3). Scores could range from *totally disagree* [1] to *totally agree* [5].

Attitude towards car use. Respondents indicated to what extent their family, friends or colleagues consider them as a car lover. This phrasing was chosen to reduce the chance of social desirable responses. Five categories were distinguished: a true car lover ($N = 17$), someone who loves driving but could do without a car ($N = 85$), someone who is indifferent towards cars ($N = 54$), someone who does not like driving, but who drives occasionally ($N = 18$), and someone who hates cars and driving ($N = 7$); 4 respondents failed to answer this question. Based on their answers, two groups were distinguished: those who evaluate cars and driving (very) positively ($N = 102$) and those who are indifferent or who evaluate cars and driving (very) negatively ($N = 79$).

Car use. Respondents were asked how many kilometres they drive per car per year: less than 10,000 km ($N = 92$), between 10,000 and 25,000 km ($N = 67$), or more than 25,000 km ($N = 21$); 5 respondents did not indicate their annual kilometrage.

Table 1

Rotated factor loadings of judgements of attractiveness of positive aspects of car use

	Factor 1 Symbolic and affective	Factor 2 Instrumental	Factor 3 Independence
Express myself through my car	.78	.01	.10
The car gives me prestige	.78*	–.15	.18
I can distinguish myself from others	.75	–.16	.22
Driving is sporty and adventurous	.70	.30	–.02
I enjoy driving a nice car	.69	.16	.03
My car suits me	.68	.17	.21
I love the drone of my engine and muffler	.68	.19	–.15
I get a kick of driving	.66	.14	–.03
The car gives me power in traffic	.66*	.04	.08
I am a bit in love with my car	.59	.32	–.02
I like driving fast	.54*	.26	.03
Driving is relaxing	.51*	.36	.33
Driving is my hobby ^a	.49*	.41*	.07
Driving is enjoyable	.33	.68*	–.13
I am safe in my car	.29	.59*	–.07
My car has a nice road-holding	.37	.56*	–.03
I can pick up or see off others	–.07	.53*	.13
Driving is comfortable	.16	.52*	.06
I can visit friends, family	–.10	.51*	.32
Driving makes my life more easy	.20	.50*	.39
Enables recreational trips and holidays	–.04	.49*	.20
Protection against bad weather	.13	.47*	.27
Its carrying capacity (luggage, purchases)	.09	.44*	.26
I can go out	–.10	.44*	.31
Provides privacy	.28	.42*	.31
Feelings of freedom the car gives me ^b	.33	.40*	.41*
The car is always available	.13	.11	.66*
I am not dependent on others	.11	.12	.65*
The car brings me wherever I want	.10	–.02	.64*
I can choose my own route	.24	.04	.51*
I am free to stop everywhere	.08	.15	.50*
Driving saves a lot of time	.23	.32	.43*
Cronbach's alpha	.90	.80	.72

Note: Factor loadings higher than .40 are marked with an asterix.

^a This aspect was included in the 'symbolic and affective motives' scale (Factor 1).

^b This aspect was included in the 'independence' scale (Factor 3). The aspect 'I am anonymous in my car' was not included in any of the three scales, because it did not load highly (>.40) on any of the factors.

Socio-demographics. ¹ Respondents indicated their gender (61% was male), age (25 or younger, $N = 31$; between 25 and 40, $N = 65$; between 40 and 55, $N = 46$; older than 55, $N = 41$), and

¹ Due to missing values, the total numbers do not always add up to 185.

monthly net household income (less than Dfl. 2000, $N = 47$; between Dfl. 2000 and 5000, $N = 108$; more than Dfl. 5000, $N = 27$; in 1997 Dfl. 100 = US\$51 = £31).

2.2. Results

First, it is examined which categories of car use motives could be distinguished based on the data on the (un)attractiveness of car use aspects. The judgements of the attractiveness of the 33 positive aspects were subjected to an explorative principal components analysis, using varimax rotation. It appeared that a three factor solution was the most appropriate, with most aspects loading high on one factor only (i.e., only two items had factor loadings higher than .40 on more than one factor, while only one item had a factor loading lower than .40 on any of the factors; see Table 1). The three factors accounted for 42% of the variance of the judgements on the attractiveness of the positive aspects of car use. The first factor accounted for 25.8% of the variance and reflects symbolic and affective motives for car use. The second factor accounted for 10.3% of the variance in the judgements, and refers to instrumental motives for car use. Factor 3 explained 6.1% of the variance in the judgements, and refers to independence and freedom.

These results suggest that respondents make a clear distinction between instrumental and symbolic and affective motives for car use. Besides, independence appeared to be a distinctive motive. Based on these results, three new variables were constructed reflecting different factors that make car use attractive (i.e., symbolic and affective aspects, instrumental aspects and independence), by computing the mean scores of items that correlated higher than .40 with each of the three factors. The internal consistency (Cronbach's alpha) of the scales was high (see Table 1). Scores could range from *totally disagree* [1] to *totally agree* [5] that the particular factor makes car use attractive. Group difference in judgements of the attractiveness of the three factors were examined by means of Analyses of Variance (ANOVAs). Table 2 reveals that the groups especially differ in their judgements of the attractiveness of the symbolic and affective aspects. Respondents who frequently drive evaluated the symbolic and affective motives as well as the independence of car use more favourably than did those who drive less: $F(2, 169) = 3.6$, $p = .04$ and $F(2, 174) = 4.0$, $p = .03$, respectively. Interestingly, no differences were found between these groups in the attractiveness of the instrumental aspects. Furthermore, respondents with a (very) positive car attitude evaluated the symbolic and affective aspects ($F(1, 171) = 30.9$, $p < .001$), the instrumental aspects ($F(1, 175) = 4.4$, $p = .04$) as well as the independence of car use ($F(1, 175) = 10.6$, $p = .002$) more favourably than those with a less favourable car attitude. Next, younger respondents valued the symbolic and affective aspects more positively compared to the other age groups: $F(3, 171) = 4.4$, $p = .006$. Also, lower income groups judged more favourably about the attractiveness of the symbolic and affective aspects than did higher income groups: $F(2, 171) = 4.1$, $p = .02$. No significant gender differences were found in the evaluation of the attractiveness of positive aspects of car use.

Second, Dittmar's model of the meaning of material possessions was tested. So, this time a theory-driven approach was followed to examine whether car use indeed fulfils instrumental, symbolic and affective functions, respectively. A confirmative factor analysis (multi-group method, e.g., Ten Berge and Siero, 2001) revealed that the instrumental and affective functions of car use could be distinguished clearly, i.e. the items correlated most strongly with the scale to which they would belong to on theoretical grounds (see Table 3). Therefore, two new variables were

Table 2

Mean scores of groups differing in car use, car attitude, age and income on evaluation of attractiveness of symbolic and affective aspects, instrumental aspects and independence

	Factor 1 Symbolic and affective	Factor 2 Instrumental	Factor 3 Independence
Annual kilometrage	*	ns	*
<10,000 km	2.2	3.5	3.9
10,000–25,000 km	2.1	3.5	3.9
>25,000 km	2.6	3.6	4.2
Car attitude	**	**	**
(very) positive	2.5	3.6	4.0
neutral or (very) negative	1.9	3.4	3.8
Age	**	ns	ns
<25 years	2.6	3.6	4.1
25–40 years	2.2	3.5	3.9
40–55 years	2.1	3.5	3.9
>55 years	2.2	3.6	4.0
Income	*	ns	ns
<Dfl. 2000	2.5	3.5	3.9
Dfl. 2000–5,000	2.2	3.5	4.0
>Dfl. 5000	2.0	3.6	3.8

Note: * $p < .05$; ** $p < .01$, ns = not significant at $p < .05$.

Table 3

Confirmative factor analysis on items reflecting the meaning of car use

	Instrumental	Symbolic	Affective
<i>Instrumental</i>			
For me, the car has instrumental functions only	.64	–.42	–.49
It does not matter to me which type of car I drive	.50	–.25	–.24
I only have a car to travel from A to B	.46	–.32	–.39
The functional quality of a car is more important to me than its make	.42	–.40	–.28
If I did not need a car, I would dispose of it immediately	.25	–.06	–.17
<i>Symbolic</i>			
A car provides status and prestige	–.32	.49	.34
My car shows who and what I am	–.29	.49	.27
I may be jealous of someone with a nice car	–.25	.36	.46
You can know a person by looking at his or her car	–.09	.29	.09
The brand of a car is more important to me than its functional qualities	–.37	.26	.20
<i>Affective</i>			
I love driving	–.43	.20	.61
I know of a dream car that I would love to possess	–.38	.43	.50
I would love to drive in the newest Ferrari, Porsche or Jaguar	–.23	.38	.43
I like to drive just for the fun	–.37	.18	.45
I feel free and independent if I drive	–.17	.19	.56

Note: Correlations loading highest on each factor are printed in bold. The correlations between items included in a scale and the specific scale itself were corrected for 'self correlations', i.e., in this case, corrected-item total correlations are printed.

constructed by computing the mean scores of items that correlated strongest with each of these two factors; Cronbach's alpha was .68 for the instrumental function and .70 for the affective function. Two of the items reflecting the symbolic function of car use did not correlate most strongly with the symbolic factor. Therefore, these items were excluded from the scale measuring the symbolic function of car use. The reliability of the resulting scale (including three items) was (only) .60, so these results should be interpreted with some care. Scores on all three scales could range from *not important* [1] to *very important* [5] function of car use. As might be expected, scores on the three scales were correlated. The more strongly respondents think car use mainly has instrumental functions, the less they value the symbolic ($r = -.31$) and affective function ($r = -.46$). Moreover, respondents who evaluate the symbolic function of car use favourably also evaluate the affective function more favourably ($r = .31$).

Next, it was investigated whether different groups evaluate these three functions of car use differently by means of Analyses of Variance (ANOVAs). Again, most group differences were found in the evaluations of the symbolic and affective functions of car use. Table 4 reveals that respondents who have a positive car attitude judged more favourably about the affective function ($F(1,175) = 61.5, p < .001$) and the symbolic function ($F(1,175) = 3.1, p = .079$) of car use compared to those with a neutral or negative car attitude. However, respondents with a positive car attitude less strongly thought the car has only an instrumental function compared to those with a neutral or negative car attitude: $F(1,175) = 25.9, p < .001$. These results reveal that positive car attitudes are not purely cognitively-based. Younger respondents more strongly valued the affective function of car use ($F(1,176) = 9.9, p < .001$) than did the older age groups. Furthermore,

Table 4

Mean scores of groups differing in car attitude, age, income, gender and annual mileage on evaluation of the instrumental, symbolic and affective function of car use

	Instrumental	Symbolic	Affective
Car attitude	***	*	***
(very) positive	3.3	2.4	3.6
neutral or (very) negative	3.8	2.2	2.8
Age	ns	ns	**
<25 years	3.3	2.5	3.8
25–40 years	3.5	2.2	3.4
40–55 years	3.7	2.4	3.0
>55 years	3.5	2.2	3.0
Income	ns	ns	**
<Dfl. 2000	3.5	2.3	3.6
Dfl. 2000–5000	3.5	2.4	3.2
>Dfl. 5000	3.6	2.2	2.9
Gender	ns	**	ns
Male	3.5	2.4	3.3
Female	3.5	2.1	3.3
Annual mileage	ns	**	ns
Less than 10,000 km	3.5	2.2	3.3
10,000–25,000 km	3.5	2.4	3.2
More than 25,000 km	3.2	2.6	3.5

Note: * $p < .10$; ** $p < .05$; *** $p < .01$, ns = not significant at $p < .10$.

low income groups valued the affective function of car use more compared to the other income groups: $F(2, 177) = 8.8, p < .001$. Men valued the symbolic function of car use higher than did women: $F(1, 177) = 8.3, p = .004$. Finally, the higher the annual mileage of respondents, the more favourable they evaluate the symbolic function of car use: $F(2, 174) = 3.0, p = .053$.

3. Study 2

3.1. Method

The second study was aimed to examine to what extent instrumental, symbolic and affective motives contribute to the explanation of car use. Moreover, individual differences in the significance of these three categories of motives were examined. An important difference with Study 1 is that Study 2 focuses on car use for commuting during rush hours. It was assumed that commuter trips are highly functional. If it could be demonstrated that commuter trips are dependent on symbolic and affective motives too, we might have a strong case on the significance of these motives for mode choices and, more specifically, car use.

A survey study was conducted in 1999 among adults in and around Rotterdam, a region in the west of the Netherlands with serious congestion problems. Only respondents who regularly travelled during rush hours were asked to participate; 52% of these respondents filled out the questionnaire. In total 113 adults participated in this study, of which 73% was male. The mean age was 42 years. The sample was representative for commuters in congested areas in the Netherlands (see Steg et al., 2000). In line with Study 1 and Dittmar's model (see Section 1), three categories of car use motives were distinguished: instrumental, symbolic and affective. However, to validate and extend the findings of the first study, different measures were used to assess these motives. This time the measures were based on common theories and methods in social psychology, which were discussed in Section 1. The main measures are discussed below.

The measure of the *instrumental motives* was based on attitude measures as proposed by the theory of planned behaviour (Ajzen, 1985). Respondents indicated to what extent they think commuting by car during rush hours is cheap, comfortable, easy, environmentally friendly, fast, independent, private and safe. Scores could range from *very unlikely* [1] to *very likely* [5]. Next, they indicated to what extent these 8 aspects are important for their travel behaviour on a scale ranging from *not important at all* [1] to *very important* [5]. Previous studies revealed that these aspects are important to Dutch car users (see Slotegraaf et al., 1997). For each aspect, scores on both items were multiplied, after which the mean product score was computed. The final scale for instrumental motives had a high internal consistency (Cronbach's $\alpha = .87$), with scores ranging from *negative* [1] to *positive* [25].

Measures for symbolic motives were based on social comparison theory (e.g., Festinger, 1954), self-presentation theory (e.g., Schlenker, 1980), and the theory of normative conduct (Cialdini et al., 1991). Four different measures were used. *Injunctive social norms* were assessed by asking respondents to what extent they agreed with the following three items: 'My colleagues would think it is peculiar not to commute by car', 'My family thinks I should commute by car' and 'My friends think the problems of car use during rush hours are exaggerated'. Scores could range from *strongly disagree* [1] to *strongly agree* [5]. Scores on the three items were not strongly correlated.

Apparently, there is no common social norm among different reference groups. Therefore, we used the single items in the analysis. *Descriptive norms* were measured by asking respondents how their friends, family, and colleagues, respectively, travel to work. The internal consistency of this scale was acceptable (Cronbach's $\alpha = .62$); scores could vary from *others never commute by car* [1] to *others always commute by car* [5]. Finally, respondents indicated to what extent they compared themselves with others with regard to car use. The scale for *social comparison and self presentation* comprised seven items (e.g., I will not easily travel by bike or bus when all my colleagues travel by car, I pity people who do not commute by car, Travelling by car suits me better than travelling by bike or public transport) and had an acceptable internal consistence (Cronbach's $\alpha = .64$).

Affect was measured following Russell (e.g., Mehrabian and Russell, 1974; Russell and Lanius, 1984), who demonstrated that affective responses may be categorised on two dimensions: pleasure and arousal, i.e., all human emotions are based on a combination of pleasure and arousal. First, respondents indicated to what extent car use is *pleasurable* on three (five point) scales: angry–happy; unsatisfied–satisfied, annoyance–pleasure. The mean score on these three items was computed; resulting scores could vary from 1 ‘not pleasurable’ to 5 ‘very pleasurable’. Cronbach's α of this scale was .81. *Arousal* was based on the items tense–relaxed; hurried–peaceful; aroused–calm. Again, five point scales were used. Mean scores were computed; scores could vary from 1 ‘not arousing’ to 5 ‘very arousing’. Cronbach's α of this scale was .70.

Car use was measured by computing the percentage of commuter trips driven by car. Based on this, two groups were distinguished: those who always commute by car (‘habitual drivers’, $N = 67$) and those who also use other modes of transport (‘infrequent drivers’, $N = 46$).

Socio-demographics. Respondents indicated their gender (73% male, $N = 82$), age (30 or younger, $N = 18$; between 30 and 40, $N = 34$; between 40 and 50, $N = 34$; older than 50, $N = 26$; one missing value), and monthly net household income (less than Dfl. 3500, $N = 39$; between Dfl. 3500 and 4500, $N = 27$; between Dfl. 4500 and 5500, $N = 19$; more than Dfl. 5500, $N = 23$; 5 missing values).

3.2. Results

First, from the above we may conclude that useful measures of instrumental, symbolic and affective motives for car use could be developed based on the theoretical frameworks and models described above. Second, we examined to what extent commuter car use during rush hours could be explained by instrumental, symbolic and affective motives by means of a Multiple Regression Analysis. A stepwise procedure was followed to identify motives that significantly contributed to the explanation of commuter car use. It appeared that the percentage of car trips for commuting (e.g., the proportion of car trips on the total number of commuter trips) was only significantly related to symbolic and affective motives (see Table 5). In total 28% of the variance in the percentage of car trips could be explained by norms, affect, and social comparison. More specifically, respondents commuted more often by car when others also drive to work, when their family expects them to do so, when they compare their commuter mode choices with others and think driving a car suits them better than travelling by public transport or bike, and when they think car use is less arousing (i.e., stressful). So, especially symbolic and affective motives appeared to contribute to the explanation of car use, while instrumental motives did not significantly contribute to the

Table 5

Stepwise regression analysis of car-use motives on percentage of car trips for commuting

Motive	R^2	R^2 -change	F -change	p	β
Descriptive norm (behaviour of others)	.16	.16	20.13	<.001	.30
Expectations family	.20	.04	5.83	.018	.23
Arousal	.24	.04	5.25	.024	–.21
Social comparison and self-presentation	.28	.04	5.11	.026	.19

Table 6

Differences in motives for car use between habitual drivers and infrequent drivers

Motive	Habitual drivers	Infrequent drivers
Instrumental motives ¹	12.8*	11.0*
Descriptive norm (behaviour others) ²	4.3***	3.7***
Expectations family ²	4.3**	3.8**
Arousal ³	2.7*	2.9*

¹ Scores could vary from 1 = 'negative' to 25 'positive'.² Scores could vary from 1 'anti car' to 5 'pro car'.³ Scores could vary from 1 'not arousing' to 5 'very arousing'.* $p < .10$.** $p < .05$.*** $p < .01$.

explanation of commuter car use. These effects could not be attributed to differences in variance in the independent variables, as the standard deviations of all predictors did not differ much.

Third, it appeared that those who only commute by car evaluated instrumental, symbolic and affective aspects of commuter car use more favourably than those who also use other modes of transport for commuting (see Table 6). Moreover, male drivers more often compared their commuter travel with others and thought the car was more important for their self-expression than female drivers did ($M = 1.9$ and $M = 1.6$, respectively; $p < .10$). They also indicated that driving was less stressful than women did ($M = 2.7$ and $M = 3.1$, respectively; $p < .05$). Finally, respondents of 30 years or younger thought commuting by car was more pleasurable than the other age groups did ($M = 3.2, 2.7, 2.6$ and 2.8 , respectively; $p < .05$).

4. Discussion

The results from these studies, in which different methods were used (inductive and deductive approaches; different measures for instrumental, symbolic and affective motives) and different types of car use were studied (i.e., annual car kilometrage, commuter car use), provide solid empirical evidence for the significance of non-instrumental motives for car use. The explorative analysis in Study 1 (i.e., the inductive approach), aimed at examining dimensions underlying the attractiveness of 33 positive aspects related to car use, revealed that respondents make a clear distinction between instrumental motives for car use on the one hand, and symbolic and affective motives on the other. These results were validated in the two tasks that followed a deductive

approach. Study 1 revealed that indeed three functions of car use could be distinguished, as proposed by Dittmar (1992). Similarly, Study 2 revealed that Dittmar's (1992) model on the meaning of material possessions could be operationalised by theoretical concepts and measures based on common social psychological theories and models, and useful measures for instrumental, symbolic and affective motives could be developed based on these theories and models. These results provide support for Dittmar's model on the meaning of material possessions. Interestingly, independence emerged as a separate factor in the explorative analysis in Study 1. Future research should clarify whether independence is indeed a separate factor influencing car use, by including multiple items reflecting this factor.

Second, it appeared that symbolic and affective motives play an important role in explaining the level of car use. Study 2 revealed that commuter car use was especially related to symbolic and affective motives, and not to the instrumental ones. This implies that people more often commute by car when they judge its symbolic and affective functions more favourably, while differences in commuter mode choices are not significantly related to the evaluation of the instrumental function of commuter car use. So, even commuter traffic, which may be considered as highly functional, is most strongly related to non-instrumental motives. Symbolic and affective motives do not only result in undirected travel (cf. Mokhtarian and Salomon, 2001), but are also one of the reasons why car use is very attractive to many people. Symbolic and affective motives may well play a more significant role when making trips for other purposes, such as recreational or social trips that are likely to be less functional. Study 1 also revealed that frequent car drivers evaluated the symbolic and affective aspects of car use as well as the independence of car use most favourably. Again, it appeared that the level of car use was not related to the evaluation of the instrumental aspects of car use. Also, frequent drivers evaluated the symbolic (but not the affective) function as distinguished by Dittmar more favourably than did infrequent drivers (Study 1, task 2). Again, no differences were found between frequent and infrequent drivers in the evaluation of the instrumental function of car use.

Third, various group differences were found in the evaluation of the different motives for car use. A rather consistent pattern was found across the three tasks in both studies. In general, most group differences were found in the evaluation of the symbolic and affective motives for car use, while only few differences were found in the evaluation of the instrumental motives. Apparently, most respondents agree on the extent to which car use has important instrumental values. Respondents with a positive car attitude evaluate all three functions of car use more favourably compared to those with a neutral or negative car attitude. Above all, both groups differed in their evaluation of the symbolic and affective function (Study 1, task 1) and in the evaluation of the affective function (Study 1, task 2). Furthermore, both tasks in Study 1 revealed that young respondents valued the symbolic and affective functions of car use more strongly than did the other age groups (Study 1, task 1 and 2). Similarly, Study 2 revealed that especially young respondents thought car use is pleasurable. The results of Study 1 also suggest that lower income groups value the symbolic and affective aspects of car use (task 1) and the affective function (task 2), respectively, most strongly. However, these results were not validated in Study 2. Finally, male drivers seem to value the symbolic (and some affective) aspects more strongly than did female drivers, yet no gender differences were found in the first task of Study 1.

This study aimed to examine to what extent various motives are related to the level of car use. Of course, other factors may play an important role too, like the opportunities people face. Travel

behaviour is to a large extent dependent on situational characteristics, which affect the availability and relative attractiveness of various travel modes and the necessity to travel. Situational characteristics and motives may well interact, e.g., people may choose to live far from their workplace (and to be dependent on their car) because they love to drive. Likewise, people may rationalise their car use when car dependency is high, by evaluating car use more positively on instrumental, symbolic and affective aspects (cf. Steg and Vlek, 1997; Tertoolen et al., 1998). Future research should reveal whether and how situational characteristics and motives influence each other.

The results of this study may have important consequences for travel demand management. People do not only drive their car because it is necessary to do so, but also because they love driving. Symbolic and affective aspects significantly contribute to the positive utility of driving (cf. Mokhtarian and Salomon, 2001). This might be one of the reasons why attempts to influence car use have not been very successful, and it might explain the vast resistance against (effective) policies aimed at reducing car use. As policies aimed at managing travel demand will be more effective if they are directed at important factors influencing car use, we may need to design policies that are (also) directed at non-instrumental motives. So, policy makers should not exclusively focus on instrumental motives, but they should also consider the many symbolic and affective values of various modes of transport.

Of course, these results do not imply that policy measures aimed at influencing the instrumental aspects of car use (like costs, time) will be ineffective. Policies like transport pricing may be very effective in managing travel demand. However, such measures are not easily implemented because people generally strongly resist such measures. This may well be because such measures affect the symbolic and affective functions of car use. Policy makers may need to consider how to reduce these (possible) negative consequences by implementing accompanying measures that compensate for possible losses in symbolic and affective values. Our results also suggest that policies should be tailored towards specific target groups. Different groups value the symbolic and affective aspects differently, which should be taken into account when developing policies.

Dittmar's (1992) model on the meaning of material possessions appeared to be a suitable theoretical framework to study various motives related to travel behaviour. Future research on the significance of non-instrumental motives could well build on this model and the studies reported here. Since quite a few explorative studies on various motives for car use have been conducted, more theory-based studies are needed.

Future research should clarify the extent to which the results may be generalised to other types of travel behaviour (e.g., car use for recreational or social purposes), populations (e.g., countries in which car dependency is much higher than in the Netherlands, like the USA or Canada) and travel modes (e.g., public transport, bicycles). A recent study by Steg (2003) revealed that dimensions underlying the attractiveness of various aspects related to car use and the use of public transport are indeed quite similar. In this study, respondents indicated to what extent 17 different aspects make driving a car and the use of public transport, respectively, attractive. Results revealed that in both cases, similar instrumental, symbolic and affective factors were underlying the attractiveness judgements. Furthermore, symbolic and affective motives may not only affect mode choices, but also other transport choices. It has been demonstrated that affective motives, such as feelings of power, sensation and superiority, influence speeding, and consequently, traffic safety (e.g., Näätänen and Summala, 1976; Rothengatter, 1988; Lawton et al., 1997). Further re-

search should examine the relationships between various types of transport behaviour and instrumental, symbolic and affective motives in more detail.

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