

Qualitative analysis of commuters' responses to rewards for rush-hour avoidance

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Abstract

Recently, a new travel demand measure (Spitsmijden) was introduced in the Netherlands, which is based on rewarding frequent car commuters to avoid the rush hour, using monetary incentives. Analyses of the quantitative data gathered in various Spitsmijden projects have revealed much of the factors influencing car users' responses to rewards, their decision to participate and the order of magnitude of rush hour travel reduction. However, questions remained regarding participants motivations to participate and avoid the rush hour, and how their behaviour and motivations develop throughout the reward period. This paper describes the use of qualitative research methods (semi-structured interviews) that were applied to tackle these questions. Interviews held with 12 participants were coded and analysed using the MaxQDA software package. The analyses suggest that participants' motivations and behaviour are not stable and that a process takes place in which the rewarding gradually leads to behavioural change. Although the reward is the initial motivation to enrol and avoid the peak, many find travel options that are in themselves rewarding, leading to intrinsic motivation to sustain the behaviour. Some eventually choose a single new travel option (stabilisers), while others optimise their choice using dynamic traffic information (flexibles). Those who do not find attractive alternatives to avoid the peak do not develop intrinsic motivation and fall back to their old behaviour when the reward ends (relapsers). From a methodological point of view, the qualitative method used has significant added value to the earlier quantitative methods in the sense that processes can be identified in which motivational, behavioural and contextual factors interact, leading to richer descriptions of and improved insight into the behavioural adaptation.

Key words

Behaviour-change, congestion, motivation, qualitative research, rewards, semi-structured interviews, rush-hour avoidance, mobility.

1. Introduction

Road pricing has been suggested over the past two decades as a first-best solution to efficiently alleviate congestion externalities (Nijkamp & Shefer, 1998; Rouwendal & Verhoef, 2006; Small & Verhoef, 2007). In practice, imposing road pricing is controversial and insight is lacking in key domains. Pricing the use of public-funded roads raises questions regarding social equity (Giuliano, 1994) and public acceptability in addition to economic efficiency (Banister, 1994; Viegas, 2001). Perceptions of fairness seem to play a crucial role in public acceptability of pricing schemes (Eriksson et al., 2006). In the Netherlands, road pricing is seen by many as an unfair and illegitimate policy despite the government's best efforts to advance a km-charge over the whole Dutch road network.

In this context it has been argued, in line with psychological theory (Kahneman & Tversky, 1984), that an incentive for avoiding peak hour travel can achieve a similar behavioural response to that of pricing (Ettema et al., 2010; Knockaert et al., 2007). The 'Spitsmijden' (translated freely as peak avoidance) concept was applied in various settings in The Netherlands with the objective of investigating the potential impacts of rewards over commuters' behaviour during the peak-hour. The rationale behind Spitsmijden is to reward commute travellers if they display desired behaviour, i.e. avoid driving during the morning peak hours. To avoid the peak, they may drive during off-peak times (before or after the morning peak), travel by other modes (public transport, cycling or carpool) or work from home. Travellers' behaviour is compared to a reference situation without rewards which determines to what extent, if at all, peak-hour driving was avoided. To date, Spitsmijden has been tested in several projects and locations. Three projects were conducted on the A12 highway – the main route crossing from east to west: Spitsmijden 1 - a 13 week pilot study in 2006 (Zoetermeer-The Hague); Spitsmijden 2A – 9 months 2008-2009 (Gouda-The Hague) and Spitsmijden 2D – 2008-2009 (Gouda-Zoetermeer). Other projects have been running as a temporary measure during lane closures and road or bridge works (Bliemer et al., 2009). In operational terms, the behavior of participants in Spitsmijden is monitored using license plate recognition on the main trajectory and other routes (if change of route is not permitted). In addition, participants fill out a logbook (for certain weeks) providing data on their trips, times and locations especially if they were not using their car (i.e. undetected day). Data on socio-demographic characteristics, work and household flexibility, habitual behaviour and traffic information usage are collected through surveys.

To date, scientific research into Spitsmijden has been conducted using quantitative methods i.e. econometric techniques (e.g discrete choice models). These methods have been applied to find regularities between the degree of peak avoidance, on one hand, and the different reward regimes (i.e. treatments), socio-demographics and work/household related constraints, on the other hand. In general, these analyses have revealed that peak avoidance is affected mainly by type (monetary or in-kind) and height of the reward. However, other factors have also been found to influence behaviour such as availability of alternatives, household and work constraints, certain socio-demographics (gender, education), usage of travel information, habitual behaviour (usual peak-hour commuting frequency, departure time, use of other modes), attitudes and even the weather (Ben-Elia & Ettema, 2010). In addition the factors explaining whether travellers decide to participate in Spitsmijden have also been investigated, revealing that flexibility of working hours, availability of alternative travel modes, economic sector of employment and motivations play a key role in the decision to participate (Ben-Elia & Ettema 2009).

However, two main issues have not been sufficiently studied in the context of Spitsmijden. First, although we have identified the factors that seem to affect participants'

behaviour and participation, we have not investigated the underlying reasons and motivations to participate in the program and to avoid driving during morning peak-hours. Although certain motivations (e.g. the reward, contributing to mitigating congestion, finding solutions to tackle congestion) explain the willingness to participate (ibid), these motivations were measured using predefined closed scales, leaving respondents no options to specify motivations in detail. Thus, to a certain extent, some motivational factors may have been overlooked. Therefore, it makes sense to explore the motivations of participants in further detail, as well as the stimuli and constraints that influence their daily trip-making decisions.

A second issue concerns the dynamics of behaviour over an extended period of time (as in Spitsmijden 2A/2D). In a program that lasts over a year, motivations to avoid the peak as well as influential factors may vary. Behaviour itself may change for example from high avoidance rates in the beginning to low rates in the end, due to fatigue, or motivations and attitudes towards peak avoidance may change based on experiences during the project. Although some dynamic effects can be accommodated using econometric models such as panel based models, there is a considerable lack of knowledge about how behaviour and its underlying motivations change over a longer period, and how this affects the outcome of reward programs such as Spitsmijden.

Research into behavioural change has led to relevant theories such as Theory of Planned Behaviour (Ajzen, 1991), Norm Activation Theory (Schwartz 1977; Schwartz and Howard, 1981) and Theory of Interpersonal Behaviour (Triandis, 1977, 1980), which suggest that behavioural change may occur respectively if beliefs about the outcome of choices change (leading to changes in attitudes), if social or personal norms change and if perceived control about the outcomes of alternative behaviour is sufficient. Another important condition for change is that behaviour should be conscious, rather than habitual. Although these factors have been demonstrated to influence behavioural change in various circumstances (Bamberg and Schmidt, 2003; Fujii and Taniguchi, 2006, 2007), they have to date been studied in static settings. As a result, the *process* of behavioural change, proceeding over a longer time and including issues such as learning and exploration has not received sufficient attention.

Yet, in a setting such as Spitsmijden, in which repeated behaviour takes place during a longer period, studying how beliefs, norms and perceived control develop gradually adds significantly to understanding how behavioural patterns emerge in response to repeated rewards. A topic of particular importance in the context of a longitudinal reward program such as Spitsmijden is how motivations to avoid the peak develop during the program. An extensive literature (Deci, 1971, 1975; Cameron & Pierce, 1994; Cameron et al., 2001) discusses whether rewards (being an extrinsic motivation) are more or less instrumental than activating intrinsic motivations (e.g. by providing information) when attempting to change behaviour. Also for Spitsmijden, one can question the relative role of the reward and intrinsic motivations in various stages of the program.

In short, to understand the emergence of behavioural responses to rewards in a longer term program, it is important to study the development of intrinsic and external motivations to enrol in the program and avoid the peak, as well as the development of beliefs, norms and perceived control. Therefore, the main objective of this paper is to elucidate the behavioural process that develops over a longer period of time while participating in Spitsmijden (in our case Spitsmijden 2D). The following research questions are addressed:

1. What motivates participation in Spitsmijden?
2. How do participants' intrinsic motivations develop over time during the course of the program?

3. What stimuli and constraints do they experience and what effect do these have on their decision to avoid the peak-hour?
4. What role do support measures play, e.g. accessing traffic information or employers or household arrangements?
5. Does avoidance behaviour change during the course of the project and if so how?

To address these questions, we will use qualitative research. The motivation for this is the emphasis put on exploration of a process of behavioural adaptation. Although certain factors have already been identified to influence peak avoidance behaviour, we deliberately did not impose an a priori structure on the adaptation process or made a priori assumptions about the relevant beliefs, norms and motivations. The rest of the paper is organized in the following way. Section 2 provides a brief description of qualitative research methods and their application to our research problem; Section 3 explains the methodology applied in this study; Section 4 presents the results; Section 5 presents a discussion; Section 6 sets conclusions and future research directions.

2. Qualitative research methods

Since the use of qualitative techniques is not common practice in transportation research, this section discusses the principles of the approach. The purpose is to sketch an image of qualitative research and focus on four elements: purpose, methods, research procedure and findings. Next, we demonstrate how these relate to our research agenda.

Purpose. In general, the purpose of qualitative research is to find out how people give meaning to their social world. Participants are asked to reflect on their experiences within the focus of the research questions. It is assumed that people actively construct their social lives and shape their social environment by interacting with others in a meaningful way. A fundamental source of guidance, as in all research, is the problem statement of the research project. What is deemed relevant in the data should in some way or another be connected with the area of interest. Often this is not wholly clear from the start. For researchers to understand the perspective of the people involved, they have to find out what they take for granted, how they think about their social lives and how they use language to express themselves.

We acknowledge that answering the research questions will need a large deal of exploration. The quantitative models that resulted from the research of Spitsmijden 1, showed a definite connection between behaviour-change and factors such as household constraints, flexibility of work, and appreciation of alternative ways of travelling in addition to the reward itself. However, the mechanisms behind some of these factors still need elaboration and other factors might be further explored. Consequently, the research objectives are geared to better understand the perspective and behaviour of drivers. Qualitative research methods are beneficial when exploration is needed in an area of scientific interest. Qualitative researchers do not imply their theoretical framework on the participants. Instead, by asking open questions the participants are enabled to bring to the front what they think is important for answering the question. Qualitative interviewers encourage participants to talk about experiences and points of view on their own conditions therewith facilitating exploration of terrains of interest.

Methodology. In order to provide knowledge about the social worlds of those researched, standard qualitative methods tend to emphasize flexibility of procedure (Boeije, 2010). Flexible methods are adaptive to what the field of research has to offer. As a consequence,

methods are often emergent and are modified during the course of the research process, because only when the researcher is 'in the field' does it become clear which research questions have been successfully posed, which new questions or approaches need to be included, what types of additional observations could be made using variants of the developed methods, and so on. Therefore, the measurement instruments are mainly semi-structured. Before going into the field, researchers generate a well-prepared instrument, such as an interview protocol, an observation scheme, or a focus group agenda, but only in 'the real world' does this instrument reveal its value.

The issues concerning the Spitsmijden project are quite complex in nature. A decision to participate in the project could be based on different personal considerations, as well as the decision to choose alternative modes of travel to avoid the morning peak-hour. Qualitative methods are employed to unravel complex issues such as decision making. These methods can provide insights into all the different aspects that participants weigh and into the decisive aspects that play a part in daily decision making. Qualitative interviews realize this by asking participants for a complete overview of their considerations as well as for a reflection on the interplay of these factors. Interviewees can do so from their own frame of reference and for instance, frame their decision in terms of environmental interest, costs, productivity or a combination of these.

Research procedure. In qualitative research, a cyclical process is often advocated (Mays & Pope, 1995). As such, it is preferred to sample a subset of cases, collect data, and then to analyze these data, before repeating this cycle with a new set of cases. Ideally this cyclical process is continued till no new insights originate, and the findings show no obvious gaps anymore (that is, saturation is achieved). Otherwise stated, the social phenomenon that was studied is understood, and the research questions can be answered. This working method is propagated because it will lead to in-depth understanding of what is going on in the field.

Qualitative methods are flexible which makes them appropriate to study change. Change is sometimes difficult to study with fixed instruments as the adequacy of measuring instruments might decrease over a longer period. Data collection in qualitative research can be adjusted to the issues that are at stake at a specific measuring moment. Additionally, participants can reflect on previous periods and recall any decisive moments. It is an important question whether participants become more aware of travelling decisions and whether any change in their behaviour becomes routine. This information is very relevant with regard to the future success of reward-based congestion management programs

Findings. Qualitative research can provide descriptions of daily life. Descriptions must be understood as detailed accounts of what a specific setting looks like, what keeps people busy and what they take for granted. Often, qualitative researchers do not only aim to describe what is happening, but also want to explain how it works and why it is that things work that way (Clifton & Handy, 2001). Microscopic insights can be placed against theoretical and societal backgrounds or macroscopic conditions to further understand the research topic. During the analysis researchers reduce, select and interpret the data. However, the claims they make need to be grounded in the data i.e. stories and examples, and therefore data needs to be included as research evidence. In the Spitsmijden project the use of qualitative techniques can be helpful to obtain more complete and richer descriptions of behavioral processes. Next to descriptions the methods are aimed at providing understanding of the complexity of decisions and travel behaviour. The findings can help to develop further theorizing in the realm of mobility, for instance by providing different stages in behavior or in discovering different types of commuters.

3. Methodology

3.1 Recruitment and sample selection

Initially, 20 participants were targeted for semi-structured interviews. However, it was necessary to decide which out of more than 4,000 participants in the Spitsmijden program, would be approached. Ample data was available regarding the daily peak avoidance behaviour via the detection equipment. The daily data was aggregated to monthly summaries (proportions) for each participant regarding: number of days of driving before the peak, during the peak (6:30-9:30) period and after the peak period. Given that the interest is in change of behaviour we were interested in sampling four subgroups: Participants showing a high peak avoidance rate throughout the program; Participants showing a low peak avoidance rate throughout the program; Participants starting with a high avoidance rate but falling back to a low avoidance rate; And participants starting with a low avoidance rate but later climbing up to a high avoidance rate.

As a start to explore the data we used the method of Parallel Coordinates (||coords) implemented in the ParallAX software (Inselberg, 2009). It applies geometric principles of multidimensional visualization to find regularities in the data without any a priori assumption on the distributions of the response variables (see Appendix A). Next, we looked at the number of peak avoidance days in each month (March 2008 – July 2009) and detected two representative periods of high activity in the program. one in the early stages of the program (4th month) and another towards the end (17th month). A cluster analysis (in SPSS v.15) was run: driving before the peak and driving after the peak. This demonstrated that for each peak avoidance strategy (before or after the peak) there were four distinct group-clusters: Low avoidance (LL); High avoidance (HH); High avoidance initially and low avoidance later (HL) and Low avoidance initially and high avoidance later (LH) – and eight clusters in total. A balanced random sample of participants was produced using randomized sampling (with 8 strategy clusters for sample strata and within the sample clustering by both gender and age) and weighting for the four types (most of the participants are marked as LL). This sample was delivered to the project's back office which sent invitations to participate in the study by email.

Although 95 participants were approached by email, only 12 interviews were ultimately held mainly due to different levels of willingness to participate in the interviews. Willingness to participate in the interviews was unevenly distributed across the clusters and seems to be related to the rate of peak avoidance. In the clusters where participants reacted strongly to the reward or avoided the peak already, response was higher (6 participants in LH and 3 in HH). In the clusters with high peak travel, willingness to participate was much lower (only one participant in LL). In addition, there were cases where participants first agreed to be interviewed, but withdrew when it turned out to be difficult to make an appointment. Again, this primarily happened for the clusters with relatively higher peak-hour driving shares. Eventually, three interviews were conducted in each of the selected clusters, mentioned above, except for the LL-participants. These individuals can be considered as drop-outs of the project already and had less interest to participate in an interview.

3.2 Data collection

Master students of Utrecht University, Faculty of Geosciences, were recruited to conduct the interviews. They had taken a course in qualitative research methods and additionally received a short four hours training workshop in which they were also able to practice. Examples taken from transcripts of good and bad interviews were also discussed. In

the training the project of Spitsmijden was explained to them as well as the objectives of the interviews. The topic list that they would be using during the interviews was addressed and discussed for any unclear parts. Based on their comments some adjustments were made to the topic list (see Appendix B.)

Interviews were eventually held from November 2009 until January 2010. For safety reasons, interviews were conducted in pairs of two students. The interviews took place at the homes of the participants and lasted approximately one hour. All interviews were digitally recorded and fully transcribed. During the data collection process, the interview transcripts were used to discuss interview techniques with the interviewers to improve the quality of their interviews and to adjust new interviews to seemingly interesting topics. All interviewees already were involved in the Spitsmijden project and had given their informed consent previously.

3.3 Data analysis and quality control

Data were analyzed with the use of Maxqda2007 software for qualitative data-analysis. The first step of the analysis consisted of disassembling the interview texts into relevant themes (Boeije, 2010). In this so-called stage of open coding each theme is assigned a label, a code. Some codes were deductively derived from the literature, such as 'flexibility work arrangements', 'public transportation' and 'supporting measures'. Others were inductively derived from the interviews, for example, 'optional reward', 'decrease travel time', 'rhythm', and 'decisive factor'. All interviews were coded in this way. Coding was regularly discussed in the project team in order to reach agreement on the interpretation of the data.

In the second stage of the analysis themes were distinguished that could be considered main themes in the interviewees' considerations and more peripheral issues. The research questions were influential in deciding what were considered the main themes. This resulted in a hierarchical code tree that was regularly refreshed on the basis of new information stemming from the data. The final code tree can be found in Appendix C. The fragments that could be retrieved with the codes were examined thoroughly while looking for regularities and patterns. This resulted in different stages that participants seemed to go through from entering the project till finishing the program and to a typology of different participants. In this step of the analysis finding answers to the research questions is paramount. It should be noted that all the text fragments were in Dutch and they were eventually translated to English only for publication purposes.

4. Results

We will start by describing why the participants chose to participate in the Spitsmijden project. Next we focus on their decision to change their behaviour in order to gain the reward and the considerations that played a role. Attention is paid to different alternatives in transportation, the advantages and disadvantages that are mentioned and what factor ultimately is decisive. Then we continue with the experiences during the project and whether the project has an effect on their behaviour in the long run. Finally, we elaborate on four distinct profiles of participants in the sample.

4.1 Motivations to enter the project

For ten participants, the reward was the primary reason to enrol in the program. Two participants were only registered for one day in a fortnight and as a consequence the amount of money to be earned was considered low and not influential. At the same time they all state

that they do not need the reward financially and they consider it to be extra money. It is added to the big heap and hardly noticed when it was paid. Still, it was the reward that made them enter the program

'I: Why did you participate?

P: Mainly the idea that it could never harm. (...) A bit out of curiosity? No not really, because at that time you don't have a clear picture of what you will gain. The decisive moment for me was that I was offered money. That is what pulls you in.' (P-01)

The amount of money is considered appropriate. If it were less, then it would not be considered as a sufficient reason to request a change to their behaviour. However, most participants can earn quite a substantial amount of money, if they stick to avoiding the peak. Some participants stated they find a reward so much more encouraging than a sanction and others stress that with the reward there is nothing to lose only to win.

Other reasons mentioned for participating included both individual-related reasoning such as decrease of travelling time and avoidance of the peak hour, as well as socially related reasoning such as the scientific value of the project itself, the contribution to concerted action to deal with congestion, fastening the road construction works. The environment was never a reason and it was often stated that it should have played a part, but that in fact it did not. Some felt challenged and wanted to see if they could make it before the rush hour. Some were more generally interested in traffic and transportation and were just curious if the whole project would be effective and whether the project organisation could manage.

It is interesting to note that all participants take the decision to participate individually without discussing it with family members or others. Some find out later on that colleagues are invited to the program as well, but that is not influential in any way. This suggests that the option to earn extra money, the potential behavioural change needed and the consequences are considered to be of individual relevance mostly.

4.2 Exploration stage

Once enrolled, the participants started thinking about alternative transportation and the time they depart from home, in order to get rewarded. It raises their awareness about the flexibility of their work, the necessity to be at a specific location at a fixed time and about travelling times. They also reflect on their experiential knowledge with peak hours and traffic in general.

For some a short period of exploration starts in which they test the options that are available to them to avoid the morning rush hour. They find out how late they exactly have to leave to earn the reward. There are learning effects. They come to know the advantages and disadvantages of particular options.

'I: Was the reward important for you?

P: Well no, but it was a pleasant consequence. I mainly wanted to gain some experience: what would I gain in terms of time? I got to the office in 45 minutes and sometimes in 35 minutes and I did not drive exceptionally fast. That is when you leave at 5:50 (...) If you leave later it easily takes you about an hour and a half.' (P-06)

'Now I will try to leave on Fridays not just before five thirty but just before seven. To check how that turns out. Not any later, I once did that and I shouldn't, because you get stuck in traffic'. (P-09)

In considering the options the costs and benefits, including the reward, are weighed:

‘Yes, I consciously thought about how to do this? Can I go by public transport? And then I thought that is not an option for me. Things would be so much worse, I am not doing that for four euro. If I work nine hours a day and am away from home for twelve hours, it is not worth four euro.’ (P-10)

This exploration stage is not that clear for all interviewees. Eight participants did not have to change their common behaviour very much to gain the reward. For instance, they already were starting their day early and had to get up ten minutes earlier than before. For four participants it meant a moderate to large change. For instance, one participant who started to work at home for two days and one participant who started travelling by train.

In some cases the program is congruent with what the motorists already noticed, but it helps them to act more explicitly on these experiences. Like P02 who had already noticed that traffic became more and more disquiet causing her delay and now came to drive before the rush hour. She called the program an eye-opener. Two participants’ employers allowed working from home which matched the intention to avoid the rush hour. One participant noticed that other motorists were probably participating in Spitsmijden because congestion levels decreased. This helped her to let go of her scepticism and adjust her behaviour. So it seems that the nature of traffic congestion itself and developments in it are triggers for motorists to reflect on their behaviour, but that they need the reward to act upon it.

4.3 Choosing an alternative

After the testing period, the majority of participants came to choose one option. The most used alternatives are: driving before the rush hour (6x), using different routes (2x), working at home (1x), driving after the rush hour (1x) and alternative transportation (1x) i.e. going by train. One participant does not develop a preference. The choice for transportation can be quite complex. As the following quote shows, different elements have to be balanced:

‘My consideration to participate was that it might lead to something that could be useful in the future. To make a small contribution to making things run smoother. The environment did not cross my mind. I realised that afterwards. Money did not play a role for me. Obviously, my work hours were important: how to deal with those. But I have already done that for years myself’ (P-05)

There is one group that although developing one preferred option, likes to combine different alternatives to avoid the rush hour. Sometimes they drive before the rush hour, sometimes after and some days they work at home. There are also less conventional alternatives, like staying overnight with family or friends, using alternative routes via secondary roads, going by motor cycle or doing site visits instead of going to the office. Public transportation, i.e. the train, is not considered a feasible alternative in this group. Individuals in this group extensively use support measures to discover what is the best daily option to get to work

‘When I get up, first I look at Teletext. On page seven-hundred-something, the queues are listed and I check what is going on on my route. Have there been accidents? You more or less know the usual queues, but you check if there has been an accident, glazed frost or snow or something like that. Then you know: OK there will be a queue and travel times will go up. Then I get alarmed: I have to watch things carefully. Then when I got dressed, I go to the laptop that is always switched on in my room. The ANWB (Dutch Car Drivers Association) has a great site where they indicate with red bars

where congestion develops. You can also see if it is increasing or resolving. Based on that I determine the best time to leave home.’ (P05)

All participants except one develop a regularity. This means that they change their behaviour in a fixed way. This includes the option they choose, the days of the week that they use this option, the information sources they consult and eventually support, like the partners who get up to make coffee at 5:30 to get them going before the traffic jams. It is like a timetable as one of them says. There is one interviewee who decides the evening before or the day itself what she will do. There is neither one criterion that is decisive nor a fixed option for transportation. She has an irregular way of choosing transportation.

The choice for an alternative is influenced by different factors. In Table 1 advantages and disadvantages are shown that were mentioned respectively for driving before the morning peak, after the peak, going by train, working at home and the combination of options. Participants’ experiences of advantages and disadvantages are very much related to their work conditions and private lives. For instance, if openings hours do not permit one to enter the office if arriving at 6.30 then dismissing the option to drive before the rush-hour is related to the nature of the job. In our small sample family obligations, like chauffeuring children to school or day care, were mentioned twice but were not decisive since their partners usually took care of the children.

Use of public transportation is described to us in contrast with the car. Some need the car during work for visiting locations so they need to commute by car as well. The longer travelling times compared with the car stand out. The car, therefore, is seen as contentment and a private way of travelling while listening to music, making phone calls, and being comfortable and warm. Some cannot work in the train because they need certain information that is only available in the office. In that case travelling time is neither considered working time nor personal time since it is experienced less comfortable and private. The main point is that the train is not gratifying as the car.

In sum, alternative options for avoiding the morning rush hour are inspired by factors related to work conditions and to personal conditions. Work conditions are among others, flexibility, working hours, quality of work, necessity of information, presence at location and colleague dependability. Personal factors are among others family circumstances, personal agenda, experience of comfort, and being an early bird or a night person. Some of the advantages and disadvantages are valid for driving before as well as for driving after the rush hour, like time benefits and more relaxed driving. In those cases other factors are decisive, for example the guarantee to be at work in time or sleep in.

4.4 *Sinking in*

With the exception of three participants, all of them developed new reasons for sustaining their behavioural change. One participant drastically changed her behaviour by choosing to travel by train and was primarily motivated by the reward. When the project finished she immediately returned to drive by car except for one day. She remarked that the train was neither more comfortable, nor cheaper and faster than the car. One participant changed her behaviour by choosing a different but very similar trajectory in order to get the reward. Once the project is over she thinks that as congestion seemed to have diminished and she will probably drive during the peak hour again. One other participant did not really develop a new routine and floated between different options each day. She somewhat lost her interest in the program and the reward as well and already decreased her efforts during the program.

All others seemed to develop an intrinsic motivation. In reflecting upon those motivations it turns out that the value of the reward decreases:

- I: Was the reward important for you to get involved in the program?
 P: At first, it was the motivation to participate, yes.
 I: Is it still as important now?
 P: No.
 I: And why not?
 P: Because for me the most important thing is to be sure that I get to work on time. By participating in this program I know that that is the case. That I also get a reward is just a nice bonus' (P-02)

'Well, if you ask me what pulled you in, it's the reward. But if I have to say what the biggest gain is, it is driving without congestion. That's the most important thing to me. That's just what I hate most, those traffic jams.' (P-10)

Their motivation is centred on avoidance of congestion (5x), certainty of being at work in time (2x) and time benefits (2x). The newly developed reasons to avoid the morning rush-hour all have a personal interest component, such as relaxed driving, driving faster, time benefit, being at work in time, matching personal state, or a longer working day. Those participants have sustained their new routines now that the Spitsmijden program has ended. It is self-evident for them to continue to benefit from the advantages that they have discovered during the program.

4.5 Typology of Spitsmijden participants

When looking at the different participants in our interview sample, we can construct four different types. They are shown in Table 1.2. These types differ on several criteria. Their motivation to enter, to change and to maintain their behaviour differs. The options they choose are different and the use of travel information is dissimilar as well. Not all types will continue to avoid the rush-hour after the project. In the section below we will describe each of the four types and illustrate them with a brief case description.

Stabilisers

Six participants in our sample can be labelled as stabilisers. They are stimulated by the reward to join the program. After this initial trigger they reflect upon their transportation alternatives. Often they do not need major adjustments to their usual behaviour to earn the reward. The project matches their experiences with transportation that now have become more explicit. They select mainly one option for travelling to work and that is mostly driving before the rush-hour. Because they choose this option anyway they do not usually need to consult travel information sources. When participating they discover personal benefits of driving outside the rush-hour, like more time to spend at work or driving more relaxed. These benefits become more important than the reward and eventually they will continue to travel outside the rush-hour even when the reward cannot be earned anymore. Vignette 1 provides and example:

P-02 already had got up quite early, to make it to her shift transfer, but still met heavy traffic. She already had noticed that it became heavier when travelling and that made her feel uncomfortable. Public transportation is not an option due to longer travelling times. Since joining the project she drives only before the rush-hour. To accomplish this she had to get up somewhat earlier than she used to. Her new behaviour gives her peace of mind. First, it is still quiet on the road and she is certain of being on time at work. This is important to her because she will not miss the shift transfer. Second, she has more time available to start her work and for the shift transfer. She says she will definitely continue her newly found rhythm and benefit from these advantages. However, because she is not leaving her work earlier in the afternoon she has longer working days than before.

Vignette 1

Flexibles

Although flexibles already adjust their travel decisions to the daily circumstances quite often, the reward encourages them to reflect even more on their travel decisions. Three participants can be depicted as flexibles. To be frank, they find it quite insensible to habitually step into the car and drive in the rush-hour right away. They come to use different options and on a daily basis pick the option that seems most beneficial. They weigh factors relating to traffic, work and to a lesser extent personal circumstances. In making the right choice they use several sources of travel information available to them, such as internet, radio and teletext at home, as well as during their trip. They all experience quite an amount of flexibility in their jobs. In the exploration stage they discover a personal gain in participating in the program which becomes more important than the financial reward. Apart from this they have a general interest in transportation and are committed to the program in a sense that they like to think about plausible solutions. They will later sustain their behaviour when the program has come to an end. This is demonstrated in vignette 2:

P-06 prefers to drive before the morning rush-hour, but he has a lot of alternatives available such as driving after the rush-hour, by working at home and later working at an offsite location, or by working at home all day or by using a different route. During the years he has tried all alternatives, like alternative routes and even going by motor cycle, but he concluded that it does not really work. His agenda allows him a lot of flexibility. Automatically, he consults many sources of travel information in the morning to see what is the best option. Although, he regards the reward as satisfying, the time gain gradually got much more important. In addition he says he only had a moderate change to his regular behaviour, needing to get up earlier on most days, but he got used to it and suggests he will maintain his (new) behaviour.

Vignette 2

Relapsers

Two participants are labelled relapsers since they decrease their efforts to avoid the rush-hour already during the project or immediately afterwards. Relapsers are motivated to enrol in the program because of the financial reward. They are tempted to change their behaviour quite drastically or they can earn it by only slightly changing their behaviour. They

mostly pick one option and stick to this to earn the reward. Already during the project or after the project their interest wanes and they return to their former routines. Some of them will continue a smaller adjustment, for instance for only one day, or they start with a new exploration phase, for instance when they believe road construction has improved the traffic flow. They do not discover a personal gain in a change of their travelling behaviour (and see vignette 3).

P07 had always driven during the peak. As soon as the project began she started travelling by train in order to get the reward. A disadvantage of this was being somewhat too early or too late at work. As soon as the project ended she started taking the car again except for one day per week. She used this period to conclude that travelling by car is more comfortable and not really more expensive than taking the train. She hardly uses any travel information, neither when travelling by train nor when driving by car. She does not like working at home and it is not really possible in her case thinking that it could well create a precedent for other colleagues (that would not be allowed).

Vignette 3

Floaters

There is one participant in our sample we called a floater. A floater is inspired to enter the program by the reward and the novelty of it all. Earning the reward is experienced as a challenge and the floater is initially quite fanatic. But during the program interest diminishes as the floater does not appreciate any regularity. A floater neither has a preferred alternative for transportation nor for a schedule. Work is not a top priority; other aspects are equally important. The daily decision is guided by different factors concerning one's personal agenda, mood, work duties and to a lesser extent traffic. Sometimes one information source is used. Although the reward is liked, it is not really needed. When the program is finished the decision takes place on a daily basis as usual. An example is demonstrated in vignette 4.

P-01 entered the program because of the reward and was quite enthusiastic in checking her watch trying to gain the reward. She discovered that avoiding the peak-hour was a time gain, but quite soon she found out that she could avoid the peak but not within the strict two-hour timeslot of the project. She lost her interest in the program. As she remarks she did not abandon the project. The agenda can be adjusted to her travelling wishes and the other way around. Work is paramount especially when it is busy. On a daily basis she decides if and at what time she will leave home taking the working and the private agenda into account. It happens regularly that the evening before she decides to leave early, but then sleeps in and travels late. Then she makes long working days to make up for lost hours.

Vignette 4

5. Discussion

In this paper we have investigated the outcomes of a qualitative study of motivations and behaviour of participants in a reward-based programme, aimed to reduce peak-hour car travel. The results invoke discussion on both a substantive and a methodological level. We

also relate here to the inherent connections between previous findings based on quantitative approaches and the new results obtained through qualitative methods.

From a substantive point of view, the results provide interesting insights into individuals' process of behavioural change in response to a changed context. Literature in the area of behavioural change has put forward various theories of the mechanisms of behavioural change. *Theory of Planned Behaviour* (TPB) (Ajzen, 1991) asserts that behaviour is affected by behavioural beliefs held about choice options, leading to attitudes toward the choice options. Eventually, the option is chosen that is believed to result in the most favourable behavioural consequences. In a more longitudinal sense, this suggests that behaviour leading to a positive outcome is more likely to be sustained, since the beliefs about the outcome will become positive (reinforcement learning: Berridge, 2001). In addition, TPB states that conformation to social norm plays a role in the decision whether or not to change one's behaviour i.e. perceived approval of the behaviour by peers may play a significant role. Finally, TPB highlights the importance of perceived behavioural control for achieving behavioural change. Having control over factors that might hinder or facilitate the behavioural change, will positively contribute to behavioural change. TPB differs from *Norm Activation Theory* (Schwartz, 1977; Schwartz and Howard, 1981), which puts more emphasis on intrinsic norms and moral convictions about how to behave, mainly in the context of prosocial, altruistic behaviour. This implies that awareness of the consequences of not displaying prosocial behaviour is a necessary condition for achieving behavioural change. *Theory of Interpersonal Behaviour* (TIB) (Triandis, 1977, 1980) extends TPB by stressing the role of habit in behaviour. The more habitual the behaviour, the less conscious decisions are made and the less likely one is to change behaviour in response to a change in context. Finally, TIB stresses the affective (i.e. emotional) component in behavioural change. That is to say, apart from the cognitive evaluation of expected outcomes suggested by TPB, an affective component, related to the attitude toward the behaviour is assumed. It is noteworthy that the above theories have usually been thought of and tested in terms of before/after introduction of some policy, rather than as an ongoing process.

An interesting outcome of our qualitative approach is that it provides insight into the process of behaviour-change rather than just measuring the occurrence of behavioural change. In this respect, we observe that for most respondents, various mechanisms suggested by the aforementioned theories are at play during participation in the programme, but usually not simultaneously. Also, there exists considerable heterogeneity in how the process of behavioural change takes place and what motivates it in various stages. Yet, certain types of participants can well be distinguished. This is something we were unable to uncover in previous quantitative studies of Spitsmijden. Noteworthy is that for the most frequent types (Stabilisers and Flexibles) their motivation for avoiding the peak-hour underwent a change. Whereas initially the reward is the extrinsic motivation (according to TPB based on the belief that receiving the reward will be positively experienced), intrinsic motivation takes over once the participants experience positive outcomes of their behavioural change. In line with TPB, this changes their beliefs about behaviours such as early departure, leading to sustained (internalized) behavioural change. Also in line with TPB, if the reward is the only reason (motivation) for avoiding the peak and no positive effects of the change are experienced, beliefs about it will not change, intrinsic motivation will not develop, and behaviour is not sustained after the rewarding ends as was the case for the Relapsers and Floater.

The above suggests that it may be possible to achieve behavioural change without investment in infrastructure or services by making travellers more aware of the outcomes of their travel options, provided that attractive alternatives exist. In a different context, this might confirm outcomes of soft policies, which aim at changing individuals' behaviour by

providing information about outcomes of choices. Arguably, however, experimenting with behaviour may work better to change beliefs about the outcomes of choice options. Thus, a vital function of the reward appears to be to trigger experimentation, leading to belief updating, change of attitude toward travel options and eventually behavioural change. This further explains previous findings from Spitsmijden 1 suggesting that (in retrospect) self-experimentation supported the change of behaviour (Ben-Elia and Ettema, 2010).

Another outcome of the interviews is that the majority reports to have made only minor behavioural changes to earn the reward. This confirms outcomes of earlier quantitative studies of Spitsmijden, in which it was found that in the context of departure time choice, participants were more likely to choose departure times rather similar to their original ones. One way of interpreting this is in terms of effort perception.. The interviews then suggest that there is also a likely relationship between belief modification and the effort required for the behavioural change. If the new behaviour requires only a minor modification of the current behaviour (e.g. departing 10 minutes earlier for various participants) one is more likely to explore this option and change ones beliefs which will support a behavioural change. Also, the trade-off between changing one's schedule and having a shorter commute time is more likely to be perceived as positive, leading to a behavioural change. In support of this notion the majority of participants did report mostly minor behavioural changes. Furthermore, in line with TIB, the results indicate that habit plays a role in travel decision making. Some participants indicate that they had become increasingly aware of increasing congestion and longer travel times, but apparently habit prohibited them from acting upon it. For those, the reward served as a trigger to reconsider their options at a more active level. This led them to modify their beliefs about the outcomes of travel options, change their attitude toward the options and eventually change their behaviour. Once behaviour changes, a new habit kicks in, for some, who establish a new behavioural pattern that is consequently sustained and internalized.

Regarding support measures applied by participants, most prominently mentioned is the use of travel information to find the optimal choice for the day, depending on the daily traffic conditions. It is noted, though, that using these support measures is related to a specific desire (by Flexibles) for the optimal outcome. Different from the participants who establish a new habit (Stabilisers), the Flexibles seek to optimize in terms of travel time, arrival time etc. per day. Stated in TPB terms, the support measures help the Flexibles to have better control (i.e. certainty) over the outcome of their choices and select the optimal one. This outcome is in line with earlier Spitsmijden studies (Ben-Elia and Ettema, 2010), who found that participants with a higher frequency of using and higher availability of traffic information display more variation and thus display more flexible behaviour

The interviews did not reveal clear instances of social norms affecting behaviour. Participants state explicitly that behaviour of colleagues or friends did not affect their decision to participate. However, personal norm (as in NAT) seems to play a role for some. In particular they mention reasons such as contributing to research into peak traffic, helping to reduce congestion etc. Similar considerations for participation were mentioned in earlier Spitsmijden studies (Ben-Elia and Ettema, 2009). Thus, the outcomes suggest that various elements that are reported to influence behaviour(al change) according to the above theories, play a role in behavioural change in response to rewards. However, for most participants behavioural change is affected by multiple mechanisms that have an effect subsequently.

Taking this all together, leads to the following figurative model of behavioural change (see Figure 1). For all interviewed participants, the reward serves to involve them in the program and make them reflect on their current behaviour and travel options. In effect this

comes down to breaking their habit. After an exploration phase, participants identify one or multiple preferred options. If these options have intrinsic advantages (apart from earning the reward), beliefs and attitudes about the alternatives and behaviour are updated, as suggested by TPB and reinforcement learning theories. Depending on decision making styles, some will determine a single preferred travel option which is repeatedly chosen and thus develop a new habit. Others will aim to optimize their travel each day, depending on the specific situation. They will use traffic information as a supportive measure, thereby increasing their degree control over the outcome of their choice. If the new choice option is inferior to the behaviour before reward (i.e., the reward is the only motivation for behavioural change), beliefs and attitudes are not updated in a positive sense, and the new behaviour is not reinforced. For some, personal norms regarding desirability to contribute to research and insight into reduction of congestion may serve as an additional factor contributing to behavioural change. A note that needs to be made is that this behavioural model is based on a selective sample of respondents. As indicated before, there is a likely correlation between responsiveness to the reward, suggesting that the above model describes the behaviour of the more responsive participants in the program.

On a methodological level, this study constitutes an interesting opportunity to learn about the added value of qualitative research when investigating processes of behavioural change (in travel). Whereas with the quantitative analysis, beforehand, we obtained substantial indications and associations related to the change of behaviour (i.e. the what's and the who's), the exact process of behavioural change was only further elucidated following the analysis of the interviews.. Furthermore, the interviews have allowed us to distinguish various phases (such as enrolment, exploration, sinking in) and motivations during these phases (monetary reward, impact on daily schedules, etc), something that was not well understood earlier. An additional advantage is that when focusing on the process, it is possible to identify typical patterns of behaviour in responding to the reward allowing for a more complete description of behaviour as well as acknowledging the apparent heterogeneity in typical response patterns. .

A typical merit of qualitative approaches is that they allow for exploring a topic (i.e. finding relevant factors, motivations etc.). For instance, in a study on gender differences in chauffeuring children, Schwanen (2007) used interviews to identify influential factors (such as culture dependent identities and roles) that influence chauffeuring behaviour, which are not easily found using quantitative methods. This was less the case in the current study. Factors that were stated to influence peak avoidance behaviour and choice of travel alternatives (see Table 1) have been typically reported in many studies of mode choice, departure time choice and activity based modelling. This is due to the fact that the behaviour under research is of a rather practical and structured nature, suggesting that factors that have been found to influence mode and departure time choice in numerous transportation studies also apply in this case.

Nonetheless much of the quantitative-based research already carried out into Spitsmijden has been cardinal in developing a set of focused research questions, touching upon well-defined issues. In fact, the qualitative study has been used to shed more light on issues raised by the quantitative analyses. While in many cases (as noted above) congruity with previous findings is found, providing evidence to the robustness of those results, new insights into aspects such as the dynamics in the adaptation process and the role of motivating factors prove the added value of the qualitative approach . As such this study can be regarded as an exemplary application involving a 'mixed methods' approach, which proved to be very beneficial in this case.

A final note concerns the sampling procedure, which was based on longitudinal quantitative data. Although we were not successful in achieving the best coverage for all the categories stemming from the quantitative data, we feel that sampling based on quantitative data is an advisable approach (if possible) since it allows to link qualitative to quantitative outcomes. In our case it suggests that the behavioural patterns we identified are found for responsive and rather motivated participants, and that the behavioural patterns of other participants might be different and require additional research (e.g. reasons behind dropping-out). This might have gone unnoticed if we would have applied a simplified random sampling amongst all participants.

6. Conclusions

In this study we have applied qualitative research techniques (semi-structured interviews) to investigate participants' motivations to enrol in Spitsmijden and participants' dynamics in behaviour, awareness, motivation and use of support measures throughout the project.

From a substantive point of view, we find (most) participants' motivations and behaviour to change during the ongoing process of recruitment, enrolment and participation. For most, the reward serves to attract them to the program, reflect on their behaviour and explore alternative behavioural options, thus breaking their former habitual behaviour. Subsequently, most find options that provide some intrinsic added value, leading to the extrinsic reward becoming a less important motivation for behavioural change. At the same time, there is considerable heterogeneity between participants. Some settle for a new habit based on their experiences, whereas others aim to optimize their daily choices, using traffic information as a support tool. Also, some mention altruistic, pro-social motivations, where others indicate that the reward is their main motivation, due to the lack of attractive alternatives. Taken together, the various adaptation processes include elements from existing theories of behavioural change, but in a more complex, subsequent way. We believe that this is an important contribution to the travel decision making literature.

With respect to policy implications, we note that the effect of the reward turns out to be different than expected to most (note however that the conclusions are based on a biased sample). Instead of being the main motivator of behaviour throughout the project, it serves to trigger reflection and finding better choice options. This warrants the question how rewards are best applied. If the main effect is to trigger reflecting, they could be applied for a shorter period and on more locations, to render more effect. In this way cost effectiveness would be increased, and by aiming for intrinsically supported behaviour changes, the effect will be more durable. Note that applied in this way, rewards play a similar role as providing information in so called soft policies (e.g., Richter et al., 2010): breaking people's habit and leading them to make conscious travel decisions.

From a methodological point of view we conclude that the use of qualitative techniques is very helpful in obtaining more complete and richer descriptions of behavioural processes than would not be possible using solely quantitative techniques. The added value here is not so much in identifying new influential factors (this has already been found out), rather on developing process descriptions of how individuals change their behaviours and motivations and investigating heterogeneity amongst participants responses. Note that this application logically follows up on quantitative studies that were carried out previously, and lead to a set of focused research questions. Hence, the emphasis has been on more elaborate understanding of susceptible effects, rather than on "pure" exploration.

Notwithstanding the valuable outcomes, further research is required to clear up some unresolved issues. First, a remaining issue is how the rewards affect motivations and awareness of participants who do not strongly respond to the reward but still decided to enrol in a programme such as Spitsmijden. This would require additional interviews with this group which has been missing in this study. Second, it would be interesting to use the classifications obtained from the interviews as a base for further quantitative analyses, e.g. by carrying out cluster analyses on day-by-day peak avoidance data that is available and relating these clusters to socio-demographic data. The possibility to use structural equations modelling for better understanding of the behavioural processes involved is also worth considering.

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Table 1: Advantages and disadvantages of different peak-hour travel alternatives

<i>Advantages</i>	<i>Disadvantages</i>	<i>Influential factors</i>
Before rush hour		
On time at work		Dependent colleagues
Long working days		More working time
	Long working days	Working too much
More time for transfer		transfer shift
	Shortage sleep	Tiredness at work Difficulty to maintain option
	Too early at work/appointment	Opening hours office
Quiet driving		Relaxed arrival
After rush hour		
Take children to school/day care		family obligations
Driving calmly		Fitness at work
Less travelling time		More working time
Personal rhythm		Being a night person Having young children
	Too late at work/appointment	Inflexibility work
	Starting late	Working late to make hours
Public transportation (train)		
	Not being able to work during trip	Less working time
	Long travelling time	Long days from home
	Less relaxed and private	Less personal time
	Unreliable	Missing appointments
	Not gratifying	Need car during work
Working at home		
No travel at all		Ability to do work at home
	Not at location	Presence needed at work
Combinations of options		
Matches current personal state		Flexibility
Matches current traffic situation		Traffic information available

Table 2: Four types of Spitsmijden participants

	Stabilisers	Flexibles	Relapsers	Floaters
Motivation sustainment	personal gain	personal gain	reward	novelty
Importance of reward	initial	initial	continuous	initial
Options for travelling	one	various	one	various
Information sources used	none or one	many	none or one	none or one
Long term behaviour	continuation	continuation	decrease or stop	floating

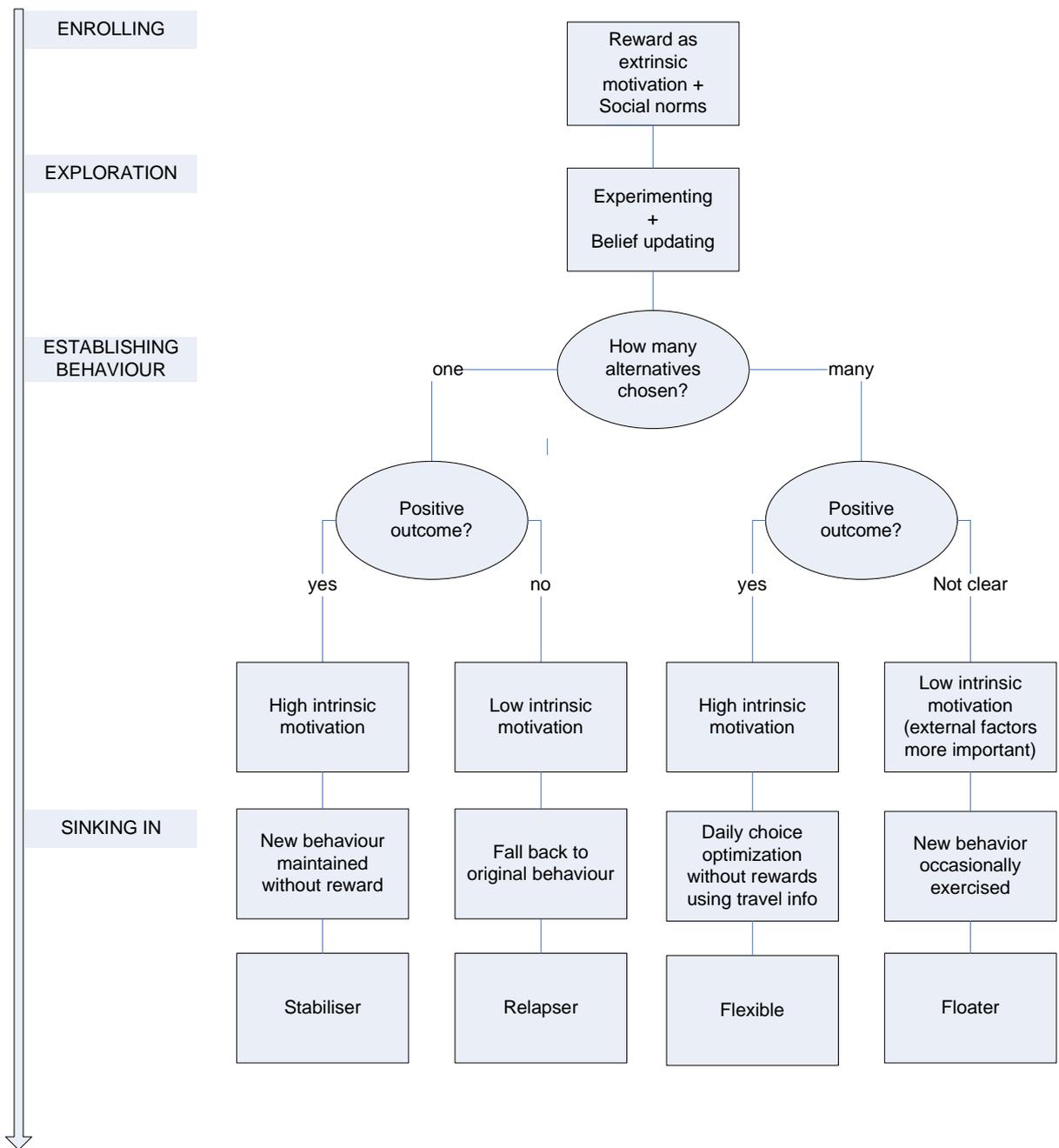


Figure 1: Behavioural adaptation processes

APPENDIX A – SAMPLING

Parallel coordinates links each data point over all the relevant dimensions, creating a mesh of the multivariate data. For example in 2 dimensions (x_1, x_2), each data point will have 2 parallel coordinates; one on each column. The key idea is that a point in multidimensional space becomes a line of interconnected points in sets of columns in parallel space. For further understanding of the concept we recommend reading Alfred Inselberg's book (Inselberg, 2009). In Figure 1 we present a demonstration of the parallel coordinates method using the Parallax software. It shows an interval's selection of the proportion of peak-hour avoidances on the 4th month (pa4). The interval selects (in blue) all participants (id) who have a 50% after the peak avoidance rate ($N=292$). It is clear that this subgroup is hardly avoiding the rush-hour by driving before the peak (to the left of the selected group). Only after the peak (pa's) and within the peak (pp's) are linked geometrically to the selected interval.

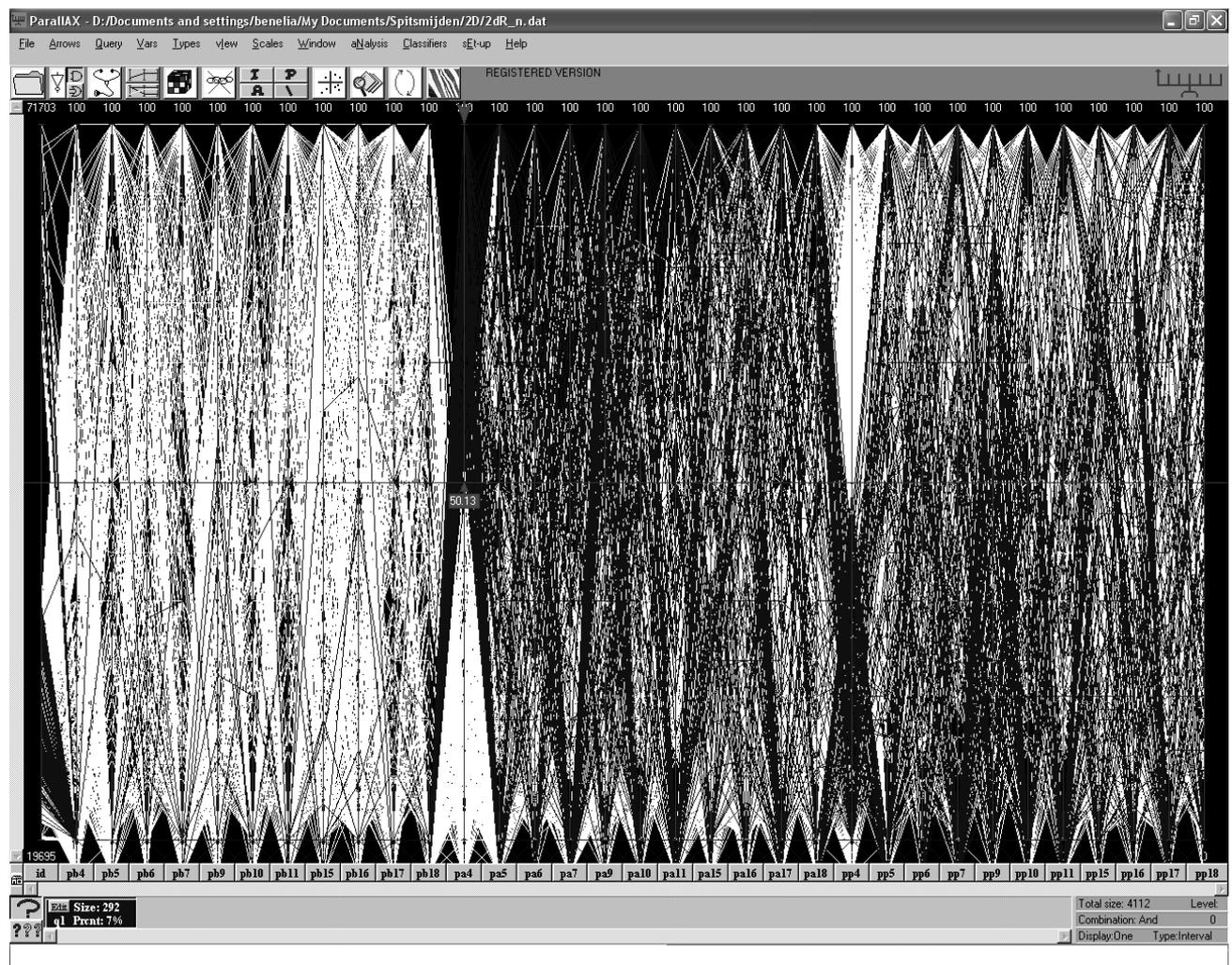


Figure 2: Interval selection in Parallax of peak-hour avoiders (4th month) driving after the peak

APPENDIX B - TOPIC LIST

INTRODUCTION

The nature of the interview is to gather information on your experiences in the course of Spitsmijden. The information you will provide will allow us to better understand the behaviour of travellers participating in the program and for improving it in the next phases of implementation.

RECRUITMENT PHASE

Could you tell me how you became involved in the Spitsmijden research project?

- How did you know about it? Form where / who did you receive the information?
- Are there other members of the family who participated / who did not participate? Was this influential in the decision?
- Nature of decision: individual or family? Easy or difficult?
- What was decisive in deciding to participate?
- Did you involve your workplace in your decision? How did they react? Were they supportive? In what ways?

EXPERIENCES IN THE COURSE OF THE PROGRAM

What are your experiences until now?

- How does it work out for you? Difficulties?
- Could you tell me about the days in an ordinary week?
- Nature of decisions: schedule the week or daily basis? Individual or family? Other?
- How long are you participating? Do you like it? Has this changed in any respect?
- Any other experiences that you think of as relevant?
- If you stopped participating - Why?

MOTIVATIONS AND STIMULI

For you, what mainly influences to drive or avoid the morning peak?

- Stimuli to avoid (complete!)
- Constraints to avoid (complete!)
- Have any changes taken place since you joined the program? What kind of changes?
- Do you use any support measures to guide your decision? What kind of measures? (Explanation).
- Do you use traffic information in your travel decisions? Has this changed as a consequence of participating in the program? In what ways?
- Has the project influenced your awareness of travelling decisions? In what way? How did this come about?
- Were there any decisive events in the period that you are participating? What kind of moments/events?

EFFECT OF THE REWARD

In the program you are rewarded for avoiding the morning peak. Is that important for you?

- Have you used the reward? In what way?
- Was the reward important for your decision to participate? Is it equally important now or has its worth diminished? How come?

- What about other factors (complete?) Are they more important now or less important?
- What will you do if the project ends and the reward stops? Awareness? Behaviour? Other?
- How did you go about gaining with the reward? Did you have a favourite option (before/after the peak / public transport / work at home)? Did you have other options? When were they chosen? Was this different before you started? Has this changed in the course of the program? How?

EVALUATION

If you were to evaluate the Spitsmijden project, how would you do that?

- In your opinion, what is important for people in terms of travel decisions?
- What did you like about the program? What would you definitely change?
- If you were to decide now on participation, what would you choose? Why?

APPENDIX C – MAXQDA CODE SYSTEM

Code System*

- Project
 - Long term
 - General information
- Motivation
 - Road construction
 - Environment
 - Challenge
 - Avoid congestion
 - Scientific research
 - Decrease travelling time
 - Decision
 - complexity
 - decisive
 - Reward
 - optional
- Stimuli / constraints
 - Carpoolpartner
 - Family obligations
 - Private agenda
 - Congestion
 - Quality work
 - Sleep
 - Flexibility
 - Teleworking
 - Opening / closing hours work
- Support measure information
- Behavioural model
 - Fit
 - Exploration
 - Awareness
 - Habits
- Alternatives
 - Alternative routes
 - Teleworking
 - Before rush hour
 - disadvantages
 - advantages
 - After rush hour
 - advantages
 - disadvantages
 - Alternative transportation
 - Not able to work
 - Comfortable car
 - Unreliable
 - Longer travelling time
 - Car needed work

* Translated from Dutch.