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Instrumental-reasoned and symbolic-affective motives for using a motor car

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Abstract

This study was aimed at clarifying the relative importance of symbolic-affective as opposed to instrumental-reasoned motives for car use. We examined which motivational dimensions are underlying the (un)attractiveness of car use, in order to distinguish a limited set of main motive categories. Three methods were developed, which differed in the extent to which the purpose of the task was apparent. The tasks were: (1) a similarity sorting of car-use episodes, (2) a Q-sorting following attractiveness of car-use episodes, and (3) a semantic-differential method for evaluating (un)attractive aspects of car use. The symbolic-affective motives for car use were better expressed when the aim of the research task was not too apparent. If the aim of the task was evident, respondents tended to evaluate car use in terms of instrumental-reasoned motives. Overall, the results indicate that both instrumental-reasoned and symbolic-affective functions of the motor car are significant dimensions underlying the attractiveness of car use.

1. Introduction

In recent research, people's car use is predominantly explained through cognitive-reasoned behaviour models (e.g., Everett & Watson, 1985; Golob, Horowitz, & Wachs, 1979; Gould & Golob, 1998; Hensher & Stopher, 1979; Recker & Golob, 1976). The implicit assumption is that car users make reasoned choices and behave rationally (see also Verplanken, Aarts, Van Knippenberg, & Van Knippenberg, 1994). In these studies, travel mode choice is considered to depend on preferences and attitudes towards available transport options. Actual mode-choice behaviour

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is supposed to be the result of a trade-off between perceived costs and benefits. Results of these studies show that preferences and attitudes towards car use do indeed correlate with actual car use. Moreover, people generally have a positive attitude towards car use. They appear to evaluate car use especially as an attractive means of transport because of its flexibility, independence, availability, speed, reliability, safety, carrying capacity, and comfort (e.g., Geller, Winett, & Everett, 1982; Golob et al., 1979; Recker & Golob, 1976; Steg, 1996). However, such motives from cognitive-reasoned behaviour models do not seem to give sufficient explanations of car use. Moreover, policy measures based on conclusions from instrumental-reasoned research models are not very effective. Despite increased fuel prices and taxes, growing congestion and barring of cars from city centres, car use is still increasing. Car use seems not only to be dependent on instrumental-reasoned factors, such as travel costs, time and safety. It would seem that some deeper motives having to do with affect and symbolic functions of cars are playing important roles as well.

A literature study on motives for car use yielded a long list of factors that make car use (un)attractive (see Slotegraaf, Steg, & Vlek, 1997; Steg, Brand, Rooijers, & Vlek, 1998; Steg & Tertoolen, 1999). Some of these factors refer to the general instrumental function of car use, which seems largely expressed in the instrumental-reasoned motives mentioned above. However, quite a few factors refer to the symbolic function of the car (e.g., for self-expression, as status symbol) and to affect evoked by car use. For now, we refer to these latter factors as symbolic-affective motives. Symbolic-affective motives, such as feelings of sensation, power, and superiority, significantly influence driving behaviour (e.g., Knapper & Cropley, 1981; Lawton, Parker, Manstead, & Stradling, 1997; Näätänen & Summala, 1976). Psychological analyses of car use reveal several of these symbolic-affective motives, such as privacy, status, feelings of control, power, independence and freedom (e.g., Flink, 1975; Marsh & Collett, 1986; Sachs, 1983, 1984; Tengström, 1992). Moreover, in advertisements, TV-commercials and specific automobile magazines, it is apparent that, either explicitly or implicitly, appeals are made to people's sensitivities to power, control, self-esteem and social status. However, only some of these motives (e.g., independence and freedom) are generally addressed in studies on motives for car use. To our knowledge, little systematic research has been done on the different (categories of) motives for car use.

In transport psychology, empirical studies thus far especially reveal instrumental-reasoned motives for car use. A first reason for this may be found in the research methods used. Investigators so far hardly incorporate a search for symbolic-affective motives in their studies. Yet, the few studies where affect has been measured, reveal that affective motives play an important role in travel behaviour, and that this behaviour may be better explained if affect is included (e.g., Lawton et al., 1997; Reibstein, Lovelock, & Dobson, 1980; Rothengatter, 1988).

A second reason for the emphasis on instrumental-reasoned motives for car use may be that conclusions about the significance of motives related to car use are generally based on self-reports. Yet, recent research indicates that car users are inclined to justify and rationalise their behaviour (e.g., Steg, 1996; Steg & Vlek, 1997; Tertoolen, Van Kreveld, & Verstraten, 1998). In addition to justification and rationalisation, the tendency to give socially desirable answers might be a problem as well, especially in personal interview studies. Who would easily be aware and admit that driving a car contributes to one's feelings of power or territorial instinct? People rather keep saying that it's all a matter of time and money. Marsh and Collett (1986) put it as follows:

When people are asked what they look for in a car, they usually talk in terms of factors such as economy, reliability, comfort and appearances. The received wisdom, certainly among contemporary market researchers, is that the choices people make about which cars to buy are organised according to some rational decision-making process. For some time now there has been a lurking suspicion that the answers people give when they are asked about their car preferences may be nothing more than their *theories* about how they perceive cars, and their responses may have very little to do with how they actually perceive cars, or with their real motives for choosing a particular model.

Tracking down all relevant motives for car use seems to require methods that prevent the occurrence of rationalisation and justification, and socially desirable response patterns. In this paper, we will demonstrate the results of three methods that differ in the extent to which these rationalisation processes may occur: similarity sorting of car-use episodes (most intuitive task), Q-sorting following attractiveness of car-use episodes (intermediate task) and a semantic-differential method for evaluating (un)attractive aspects of car use (most explicit task). Our idea was that the more intuitive the task, the less chance there is that people will rationalise their behaviour. The main goal of this study was to examine the relative importance of symbolic-affective as well as instrumental-reasoned motives for car use. Furthermore, we examined which dimensions are underlying the judgements of the (un)attractiveness of various factors related to car use, in order to distinguish a limited set of main motive categories. Below, we first discuss the three methods which were developed and tested. Next, we present and discuss the main results.

2. Method

2.1. Respondents

Trained research assistants interviewed 185 adults in Groningen and in Rotterdam, cities in the north and in the west of The Netherlands, respectively. Participants came from a total sample of 800 people who were invited to take part in this study. Respondents were selected to have a driving licence. 61% of the respondents were male. The modest response rate of 23% nevertheless yielded a varied sample of participants belonging to different sex, income and education groups. 51% of the respondents drove less than 10,000 km by car per year, 37% drove between 10,000 and 25,000 km, and 12% drove more than 25,000 kilometres per year.

2.2. Material

Three methods were developed: a similarity sorting, a Q-sort method and the semantic-differential method, respectively, each to be explained further below. By doing so, we could examine which method is the most appropriate to uncover symbolic-affective motives for car use. The three methods are based on common social-scientific research techniques. However, in this study, these techniques were applied by explicitly taking into account the symbolic-affective as well as the instrumental-reasoned motives for car use. First, we elucidate the way we defined the content of the methods. Next, the methods themselves are discussed.

The operationalisation of the methods was based on an extensive literature study about the psychological motives for car use (see Slotegraaf et al., 1997; Steg et al., 1998). This study resulted in a list of 60 relevant instrumental-reasoned and symbolic-affective variables related to car use (see Tables 1 and 2 for an overview).

The content of the three methods used was based on this list. One of the methods, the semantic differential, simply involved people's judgements of the (un)attractiveness of car use with respect these 60 single aspects. The similarity sorting and the Q-sort method were based on the evaluation of 32 car-use episodes, i.e., descriptions of a particular situation involving car use. The total set of car-use episodes is given in Appendix A; the episodes are briefly indicated in Table 3. As a systematic variation of the 32 episodes with respect to all 60 aspects was virtually impossible to

Table 1
Mean score and standard deviation on 33 attractive aspects of car use

I think car use is attractive, because:	*M*	S.D.
1. the car brings me anywhere I want	4.26	.74
2. the car is always available	4.23	.82
3. its carrying capacity (shopping, luggage)	4.18	.71
4. I can use the car for recreational trips and vacations	4.05	.83
5. I don't have inconvenience because of bad weather	4.02	.82
6. I can pick up or see off other people	4.01	.71
7. I am not dependent on others	4.00	.76
8. I can visit friends, acquaintances and family	3.96	.91
9. the car saves me a lot of time	3.86	.89
10. I am free to choose my own route (as a driver)	3.80	.84
11. car use is comfortable	3.77	.70
12. I am free to stop anywhere I want	3.77	.82
13. of the feeling of freedom the car gives me	3.56	.92
14. car use makes life more easy for me	3.33	.97
15. I can go out and go to concerts and events	3.31	1.07
16. car use is enjoyable	3.05	.86
17. my car has a nice road-holding	3.05	.95
18. driving my car gives me a moment of relaxation	2.89	1.10
19. other people are not a nuisance to me	2.74	1.14
20. I am safe in my car	2.70	.94
21. I enjoy riding a nice car	2.68	1.08
22. car use is my hobby	2.62	1.07
23. I am just a bit in love with my car	2.54	1.05
24. my car suits me	2.49	.95
25. driving a car is sporty and adventurous	2.33	.98
26. I am anonymous in my car	2.31	.88
27. I like driving fast	2.23	1.08
28. I get a 'kick' of driving a car	2.21	1.13
29. the car gives me prestige	1.93	.85
30. I can distinguish myself from others	1.88	.92
31. I can express myself through my car	1.80	.86
32. the drone of the engine and muffler of my car is nice	1.75	.85
33. the car gives me power in traffic	1.57	.77

Note. Scale ranging from *totally disagree* [1] to *totally agree* [5].

Table 2
Mean score and standard deviation on 27 unattractive aspects of car use

I think car use is unattractive, because:	*M*	S.D.
34. car use becomes more and more expensive	3.93	.93
35. car use contributes to environmental problems	3.81	.86
36. parking is often expensive	3.59	.88
37. I can be confronted with high repair costs	3.54	2.92
38. I dislike riding when it is misty or slippery	3.53	1.03
39. it is hard to reach the city centre by car	3.51	1.09
40. other people don't know or violate the traffic rules	3.42	.90
41. some people drive too slow or stay too long on the overtake lane	3.40	.99
42. it is often very difficult to find a parking place	3.37	.93
43. the traffic jams and the delays	3.30	.89
44. I can be involved in or cause an accident	3.27	.98
45. the aggressiveness in traffic is a nuisance to me	3.25	1.10
46. people drive to fast generally	3.16	.98
47. of the criminality, like car burglary and demolition	3.05	.95
48. I cannot read or work when I drive a car	3.03	1.21
49. car use is more and more restricted	3.02	1.10
50. I have to pay attention in traffic	2.88	1.02
51. you can have a breakdown or a flat tire along the way	2.87	.86
52. there are too many traffic lights	2.76	1.02
53. car use becomes a habit very rapidly	2.76	.98
54. the delays caused by road constructions	2.70	.81
55. there are too many speed limits and speed controls	2.66	1.07
56. you have to clean your car regularly	2.54	.98
57. driving a car is stressful and causes annoyance	2.52	.94
58. I can't drink when I am driving	2.46	1.35
59. I have too find my own way and get lost now and then	2.32	.98
60. I have to wear a seat belt	1.77	.83

Note. Scale ranging from *totally disagree* [1] to *totally agree* [5].

realise, the actual variation in the description was obtained by letting them 'score' differently on five a priori dimensions considered to underlie the 60 aspects of Tables 1 and 2.

To identify these basic dimensions, the 60 aspects were categorised in a preliminary task by three independent judges, following their apparent similarity in content. This resulted in five preliminary dimensions somehow summarising the 60 aspects characterising car use, each comprising several single aspects, and each having two extreme points. The first a priori dimension referred to the meaning of car use, and distinguished the instrumental function of the car on the one hand from the symbolic value of the car on the other. The second a priori dimension was a social comparison dimension, which distinguished superior and inferior social comparison. The third a priori dimension comprised the expression of self-identity, like (lack of) freedom and (in)dependency. The fourth dimension distinguished safe from unsafe aspects. The fifth dimension reflected the emotional function of the car, which distinguishes between positive and negative affectivity related to car use. In total 32 car-use episodes were thus described, based on systematic variation and combination of the five a priori dimension ($2^5 = 32$), by trying to involve all aspects constituting the dimensions (see Appendix A).

Table 3
Mean score on relative (un)attractiveness of episodes (*M*) and PRINCALS dimensions from attractiveness Q-sorts: rotated component loadings of 32 episodes

	M	Dimension 1	Dimension 2	Dimension 3
11 Overtake and cut in	3.7	−.65*	−.15	.03
32 Crash	5.1	.59*	−.01	−.16
29 Seat belt	3.4	.57*	−.03	−.09
26 Car too small	3.2	−.53*	−.13	−.01
27 Sudden dense fog	2.9	.53*	− .34*	.08
12 Sit on tail	4.1	−.44*	−.22	−.05
17 Proud son	3.0	−.44*	.13	.29*
3 Accelerate	3.9	−.42*	−.23	.33*
28 Get a flat tyre	5.4	.41*	−.29	.37*
31 High repair costs	4.7	.36*	.03	−.01
24 Lost in foreign metropolis	5.2	.36*	.06	.30*
15 Aggressive cyclist	4.6	−.35*	−.31*	.26
23 Brake for traffic jam	3.7	−.07	−.61*	−.08
8 Car burglary	5.8	.06	.53*	−.19
22 Road obstruction	4.4	.14	.53*	.06
20 Scratch on car	5.2	.17	.52*	−.24
30 Traffic jam	4.8	.33*	.46*	.42*
2 Light signals	4.0	.10	−.40*	−.13
16 Jealous of friend's car	4.3	.15	.38*	−.01
4 Celebrity same car	4.2	−.04	.37*	.22
21 Search parking place	3.0	.04	.33*	−.11
13 Alcohol control	3.3	.15	−.32*	.03
10 Vacation by car train	3.7	−.07	.32*	−.15
1 Dream car	1.8	−.44*	.06	.55*
5 Road broken up	2.8	−.12	.15	.51*
9 Small but nice car	2.7	−.14	.28	−.48*
19 Nut of wheel loose	4.6	.00	−.07	−.47*
25 M.o.T. test	3.5	.02	.05	−.47*
6 Speed control	5.2	−.12	.25	−.42*
14 Unhappy with car	4.1	.11	.19	−.41*
7 Oncoming car	4.4	−.33*	−.27	.37*
18 Government policy	3.6	−.10	.19	.25

Note. The episodes are characterised by a short key phrase. The complete episodes are given in Appendix A. Category scale ranging from *very attractive* [1] to *very unattractive* [7]. Component loadings higher than half of the highest component loading on that dimension are marked with an asterisk.

Given the 60 (un)attractiveness variables (Tables 1 and 2) and the 32 car-use episodes (Appendix A and Table 3), the three methods were specifically designed as follows, in the order of presentation to the respondents.

2.3. Similarity sorting of car-use episodes

In the similarity sorting task, respondents sorted the 32 episodes with respect to their similarity (see Forgas, 1982; Muncer, Groman, & Campbell, 1986) in three or more piles, whereby each pile had to contain at least three episodes.

By means of a PRINCALS with multiple nominal quantifications, [1] a cluster analysis for nominal data (Van den Berg, 1988; Van der Kloot, 1997), it was examined whether there were systematic correspondences between respondents in the extent that they thought episodes resembled each other or not. PRINCALS resulted in a distribution of the 32 episodes in multi-dimensional space. This plot of episodes was interpreted in two ways. Firstly, episodes that were evaluated as similar form a cluster. The clusters were interpreted and labelled on the basis of the relevant episodes. This revealed which component aspects from Tables 1 and 2 (constituting an episode) determined the similarity of episodes. Secondly, the axes of the plot of episodes in multi-dimensional space reflect the implicit dimensions underlying the similarity evaluation of the episodes. The dimensions were interpreted on the basis of the contents of the episodes that correlated highly (positively or negatively) with a dimension.

2.4. Q-sorting of episodes' attractiveness

The Q-sort method involved an attractiveness evaluation of the 32 car-use episodes. Respondents were asked to order the episodes with respect to their attractiveness, following a fixed frequency distribution, a Q-sort, on a seven-point scale. In this study, the Q-sort implied a 2–3–6–10–6–3–2 frequency distribution of the 32 episodes; the scale points ranged from *very attractive* [1] to *very unattractive* [7].

Firstly, the relative attractiveness of the 32 car-use episodes was determined by computing the mean category scores across subjects. This revealed which aspects constituting an episode were underlying the (un)attractiveness of the episodes, as far as episodes that were evaluated as equally attractive comprised similar aspects. Secondly, a PRINCALS with ordinal quantifications, amounting to a cluster analysis aimed at factor-analysing ordinal data (Van den Berg, 1988), was conducted to examine which preference dimensions could summarise the relative attractiveness of the episodes. PRINCALS yielded a plot of the episodes in multi-dimensional space. The PRINCALS dimensions were interpreted on the basis of the aspects (see Tables 1 and 2) constituting episodes whose attractiveness scores correlated highly (positively or negatively) with a dimension.

2.5. Semantic-differential rating of car use aspects

The third method used was based on the evaluation of car use with respect to the 60 (un)attractiveness aspects of car use. Firstly, people evaluated the attractiveness of 33 positive aspects of car use, following Table 1. Secondly, they evaluated 27 negative aspects of car use to the extent to which they found them unattractive, following Table 2. In both cases, the aspects were evaluated on a five-point scale, ranging from *totally disagree* [1] to *totally agree* [5].

[1] A PRINCALS (Principal Components Analysis by Alternating Least Squares) with multiple nominal quantifications yields the same results as HOMALS (Homogeneity Analysis on the basis of Alternating Least Squares). However, in this case HOMALS appeared not to give reliable results, because some discriminant measures were higher than 1, which is supposed to be impossible; this may be due to missing data. Therefore, we performed a PRINCALS with multiple nominal quantifications, which does not have these bugs. Both analyses yielded comparable results. Apparently, the high discriminant measures did not influence the HOMALS procedure.

Firstly, the mean scores regarding (un)attractiveness of the single aspects were computed across subjects. Secondly, a principal components analysis with varimax rotation (FACTOR-analysis) was conducted to examine which dimensions could summarise the judgements about (un)attractive aspects related to car use, comparable with PRINCALS. The resulting factors were interpreted by checking which aspects correlated highly (positively or negatively) with any factor.

2.6. Differences among the three methods

The three methods used differed in five respects. Firstly, there was a distinction in the extent to which the purpose of the task was apparent to respondents. In case of the similarity sorting of car-use episodes, the intention of the researcher was the least evident, while in case of the semantic-differential method the aim of the task was most apparent. The more apparent the purpose of the task, the higher is the chance that people are tempted to reason about their car use and judge it in a socially desirable way. Secondly, the methods differed in the cognitive process that was addressed. This differs from intuitive, instinctive and subconscious (using similarity sorting of car-use episodes) to reasoned and deliberate (using the semantic differential). This does not mean that only instrumental-reasoned aspects were included in case of the semantic-differential method. But by asking people for explicit judgements, it was assumed that people would rationalise their preferences. Thirdly, the methods differed in the level of measurement. In case of the similarity sorting of car-use episodes people provided similarity judgements, which were in fact nominal data. The Q-sort method yielded ordinal data, and the data resulting from the semantic-differential method were at interval level. Fourthly, different stimuli were used, viz. 32 car-use episodes in the two sorting tasks versus 60 (un)attractiveness aspects in the semantic-differential task. Fifthly, different kinds of judgement criteria were used, viz. similarity, episode (un)attractiveness and aspect (un)attractiveness.

2.7. Procedure

Individual questionnaires were administered in a group setting, with a maximum of 20 respondents per session. This procedure was chosen to standardise response conditions and to prevent respondents from giving socially desirable answers, which would have been a risk in a personal interview setting. The tasks were well structured and divided into several parts. For each task, the research assistant first clarified the aim, questions and the response format. Next, respondents gave their individual judgements and preferences in writing, anonymously. During this, no communication occurred among the respondents or between the research assistant and the respondents. Respondents started with the most intuitive task, i.e., the similarity sorting of car-use episodes, where the researcher's aim was as implicit as possible. Next, they completed the Q-sort and the semantic differential tasks, respectively. Furthermore, the questionnaire contained items assessing people's actual car use, their attitudes towards car use, questions concerning the instrumental and symbolic value of car use, and several demographic variables, respectively. Each group session lasted about 90 min.

3. Results

Firstly, we discuss whether there were systematic correspondences between respondents in the extent to which they think the 32 car-use episodes resembled each other or not. Secondly, the mean scores on the perceived (un)attractiveness of episodes and single aspects related to car use are presented. Thirdly, we present the results of data analyses aimed at examining which basic dimensions may explain the similarity judgements and the judgements of the attractiveness of car-use episodes and aspects, respectively.

3.1. Similarity of car-use episodes

PRINCALS was performed on the raw similarity data of 177 respondents. [2] A three-dimensional solution appeared to be the most appropriate, because the eigenvalues of these three dimensions were close to .50, and there was a relatively big gap between the eigenvalue of the third and fourth dimensions. The eigenvalues of the three dimensions were .47, .44 and .41, respectively. Figs. 1–3 give a plot of the 32 episodes in three-dimensional space.

Four clusters of episodes (i.e., episodes with a similar position in the three-dimensional space) were distinguished; three of these clusters were divided into sub-clusters. Cluster 1 consisted of episodes 8, 19, 20, 24, 25, 28, 31 and 32. These episodes represented negative situations: something was wrong with the car, which had financial consequences. The car user had no control over the situation and felt powerless. Cluster 2 consisted of the episodes 5, 21, 22, 26, 27, and 30. This cluster comprised situations that imposed limits on time or freedom. Actually, the episodes 22 and 30 formed a subcluster, in which the car user felt helpless and had to resign himself or herself to the situation. Cluster three comprised episodes that represented risky situations, due to the driving behaviour of or the interaction with other traffic participants. One subcluster (episodes 11, 12, 13, 15 and 23) consisted of risky situations due to the (aggressive) behaviour of others. A second subcluster, formed by the episodes 3, 6 and 7, comprised risky situations due to 'macho' driving behaviour of the person. The third subcluster of cluster three included the episodes 2 and 29, which represented possibly risky situations, partly due to uncertainty about what was happening. Cluster 4 is characterised by episodes in which social comparison processes played an important role. In one subcluster, consisting of the episodes 1, 4, 9, 10, 17 and 18, the car user mostly felt superior over others. The episodes 14 and 16 were part of the other subcluster, in which the car user was envious about the car of other people.

3.2. Attractive and unattractive aspects of car use

The Q-sort method and the semantic-differential method both revealed the relative (un)attractiveness of various aspects related to car-use episodes and car use in general.

[2] Respondents were allowed to create a remaining category; these episodes were considered as missing data. Unfortunately, 8 out of the 185 respondents had more than 10 missing values; these respondents were left out of the analysis.

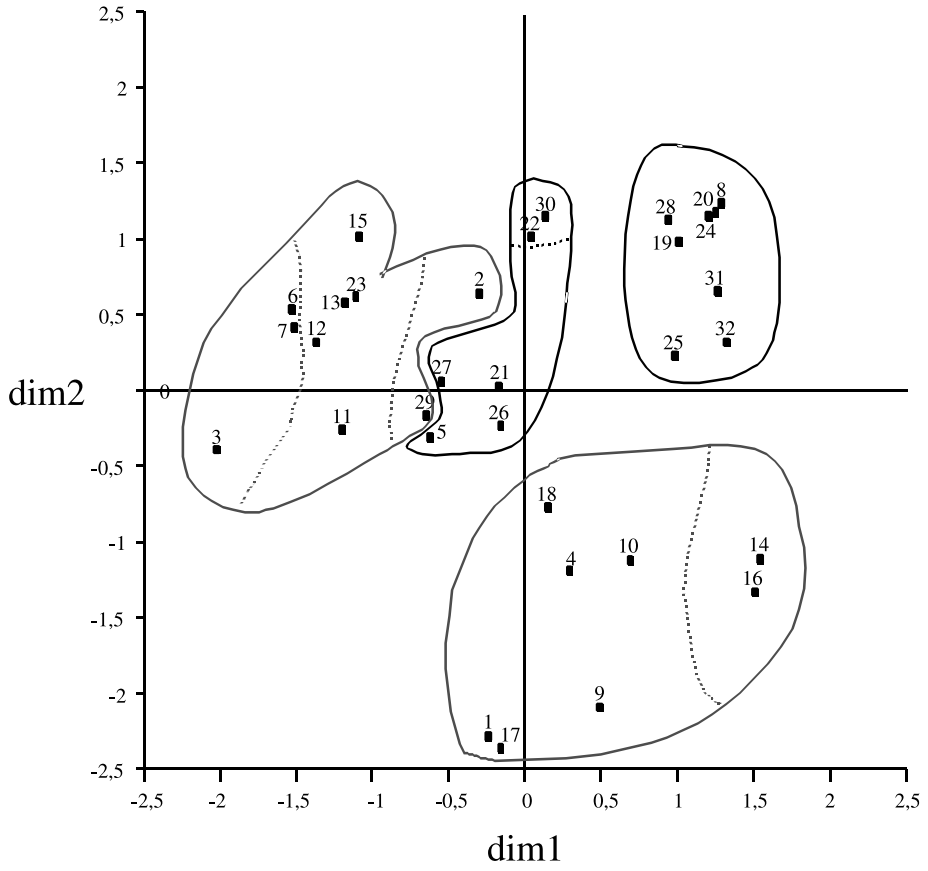

Fig. 1. PRINCALS on similarity judgements: plot of episodes in three-dimensional space, dimensions 1 and 2.

3.3. Q-sorting of episode attractiveness

Table 3 gives an overview of the mean (un)attractiveness of the 32 episodes. The most attractive episodes (episode numbers 1, 9, 5, 27, 21 and 17, respectively) were all characterised by positive excitement, positive feelings or thrill. Conversely, the unattractive episodes (episode numbers 8, 28, 6, 24, 20 and 32, respectively; see Table 3) all represented negative excitement, negative feelings or stress.

The most attractive episodes were also largely characterised by aspects referring to safety and freedom, while the most unattractive episodes reflected situations that are mostly unsafe and restricted. The attractiveness of the car-use episodes appeared to be hardly related to the instrumental value of car use.

3.4. Semantic-differential rating of aspects

Table 1 shows that, on average, respondents evaluated the independence, the availability and the instrumental (utility) value of the car (e.g., for shopping, recreation, shelter, picking up other

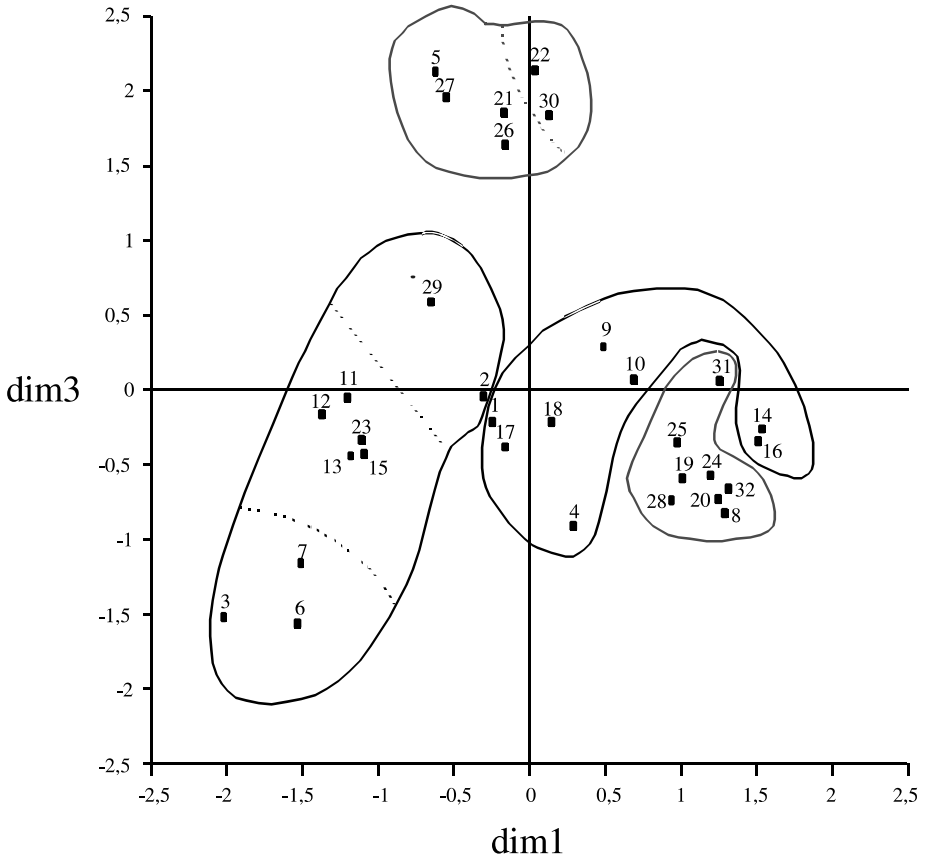

Fig. 2. PRINCALS on similarity judgements: plot of episodes in three-dimensional space, dimensions 1 and 3.

people) as the most attractive aspects of car use. Aspects referring to affect (e.g., getting a kick, liking the drone of the engine) and social comparison (e.g., distinguishing yourself, expressing yourself, feelings of power) were evaluated as far less attractive.

With respect to the unattractive aspects, the picture is reasonably consistent. Instrumental aspects, such as costs, environmental problems and driving conditions, were evaluated as the most unattractive (see Table 2). Some symbolic-affective factors were evaluated as moderately unattractive, particularly aggressive driving behaviour of other car users (violation of traffic rules and irritating driving behaviour of others) and criminality focussed on cars. Traffic conditions involved restrictions of car users' freedom, such as road construction, speed limits, seat belts, and drinking prohibitions, were not seen as very unattractive.

3.5. Dimensions underlying judgements about car use

All three methods made it possible to examine the dimensions underlying the similarity and (un)attractiveness judgements of car use, by means of different kinds of structural analysis, as explained in Section 2.

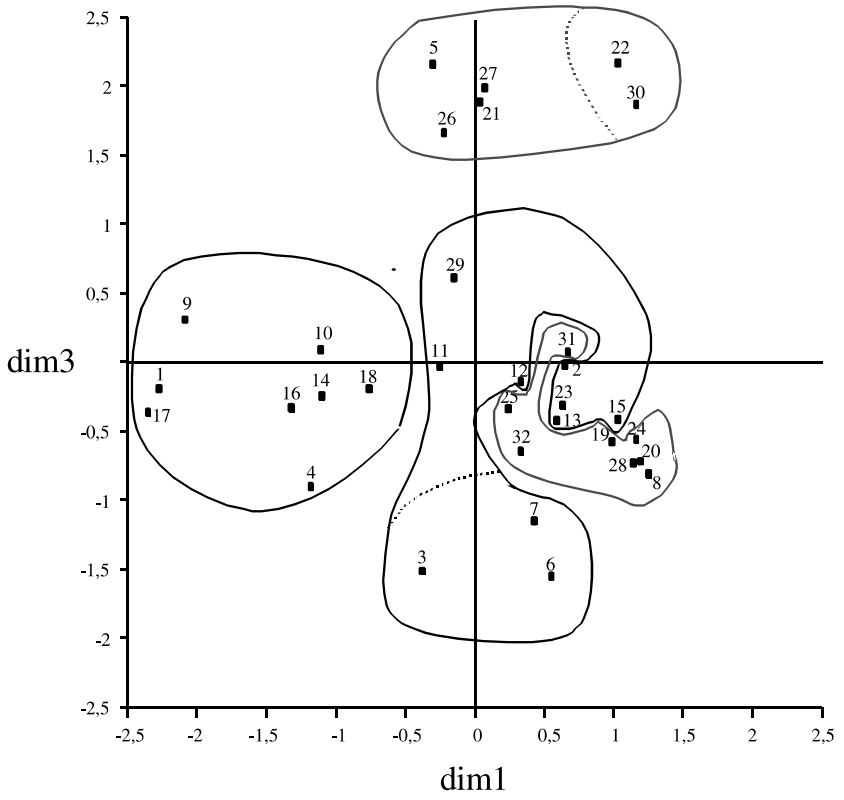

Fig. 3. PRINCALS on similarity judgements: plot of episodes in three-dimensional space, dimensions 2 and 3.

3.6. Similarity sorting of car-use episodes

By means of PRINCALS with multi-nominal quantifications it was examined which dimensions were underlying the similarity judgements of respondents. As said before, a three-dimensional solution appeared to be the most appropriate (see Section 3.1). The three dimensions of Figs. 1–3 were interpreted as follows. The first dimension is about safety and arousal aspects, and distinguished situations in which the car user was or was not in control. This dimension distinguished situations in which something was wrong with the car, the car user was irritated or stressed and did not control the situation (e.g., episodes no. 8, 14, 16, 20, 31, and 32; cluster number 4) versus situations related to unsafe and macho driving behaviour, whereby the car user did control the situation, and nothing happened eventually (e.g., episodes no. 3, 6, 7, 11, and 12, and cluster number 3).

The second similarity dimension distinguished situations in which the instrumental function of the car is stressed on one hand; these situations were mostly negatively formulated and therefore caused negative emotions (e.g., episodes no. 8, 20, 24, 28, and 30; cluster number 1). At the other end, the symbolic value of the car was stressed, attended by positive or negative social comparison (e.g., episodes no. 1, 4, 9, 16, and 17; cluster number 4). The third similarity dimension distinguished risky situations due to speeding, in which the freedom to move was stressed (e.g., episodes

no. 3, 6 and 7; cluster number 3) from safe, static and restricted situations, in which the car user lost time (e.g., episodes no. 5, 21, 22, 26, 27 and 30; cluster number 2).

3.7. Q-sorting of episode attractiveness

PRINCALS was applied to the ordinal attractiveness data from the Q-sorting of car-use episodes. It, too, revealed that a three-dimensional solution was the most appropriate; there was a relatively big gap between the eigenvalues of the third and fourth dimensions. The eigenvalues of the three dimensions were .14, .14 and .10, respectively. A varimax rotation was used, to facilitate the interpretation of the component loadings. Table 3 shows the rotated component loadings of the 32 episodes on these three dimensions. Only episodes that had a loading higher than one half of the highest loading on that dimension were taken seriously (e.g., Van den Berg, 1988); these are marked with an asterisk.

The first dimension distinguished situations that stress negative emotions due to a threat or damage to the instrumental function of the car at the one end; the car user was a victim and had no control over the situation. At the other end, the positive emotions due to the symbolic value of car use was stressed; the car user felt superior and experienced full control over the situation. The second dimension distinguished dangerous or unpleasant situations that did have, versus dangerous situations that did not have a happy ending. The third dimension distinguished situations about car ownership versus situations concerning car use.

3.8. Semantic-differential rating of aspects

Respondents' judgements about the (un)attractive aspects of car use (see Tables 1 and 2) were subjected to a principal components analysis, using varimax rotation. A five-dimensional solution appeared to be the most appropriate, because in that case most aspects loaded only high on one factor. Moreover, the sixth factor did only account for a small part of the total variance. The first five factors together accounted for 40% of the variance of the judgements on (un)attractiveness of car-use aspects. Only six items had high factor loadings (i.e. $>.35$) on more than one factor. Four aspects loaded less than .35 on the factors (see Slotegraaf et al., 1997, for a full overview of the factor solution). Below, only aspects having factor loading $>.40$ will be discussed to interpret the factors.

Factor 1 had an eigenvalue of 10.0, and accounted for 16.6% of the variance in the judgements. This factor reflected the symbolic value of car use, and particularly the kick and thrill that go together with car use, the affective relationship with the car, and the symbolic value of car use. Aspects loading $>.40$ on this factor were aspects no. 18, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32 and 33 (see Table 1 for a full description of the aspects).

Factor 2 had an eigenvalue of 4.9, and accounted for 8.1% of the variance in the judgements. Factor 2 reflected the instrumental function of car use: the availability, the flexibility, the carrying capacity, the multi-functionality, and the freedom car use is giving. This factor is supplemented with some more psychological factors, such as independence. Aspects loading $>.40$ on this factor were aspects no. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 14, and 15 (see Table 1).

Factor 3 had an eigenvalue of 3.8, and accounted for 6.4% of the variance in the judgements. Factor 3 reflected restrictions in the freedom to move or aspects in which car users were impeded

otherwise, partly through government interference. More specifically, aspects with high loadings on this factor were aspects no. 36, 39, 41, 42, 49, 52, 54, 55, and 58 (see Table 2 for a full description of the aspects).

Factor 4 had an eigenvalue of 2.6, and accounted for 4.4% of the variance. Factor 4 comprised mostly negative aspects of car use, such as unsafety, environmental problems, repair costs, and not being able to read or work, supplemented with some positive affective aspects: safety, nice road holding, relaxation and being in love with your car. The road holding qualities of a car may well be associated with and contribute to safety feelings. Aspects no. 17, 20, 35, 37, 44, 47, 48, 49, and 50 loaded high on this factor (see Tables 1 and 2 for a full description of the aspects).

Factor 5 had an eigenvalue of 2.5, and accounted for 4.1% of the variance. Factor 5 reflected the confrontation with negative situations, due to external threats. This factor emphasised the maladjusted behaviour of other car users, aggression, criminality and uncomfortable situations due to fog. Aspects no. 38, 40, 45, 46, and 47 loaded high on this factor (a description of these aspects is given in Table 2).

The FACTOR-analysis makes clear which concepts were expressed in the 60 single aspects. Apparently, the symbolic value of car use and the instrumental function of car use are clearly distinguishable dimensions underlying the judgements of the attractiveness of aspects related to car use.

4. Discussion

Car use is not only popular because of its instrumental function, but it also satisfies the need to express yourself and your social position, and it is pleasurable. However, the relevance of these symbolic-affective motives for car use has hardly been tested and validated by empirical research.

This study was aimed at demonstrating the use of methods designed to measure symbolic-affective as well as instrumental-reasoned factors related to car use. Three methods were developed, ranging from an intuitive sorting task (similarity sorting of car-use episodes) to an explicit judgement task (semantic-differential rating of aspects). The third method, the Q-sort, was an episode-ranking task. The methods differed in the extent to which the purpose of the task was apparent to respondents, in the cognitive process which was being addressed, and in the level of measurement (nominal, ordinal, and interval). Moreover, different stimuli and different judgement criteria were used.

The first aim of this study was to determine the relative importance of different motives for car use. Firstly, we examined which aspects determined whether car-use episodes were evaluated as alike or not, among which were symbolic-affective aspects. Four sorting criteria emerged: lack of control due to a malfunctioning car, limits on freedom or time, risky driving behaviour, and social comparison, respectively. So, people tended to emphasise symbolic-affective aspects (e.g., social comparison processes) as well as instrumental-reasoned aspects (e.g., lack of control due to a malfunctioning car) when they judge car-use episodes for their similarity.

Secondly, we examined how people evaluate the (un)attractiveness of instrumental-reasoned and symbolic-affective aspects related to car use. The semantic-differential method revealed that symbolic-affective factors were not evaluated as (the most) attractive aspects of car use. However, the Q-sort method revealed that the most attractive episodes all comprised affective aspects, while

Table 4
Dimensions underlying the similarity and (un)attractiveness judgements of car use

PRINCALS (episode similarity)	PRINCALS (episode attractiveness)	FACTOR (aspect judgements)
1. Macho driving behaviour, in control versus inferior car, no control	Instrumental versus symbolic meaning	Symbolic value (thrill, pleasure, prestige)
2. Instrumental versus symbolic meaning	Safety	Instrumental value, freedom, opportunity
3. Freedom to move versus restricted	Ownership versus use	Restrictions
4.		Risk, costs, (un)safety, environmental versus positive affect
5.		Stress, aggressiveness

the episodes that were evaluated as the least attractive were all typified by negative affectivity. So, if people were asked explicitly to evaluate the attractiveness of aspects related to car use, they especially mentioned instrumental-reasoned aspects. In that case, symbolic-affective factors did hardly come to the fore. However, if the aim of the research task was more ambiguous, the symbolic-affective motives did seem to play a significant role. The symbolic-affective motives for car use were more easily revealed when the aim of the research task was not too apparent.

The second aim of this study was to examine which dimensions were underlying the judgements of aspects related to car use. Table 4 gives a summary of the dimensions underlying the similarity and (un)attractiveness of car-use episodes and aspects, as appearing from the three different kinds of structural analysis.

All three methods, in combination with PRINCALS and FACTOR-analysis, revealed that the first dimension or factor (which explains most of the *variance* in the judgements of the similarity and attractiveness of the episodes and in the judgements of the (un)attractive aspects of car use, respectively) especially reflected aspects related to the symbolic-affective value of car use, like macho driving behaviour and driving an inferior car. Moreover, all three methods revealed dimensions reflecting the instrumental function of car use, and safety aspects. So, the structural analyses all revealed that both symbolic-affective and instrumental-reasoned factors were significant dimensions underlying the attractiveness of car use. However, the particular meaning of the dimensions differed among the three methods, obviously, for quite different stimuli and methods were used.

In conclusion, the results of studying motives for car use were dependent on the research method used. As expected, the more apparent and evident to the subjects the purpose of a task was, the less clear became the significance of symbolic-affective factors related to car use. If the aim of a task was clear, people were probably inclined to reason about their car use in a socially desirable way. So, the assumption of Marsh and Collett (1986), as quoted in Section 1, seems to be supported by the results of the present research. Follow-up research is needed, to examine the robustness of the results of the present study. It is advisable to develop other sets of car-use episodes, based on different a priori dimensions, and thereby check to what extent the outcomes are sensitive to variations in episodes.

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Appendix A. Car-use episodes (translated from Dutch)

1. Finally, you bought your dream car. Your neighbour watches in admiration when you are testing your new car. The car holds the road well.
2. You drive at a relaxed speed on a quiet road, listening to music. It's cosy; everything seems all right. However, oncoming cars continually warn you with light signals. You wonder what's wrong.
3. You accelerate when the traffic light turns to green. You rush with squeaking wheels past the other cars. You may drive irresponsibly fast, but the feeling is great.
4. Some time ago, you saw a celebrity driving the same car as you have. Since then, you enjoy your car even more. Until you read in the paper that he had a serious car accident.
5. The well-known road that leads to your home is being reconstructed. You have to wait some while for the traffic light. You think it's worthwhile, for the new road surface seems to be very comfortable.
6. You drive 160 kilometres per hour on a quiet motorway. You have full control over your car. Too late you discover a police team's speed control. The fine will cost you a lot of money.
7. You drive with your brand new car on a small country road. There is not enough space to pass an oncoming car. At the very last moment, he turns to the shoulder. Everything turns out well.
8. You bought a fantastic new car radio with a CD player. When you arrive at the parking lot, you see that the door of your car is open. Glass on the street, car radio gone. This cannot be true!
9. Your colleagues jeer at you and your ordinary car. You don't care, it brings you everywhere, and you have a nice shelter against rain. That's all you need, isn't it?
10. An acquaintance is disdainful of your decision to take the car train to the South of France. That's an easy drive, he said. It seemed nice and safe to you, but now you regret your decision somewhat.
11. A man in a fast car and a nifty suit, busily talking in a car telephone, cuts in on you during overtaking. You are glad you don't need a car during your work; you mostly use your car for fun.
12. While you pass a truck on a motorway with a speed of 120 kilometres per hour, you see a sports car coming up with high speed. He sits on your tail and flashes his headlights. Not funny, but you decide yourself at what speed you drive.
13. Driving home at night, you have to stop for a large-scale alcohol control. You have drunk a beer, but the blowpipe indicates everything is all right. Have a nice trip home, the police officer says. You are relieved.
14. Your car is a disaster. Half of the time, it's broken, and moreover, the car looks quite ugly. As for you, your car might as well be wrecked. However, as you will see, nothing will happen with a lousy car like this.

15. A cyclist coming from the left rushes before your car, while you have priority. While you are relieved nothing happened, you just see the upraised middle finger of the cyclist.
16. Your friend bought a gorgeous new car. You cannot allow a new one yourself, so you just have to manage with your ordinary car. Your car may break down any time, and then?
17. You pick up your son from school. You hear him saying to his friend that your car is much better and stronger than the car of his farther. You decide not to go home right away, but to make a short drive first.
18. Your car is more economical than most other cars, the car looks nice, has an airbag and is very practical because of the adjustable back seat. You use your car a lot. However, you get annoyed because the government is on car users so much.
19. You have washed and polished your car, just because you were in the mood. The car looks wonderful. Suddenly, you see that a nut of your front wheel is lost. The wheel might have run off during driving within a few days.
20. On a Saturday morning, you go shopping by car. When you are leaving the supermarket, you consider you could visit the garden centre too. At the garden centre you see a large scratch on your car.
21. You are looking for a parking place in the city centre on a busy afternoon. You are lucky to find a place in the new multi-storey car park in the city centre. However, you have to walk some way.
22. On a morning, you are, as usual, driving to your work. An unloading lorry obstructs the road. Soon, behind you are also some cars. This might take some time.
23. You are speeding on a motorway. Suddenly, you have to brake for an emerging traffic jam. Due to your fast reaction and adequate braking, you come to a standstill just in time.
24. During your vacation, you hire a car in a foreign country. You get hopelessly lost in a metropolis. When the engine begins to stutter in a scary slum, you are terror-stricken.
25. Your own brand garage says there is a fair amount wrong with your car. However, when you bring your car to a one-man business in your neighbourhood, it appears nothing special is wrong with your car. Your car passes the M.o.T. test smoothly.
26. You should have known: the boards you bought at the do-it-yourself shop don't fit in your small car. They stick out about half a meter. You decide to borrow the station car of a good friend, just for the safety.
27. On your way home, a dense fog closes in suddenly. You are not able to see your hand in front of your face. You stop at a wayside restaurant to call your wife and tell her you will probably be late. 'Nice of you to call me', she says.
28. You have decided to go on holiday by car this year. Somewhere in the middle of Germany you get a flat tyre. You just manage to keep the car on the road. It made you sit up a bit.
29. When you are bringing your son to the football fields, he says 'You are not wearing your seat belts'. Actually, you detest it, but it is of course sensible to do so.
30. You have been in a traffic jam for almost 20 minutes. While you are driving at a footpace, you realise that you are going to miss an important appointment. You are in a sweat, but you cannot do anything about it.
31. The garage bill is a few hundreds guilders higher than you expected. Some parts were completely worn and really had to be replaced. Driving like this would be irresponsible.

32. You were involved in a crash, just while you were heading in to an engagement. You can still drive your car, but the driving wheel is trembling. On arrival, your colleague says: 'Well, your car looks as if it is fit for the scrap heap'.

Note. The numbers of the episodes correspond with the numbers reported in Table 3 and in Figs. 1–3.

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