The Household Decision Making Process in Replacement of Durable Goods

THE MILLIONS ....
Sensational New Features

A study at the Department of Business Administration and at the Transportation Research Unit

By
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Umeå University
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The Household Decision Making Process in Replacement of Durable Goods

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Civilekonom

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THE HOUSEHOLD DECISION MAKING PROCESS IN REPLACEMENT OF DURABLE GOODS

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ABSTRACT: As durables are essential in many households, the level of ownership is high and, due to the high degree of penetration, a vast proportion of the current sales are replacement purchases. Even though a lot of research attention has been paid to decision making and decision processes many models are oriented towards non-durable goods and although a majority of purchases of many durable goods are replacements, few studies seem to make a distinction between a replacement purchase decision and a decision to buy an item for the first time.

The purpose of this thesis has been to increase the understanding of the consumer decision process in replacement purchase. More specifically, the research focus has been on the cognitive mechanisms behind the formation of a replacement decision and on factors affecting the timing of a replacement purchase of durable goods. Choosing to study the timing of replacement decisions reflects the emphasis on the ongoing process, not merely on what is happening at a certain moment. Many studies in the consumer behaviour research are cross-sectional and by using cross-sectional data, there is a risk of identifying cohort effects rather than identifying effects stemming from the individual process over time. This thesis' focus on the process is reflected in and emphasised by the choice of method, both a cross-sectional and a longitudinal study have been undertaken.

In order to address the research question, a theoretical framework and model were developed. The model is based on the traditional idea that many actual purchase decisions are realised through the approach of problem solving, entailing problem identification, information search, evaluation of alternatives, choice, and action. The underlying assumption of the model is that purchase expectations are related to a comparison between an aspiration level, defined in accordance with Simon's (1956) satisficing principle, and an evaluation of the currently owned product (current level). Purchase expectations are believed to be the result of a cognitive process encompassing the comparison between aspiration level and current level. When the discrepancy between aspiration level and current level goes beyond a noticeable difference, a purchase expectation is assumed to be formed and the purchase process initiated.

The results from this study reveal that the cognitive mechanism behind a replacement decision can be explained in accordance with the proposed model: Consumers compare the currently owned product with requirements of product for the same usage and if the current product falls below the requirements, replacement plans are formed. The timing of the replacement is therefore argued to depend both on factors effecting the requirements of a product for the same usage (the aspiration level), and on factors affecting the perception of the current product (the current level).

Moreover, the study indicates that problem identification initiated through a change either in aspiration level or in current level might evoke different decision strategies and consequently, the problem identification stage might be more important for marketing strategies than previously assumed. The results also highlight the importance of considering the consumers present stage in the decision process for achieving an efficient segmentation for market communication as product attributes important early in the process might not be important later in the process.

Keywords: Household decision making process, replacements, durable goods.

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This thesis is the result of several years work on a project with the purpose of studying the decision making process within households in replacements of durable goods. Although a PhD-thesis should be the work of one person, it is to a large extent the result of a fruitful interaction with people in one’s surroundings. There are a number of people who have helped me through the work. It is with pleasure that I take the opportunity to acknowledge some people that in different ways contributed during the creation of this thesis.

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Umeå September 1998

Agneta Marell Molander
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From a marketing perspective, understanding the consumer is essential for good business. If we do not understand the consumer, how can we be sure of his/her needs. If we do not know his/her needs, how can we satisfy...

1 THE CONSUMER IN FOCUS

The everyday activity of the consumer has consequences for both individuals and organisations. By understanding the consumer’s act of buying, the process of having, and the consumer’s interaction or state of being, vital knowledge of factors and situations influencing the consumer’s everyday life is generated. Yet, in many cases understanding the consumer is overlooked, such as in the case of forecasting demand where the emphasis has often been on understanding effects on the economy rather than on understanding the consumer (cf. Bayus, 1991, 1992; Pickering 1981). The general aim of this thesis is to increase the understanding of the decision process in a durable good replacement situation\(^1\), and a natural theoretical basis for this research is theories of consumer behaviour\(^2\) (cf. Solomon 1996).

\(^1\) A detailed description of the purpose is found in section 2.2.3
\(^2\) Consumer behaviour is a young field and is constantly being cross-fertilised by perspectives from many different disciplines (Solomon, 1996). According to Solomon, consumer behaviour is “the study of the processes involved when individuals or groups select, purchase, use, or dispose of products, services, ideas, or experience to satisfy needs and desires” (Solomon, 1996, p.7).
1.1 CONSUMER DURABLES

1.1.1 Replacing Durable Goods

Durable goods
Consumer durables, such as refrigerators, dishwashers, dryers, TVs, cars and microwave ovens, have become important items in many households during the last 30 years and as a result the numbers of consumers engaging in replacement decisions are increasing. Even though a lot of research attention has been paid to decision making and decision processes many models (e.g. Howard and Sheth, 1969; Bettman, 1979) are oriented towards non-durable goods (for summary of different consumer choice models see, for instance, Friedman, 1988). However, research by Pickering (1978, 1981) and Winer (1985) demonstrate the uniqueness of a durable purchase situation (see also Antonides, 1988; Antonides, 1990; Grewal and Marmorstein, 1994). The difference between a purchase situation involving durable goods rather than non-durables can be described in terms of product lifetime, availability of credit, the perceived risk, amount of information available and prior experience (Pickering 1978; 1981; Winer, 1985). These differences are likely to evoke different decision process regarding, for example, the amount of information search prior to purchasing, the attributes evaluated, and the length of the decision process.

Although relatively few studies of decision making have focused on durables, the planning of the sequence of acquiring different types of durables has been investigated (Bayus and Rao, 1989; Dickson et al., 1983; Kasulis et al., 1979; Hauser and Urban, 1986). The main stream of research in this area is the acquisition order of durables rather than the decision process in a purchase situation. Other related research has examined the disposition process of replaced durable goods (e.g. old products thrown away, given away, traded in, loaned, stored, converted to other use), (Jacoby et al., 1977; DeBell and Dardis, 1979). These studies have focused on the time after a replacement decision has been made. In a few econometric models (i.e. Gilbert, 1992; Golob, 1990; Train, 1986), the household’s replacement decision and choice of product are predicted.

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3 One common way to classify consumer products is into durables and non-durables. The classification is based on the product's lifespan (Stroeker, 1995).
A primary focus of such models, as well as the bulk of the empirical research, has been on the choice between different brands and on the household’s choice of number of automobiles (Mannering and Train, 1985).

Moreover, some research has focused on forecasting durable demand. Most of such studies are designed to model sales of new durable products (Hauser et al., 1983; Sultan and Winer, 1993) and many are related to the diffusions of innovations (cf. Rogers, 1983), such as the Bass model (Bass, 1969).

Forecasting durable demand has been shown to be problematic and difficult (Pickering, 1978, 1981; Winer 1985; Sultan and Winer, 1993). As noted by Bayus (1991), Bayus and Gupta (1992), and Bayus, et al., (1989), future durable demand is particularly hard to predict, and Bayus et al., (1989) argue that consumer spending on durables tends to vary and fluctuate more than spending in other categories. The lack of studies focusing on understanding the consumer decision process in the case of durable purchases, e.g. studies including more psychological variables to explain the occurrence of a replacement decision, might be one reason for noted difficulties in forecasting. Part of the forecasting complexity might stem from the fact that three types of buyers of durable goods (partly defined by experience with the product) can be identified; the first time-buyer, the replacement buyer, and the additional-unit buyer.

**Replacement decisions**

As durables are essential in many households, the level of ownership is high and, due to the high degree of penetration, a vast proportion of the current sales are replacement purchases\(^4\). Replacement rates are also high for products where penetration rates are less high, such as for VCRs and CD players (Bayus, 1988; Stroeker, 1995). Not surprisingly, Stroeker (1995) found that for products in the mature stage of the product life cycle\(^5\) (PLC), for instance refrigerators, washing machines, cars and colour television sets, the percentage of individuals buying the products as replacements is considerably higher than the percentage of individuals

\(^4\) During 1985, for example, 88 percent of registered refrigerator sales comprised replacements and 78 percent of the washers (Bayus, 1988).

\(^5\) The ‘product life cycle’ concept is based on the assumption that a product’s sales potential and profitability will change over time. The product life cycle is an attempt to separate different stages over the product’s life time. It is believed that distinct opportunities and problems correspond to the different stages in the life cycle. The stages include; the introduction stage, the growth stage, the maturity stage, and the decline stage. For more detailed information see, for example, Kotler (1984).
buying the products for the first time. Although a majority of purchases of many durable goods are replacements, few studies seem to make a distinction between a replacement purchase decision and a decision to buy an item for the first time\(^6\) (Bayus, 1991; Bayus and Gupta 1992; Stroeker, 1995).

The differences in types of buyers can be construed as constituting different decision processes - a first time buyer’s decision process might not be the same as a replacement buyer’s. A first time buyer might have less experience and prior knowledge\(^7\) than a replacement buyer and prior knowledge and experience has been shown to affect the decision processes (Bettman and Park, 1980; Huber and Klein, 1991\(^8\)). In addition, the replacement buyer has an actual product which has to be assessed in the replacement decision process. Therefore, one important distinction between models of the replacement decision and models of the decision to purchase a product for the first time is that, in replacement purchase decisions, the model must acknowledge that an assessment of the currently owned product in some way enters into the process of the purchase decision.

**Timing**

As previously mentioned, forecasting the demand for durable goods is difficult which in turn implies that the timing of a replacement decision is hard to predict\(^9\). One reason for these problems might be found in the increase of replacement buyers in combination with the durable product’s characteristics.

Durable goods often have a second hand market, and durable goods are seldom paid for out of present income but rather financed out of savings or on credit. This implies that the ‘consumption’ of a durable takes place over quite long time, that it is a long-term process of ‘wear and tear’ that can be extended through maintenance and repair. As many purchases are replacements the time of a replacement decision may be postponed

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\(^6\) It should be noted that such a distinction is made by for instance Howard (1989), but his models are primarily developed from frequently purchased goods and based on familiarity with product category.

\(^7\) It is acknowledged that experience might not only be gained from possessing a product but also from other sources such as (expert) magazines and advertising (e.g. Hoch and Ha, 1986).

\(^8\) Huber and Klein (1991) show that as the level of reliable information about product attributes increases, more sever non-compensatory cut-offs are used.

\(^9\) Some previous studies on inter-temporal trade-offs of the durable purchase has been motivated by reaching a better understanding of the timing, but many analyses are at an aggregate level rather than at a consumer level, or based on the economic assumption of maximising marginal utility (Winer and Sultan, 1993).
depending on the performance of the currently owned product and the owner's change and fluctuation in desire (cf. Dickson and Wilkie, 1978). This view allows a great degree of 'discretion' as regards the timing of actual durable purchase decision (Pickering, 1978; Katona, 1975; Bayus, et al., 1989).

A replacement decision is often a hard task for the consumer, as the consumer is unable to really know whether a specific point in time is the best. Every decision to keep or replace a durable is accompanied by a relatively large and potential risk that the decision will result in regret.

In brief, the focus of this thesis is to increase the understanding of the consumer's or household's process of buying durables. More specifically, it emphasises the cognitive aspects of decision making and asks how a replacement intention is formed, and focus on factors affecting the timing of a durable replacement purchase.

1.1.2 Practical relevance of the chosen problem

A deeper understanding of the household's decision process in the case of replacements of durable goods is essential for the government, vital for the industry and perhaps thrilling out of pure self-interest for the consumer himself/herself. Despite the fact that many can benefit from a deeper understanding of the decision process, little research has investigated the replacement decisions of durable goods. Moreover, relatively few studies have focused consistently on the decision process, such that longitudinal studies have been performed and the timing of a replacement decision has been possible to address explicitly.

Practical relevance for society
An understanding of why consumers replace automobiles, refrigerators, or VCRs is vital in many government areas. It can, for example, be used to promote and create demand for new technology, affect the acquisition of products, affect the use of products, and the disposal of products.

One important reason for society and the government to emphasise the decision process in replacements of durable goods is the concern with the environment. It is widely argued that consumer activities directly or indirectly contribute to today's environmental problems; for example, climate change is caused by energy consumption, while acid pollution,
diffusion of chemicals, dehydration and noise disturbance can be traced
to consumption and waste disposal problems (Ölander and Thorgesen,
1995). Paraphrased, this means that everyday activities, for example the
use of automobiles, contribute to air pollution and energy use, and that
the process of buying an automobile indirectly contributes to the use of
resources and pollution through the production process. The same
reasoning can be applied to refrigerators, where for example the improper
disposal of a replaced refrigerator, has an impact on the diffusion of
chemicals. The environmental problem is acknowledged by governments
in many countries to such extent that an entire chapter in Agenda 21
deals with the need to change consumer’s consumption patterns in order
to achieve a more sustainable consumption.

Even if it sometimes is argued that governments can rely on laws and
regulations in order to achieve a desired behaviour pattern among its
citizens, and that the understanding of individual’s motives and
behaviour can be overlooked, it is here argued that an understanding of
the consumer is crucial for a successful implementation of laws and
regulations (e.g. Ölander and Thörgesen, 1995). If measures such as laws
and regulations are taken with the purpose of changing consumption
patterns but are not based on a thorough understanding of consumer
motives, the effects might be far from those desired. For instance, if the
road authority aims to reduce traffic accidents, one common measure is
to build better roads, another measure is to lower speed limits. Yet, even
if speed limits are set lower to reduce the risk of accidents, the effect of
such a measure is dependent on decisions made by the driver and is
therefore affected by the driver’s acceptance and motivation. He/she can
still drive at a speed higher than that set by the regulation.

**Practical relevance for the manufacturer**

From a manufacturer’s perspective, money spent on replacement
purchases represents millions of dollars and the proportion of sales
generated from replacements is increasing for many products. As
manufacturers and distributors have to make investment decisions based
on their expectations of future sales, knowledge of factors affecting the
timing of a consumer’s decision to replace the currently owned durable is
of vital importance for the manufacturer’s long term survival as the
knowledge will reduce some of the uncertainty regarding consumers’
future reactions. According to Goodwin and Mogridge (1981), a deeper
understanding of the consumer will also result in an increased possibility
to judge with more confidence which forecasting models are appropriate in different circumstances.

Moreover, knowledge of factors affecting the timing of durable replacements is needed for an effective market communication and effective market segmentation. Such knowledge might provide the industry and manufacturers with tools to increase the demand for the generic product and for specific brands, and provide ideas for advertising and product development. The understanding of the timing of durable replacement behaviour can also be critical in forecasting variations in sales, effects of competitors’ movements and degrees of threat from alternative products.

**Practical relevance for the consumer**

For better or for worse, all of us, in the role of consumers, are influenced by marketing actions. For the individual consumer, knowledge of the mechanisms that make him/her act or react in certain ways are interesting, important, and valuable, in that it may give many people the chance to discover new ways to satisfy needs and a chance to be aware of and to avoid ‘sales tricks’. Knowledge of the process of buying can also be critical for social workers in their attempts to help people with problems originating from buying behaviour.

In summary, it is argued that to be successful, actions by for example politicians, by manufacturers or by consumer policy agents, have to be taken in accordance with the consumers’ motives, in relation to the consumers’ ability and by assuring that consumers have the opportunity to act in the desired way (cf. Ölander and Thorgesen, 1995). This will in turn, require a deep understanding of the everyday consumer.

**1.2 CHOICE OF PRODUCT**

According to Stroeker (1995), durables can be divided in three groups depending on expected lifetime; durables, semi-durables and perishable goods. Perishable goods are defined as goods with an expected technical lifetime shorter than six months, semi-durables have a technical lifetime between six months and three years, and finally durable goods have an expected technical lifetime exceeding three years. Of course, these different time limitations are arbitrary and should not be taken as the only way to classify products.
The product category chosen for the research in this thesis is the automobile. The reason for this choice is that the purchase of an automobile is considered to be one of the most important durable purchase decisions made by a household\(^{10}\) (Punj, 1987) (see also section 1.2.1).

Furthermore, one important characteristic of durable goods is that they wear out over time, leaving only a smaller set of services remaining (e.g. the second hand product). In order to study the timing of a purchase it is important to choose a product that is not replaced solely because of product failure. The automobile market is a market with a functioning and well-developed second-hand market, allowing households, to a great extent, to replace the automobile for reasons other than product failure. This means that the timing of the purchase is hard to predict, as the gradual diminishing of the product's value and quality gives the consumer the possibility of choosing, and alters the time of the replacement.

Numerous studies on consumer decision making have used automobiles in combination with other durable products as examples of major appliances (Westbrook and Fornell, 1979) and results indicate that there are substantial similarities in the way consumers purchase durable products. Hence, as in the case of other studies using homes, automobiles or other major appliances as a product example, the results generated in this study have potential to be generalised to most consumer durables.

1.2.1 Demand for automobiles in Sweden

The demand for automobiles in Sweden has been characterised by fluctuations, and according to Elsässer (1995), four phases can be distinguished. The first wave occurred between 1929-1939. The depression initially created low demand, but thereafter a very high demand was noted. During the second phase (1939-1949) war affected demand and a decrease in demand was noted. The third phase, 1949-1965, is called the break-through of 'private motoring' (privatbilismen) and is characterised by almost constant expansion. 1965-1993 is also characterised by a positive demand. The noted decrease in demand in the

\(^{10}\)The number of sold automobiles, for example, is an extensive part of consumer aggregated expenditures (Statistical Yearbook of Sweden, 1991, 1993).
1990s’ is the sharpest since the Second World War. Numbers of new automobiles sold during the last twenty years are shown in Table 1.1

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of sold automobiles</th>
<th>Year</th>
<th>No. of sold automobiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1975</td>
<td>285 000</td>
<td>1992</td>
<td>154 000</td>
</tr>
<tr>
<td>1980</td>
<td>193 000</td>
<td>1993</td>
<td>124 000</td>
</tr>
<tr>
<td>1985</td>
<td>263 000</td>
<td>1994</td>
<td>156 000</td>
</tr>
<tr>
<td>1990</td>
<td>230 000</td>
<td>1995</td>
<td>170 000</td>
</tr>
<tr>
<td>1991</td>
<td>189 000</td>
<td>1996</td>
<td>184 000*</td>
</tr>
</tbody>
</table>

* In 1996 private import of automobiles is no longer included. Source: AB Bilstatistik.

The continuously increasing supply of automobiles has drastically changed the lifestyle of the Western world (Vilhelmson 1990). Access to automobiles is the major reason for increased mobility, which in turn is believed to increase scope and freedom of choice, which in turn is believed to increase wealth, which again is believed to increase mobility...

Automobile ownership has many social aspects as a lot of our time is spent travelling, and many households have developed a lifestyle concentrated around mobility. According to Vilhelmson (1990), there are many motives behind the increased number of households adapting a new lifestyle. Having children often generates day-care and other social activities related to children and teenagers. A second motive is the change in the labour market. A change towards more flexible working hours, and in the site for the work itself have recently been noted. Vilhemson (1990) also acknowledges a third motive, in that the consumer has more free time and increased material standards resulting in more specialised activities, often demanding travel to the activity site.

Today there are 3 600 000 registered automobiles in Sweden (Statistical Yearbook, 1998, figures from 1996) and the average number of automobiles per households is 1 (Vilhelmson, 1990). In 1985, approximately 80 percent of the adult Swedish population had access to an automobile. The distribution of automobile ownership differs, however, depending on, for example, whether a person is single or married, old or young, or has children or not. According to Vilhelmson 20 percent of the population has access to more than one vehicle, 60 percent has access to one and 20 percent does not have access to an automobile. The single or elderly consumer has less access to automobiles then families with children and middle-aged married couple.

1.3 OUTLINE OF THE THESIS

The previous section presented the arguments for the chosen topic. In summary, the theoretical relevance for this study is the lack of understanding in the area of durable replacement decision making, particularly in addressing the timing of a replacement decision. The practical relevance concerns how society, manufacturers and consumers might benefit from knowledge of factors affecting the automobile replacement decision process.

It should be acknowledged that a purchase of a durable good often involves more risk in terms of monetary risk, social risk, and psychological risk, than a purchase of a perishable good. A purchase of a high risk product tends to involve more than one person, given that the household is a multi-person household. For durable goods the monetary risk arises in that durables are often high-ticket items requiring substantial expenditure, and the social risk arises in that durables for many people can be socially visible and have symbolic value. Therefore, a study focusing on the decision making process of durable goods needs to acknowledge that there in many cases is more than one person involved in the purchase decision.

| Theoretical and practical relevance of the chosen topic for society, the manufacturer and the consumer | Chapter 1 |
| Previous research on durable demand. | Chapter 2 |
| Conceptualisation. Purpose and model development | Chapter 2, 3 |
| Theoretical foundation Decision theory and purchase behaviour | Chapter 4 |
| Choice of respondents, choice of measurements | Chapter 5 - 7 |
| Results, discussion and implications in relation to the model | Chapter 8 - 11 |

Figure 1.1 The Outline of the Thesis
As illustrated in Figure 1.1, the following chapters (Chapters 2, 3, 4 and 5) form a review of theories of durable demand, of the individual decision maker, and of the household’s decision making. Chapter 2 presents the theoretical frame of reference, starting with an overview of studies focusing on durable demand and concludes with a model of the replacement decision process for durable goods. The focus of this model is on the timing of a replacement purchase. Previous works on durable demand by Bruner and Pomazol (1988), Pickering (1981), and Winer (1985), among others, are used as a theoretical basis in order to develop a model for understanding the replacement decision process. The proposed model does not claim to be a model of future demand, rather arriving at increasing the understanding of the durable replacement decision process which, in turn, might help in designing models of durable demand. In Chapter 3 the model is described in more detail.

The model proposed in this thesis draws on mainstream research in consumer purchase decision making and Chapter 4 is devoted to addressing some of the underlying assumptions in this research. For instance, it is argued that for the purchase of a durable good, a traditional approach (following Simon, 1955, 1956) of decision making is a possible approximation of the decision process. As the replacement decision of durables is often made jointly (in households were a dyad exists), Chapter 4 includes a review of the households characteristics and the joint decision process.11

The reason and argument for the chosen research method is presented in Chapter 5. Choosing to study the timing of replacement decisions reflects the emphasis on the ongoing process, not merely on what is happening at a certain moment. Most studies in this area are cross-sectional and by using cross-sectional data, there is a risk of identifying cohort effects rather then identifying effects stemming from the individual process over time. This thesis’ focus on the process is reflected in and emphasised by the choice of method, both a cross-sectional and a longitudinal study have been undertaken. By using a longitudinal approach in studying the decision process, individual’s changes can be more easily identified. In Chapter 5, the motives and opportunities of using panel data is discussed. The statistical problems surfacing in such a study are also briefly addressed.

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11 The consequences of joint decision for the sampling procedure is discussed in Chapter 6.
The results are presented in Chapters 7-10. In each result chapter, results are first presented and then interpreted. Some methodological issues will first be addressed (in Chapter 7) as these issues have importance for further analyses. Chapter 7 and part of Chapter 8 serve as pre-requisites for Chapters 9-10 where the focus is on the thesis' main purpose. In Chapter 9, the cognitive aspects of timing are in focus, and in Chapter 10, the external factors assumed to affect the timing of the replacement decision are analysed.

The thesis ends with a general discussion, in which the results are related to different interest groups. In the final chapter some future research is also proposed.
2 CONSUMER DEMAND FOR DURABLE GOODS

2.1 MODELS OF DURABLE DEMAND

As previously discussed studies of durable demand do not normally place an explicit focus on the decision process or on timing of a purchase decision. However, many important concepts and variables have been discussed in previous studies, providing a valuable base for investigating the decision process in a durable replacement situation. For example, Pickering (1978; 1981) highlights factors that differentiate between durable and non-durable purchasing behaviour and situations. Pickering (1981) holds that that there are three inputs for demand for a particular durable; (1) the consumer level of confidence about the future (following Katona, 1975), (2) his expectation of purchasing a specific durable, and (3) unanticipated events. Winer (1985) extends the model proposed by Pickering in that he more explicitly incorporates the depreciation rate of existing equipment in the model. Further, Winer states that his model should be seen as an even further integration of Katona’s (1975) ideas, than are the Pickering model. The Winer model is conceptual in nature and is oriented towards product category rather than towards brand or total durable demand. As concepts the proposals of Pickering and Winer are valuable, even though their models can not be directly adopted for the present purpose, the Pickering model and the Winer model are briefly described below.

2.1.1 The Pickering Model

Pickering (1981) holds that very little attention has been paid in economics to the issue of decision making within the household and argue for a more behavioural approach in studies of durable demand, as economic models of the demand for durables normally are based on variables such as income, relative price, credit condition etc. According to Pickering (1978, 1981) earlier models show unimpressive predictive power and Pickering suggests that the performance of the models can be improved by adding behavioural elements, such as consumer confidence

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12 The difference between a purchase situation involving durable goods rather than non-durables can be described in terms of product lifetime, availability of credit, the perceived risk, amount of information available and prior experience (Pickering 1978; 1981)
and expectation. In the model proposed by Pickering (1981) concepts developed by Katona (1975) are incorporated. Katona argues that consumer expectation of both the individual’s own budget and the general economic climate is important for a decision to purchase durable and discretionary goods and therefore essential for the purchase of many durable products. In Pickering's model (Figure 2.1), consumer confidence is assumed to be a function of general economic confidence, which in turn is a function of personal circumstances and expectations, and attitude towards general economic conditions. Further, consumer confidence is hypothesised to be influenced by consumer orientation to durable purchasing, which in turn is influenced by house moving expectations. The perception of product characteristics is a function of the acquisition order of new durables and the rate of depreciation of existing equipment. Product specific purchase expectation is a function of consumer confidence and the perception of product characteristics. Finally, demand for a particular durable is affected by purchase expectation and unanticipated events.

Figure 2.1 The Pickering Model of Consumer Durable Demand. 
Source: Pickering (1981 p. 65)
2.1.1 The Winer Model

Winer (1985) proposes three changes to Pickering's model. Winer's revised model is found in Figure 2.2 and as can be seen the changes are related to consumers' confidence about the future and to consumers' expectations of purchasing a specific durable. In summary, Winer proposes that, personal circumstances and general economic expectations have a joint rather than separate effect on the consumer, that consumer expectations about product characteristics are compared against current perceptions of attribute values, and that consumer orientation towards durable purchasing has direct effect on purchase expectations rather than indirectly through confidence (Winer, 1985).

In the Pickering model personal circumstances and general economic expectations have been treated as two independent factors with separate effects (Pickering 1981, 1984). Winer (1985) argues however that the two factors are highly correlated and that principal component analysis has been a common way to determine the overlap between these two indexes. He further states that many studies have found the two indices to be one index (e.g. Adams, 1964; Pickering et al., 1973; Didow et al, 1983). Consequently Winer reduces Pickering's model (Pickering, 1981) to consist of one index for general consumer confidence, yet still comprised of the original factors. Moreover, Winer (1985) argues that there is a logical explanation motivating the merge. He states that it is not reasonable to believe that the individual forecasts his personal financial situation independent from the general economic situation.

In the second change proposed by Winer (1985) he holds that expectations about future values of specific durable characteristics affect demand. In accordance with Helson's (1964) adaptation level theory, Winer proposes that in judging whether or not to buy a durable product now, the consumer compares the perceived current technology level to an expected future level and uses the size and direction of the discrepancy in the purchase process. Winer (1985) holds that if new advanced features are expected to appear on the products in the near future, such expectations this will have a negative impact on demand.

Winer (1985) further argues that orientation towards purchasing a durable good should be directly influencing specific product expectation and not indirectly effecting specific product expectations thorough consumer confidence. Winer argues that it is difficult to see why house moving and marriage expectations should affect consumer confidence.
rather than affect product purchase expectations directly. Winer finally argues that if house moving or marriage and getting kids interact with consumer confidence, the interaction would be the reversed, "house moving and deciding to have children are influenced by a high level of consumer confidence” (Winer, 1985 p. 182).

Figure 2.2 *The Winer Model of Consumer Durable Demand.*

The models proposed by Pickering (1981) and Winer (1985) are focused on forecasting durable demand and even though the Winer model is a development of the Pickering model, its usefulness for this thesis’ study is limited as the difference between a replacement purchase and a first time purchase is only addressed implicitly. Moreover, the strengths of the proposed relationships, such as the importance of unanticipated events, consumer confidence or product purchase expectations for the timing of a durable replacement purchase, are not specified or discussed. In addition, the models by Pickering and Winer include descriptions of factors affecting a durable demand, but the issue of how these factors are reflected in the decision process is not clearly addressed. In summary, the mechanisms underlying the decision processes are not addressed, i.e. the
cognitive process that initiate and explain the decision process in replacement purchase decision is not in focus in the models proposed by Pickering (1981) and Winer (1985).

In this thesis a model with focus on the decision process is proposed (see section 2.2.2). The proposed model addresses the timing and the dynamics in a replacement decision process. Despite the fact that both the Pickering and the Winer model mainly focus on forecasting durable demand rather than on the cognitive process in a replacement decision, factors proposed by Pickering (1981) and Winer (1985) are used as one theoretical base in the proposed model. Components in the models proposed by Pickering (1981) and Winer (1985) are incorporated as factors triggering the decision process. Factors related to the assumed cognitive mechanisms behind the formation of a replacement intention has also been integrated in the model (following the ideas presented by Bruner and Pomazol, 1988) (see section 4.2.1).

The model proposed in this thesis is not a model of future durable demand, but a model for increasing understanding of the decision process, which in turn might help in developing models of durable demand.

2.2.1 Previous Studies on Timing of Replacements of Durable Goods

Even if rather few studies have focused on the timing of durable replacement behaviour, interest has increased during the last few years (see Bayus et al, 1989; Bayus, 1991; Cripps and Meyer, 1994).

Bayus (1991), for example, has conducted a study in order to develop a better understanding of the timing of durable good replacement purchases. With a cross-sectional design, the characteristics of consumers who replaced a product (automobiles) early were compared with consumers who replaced the product at a later point in time. According to Bayus (1991), previous research has not addressed the replacement decision explicitly, and his results provide the bases for some initial hypotheses. Bayus found that early replacers have higher incomes but lower education and occupational status. Early replacers are concerned mostly with styling and undertake greater search activity than late replacers. Late replacers focus primarily on cost-related attributes and more often buy the automobile for performance reasons. Confounding is apparent in Bayus’s study. For instance, are there different individuals
who replace the automobile early and late that might explain the differences, or do individuals have different arguments depending on when in the product life cycle they decided to replace the automobile? Moreover, can the differences between early and late replacers be explained by analysing the different brand and make bought by early and late replacers?

Gärling and Marell (1992), addressed these issues to some degree and their results supported Bayus' (1991) in that it showed that individuals differ in reasoning and behaviour depending on when the replacement takes place. Gärling and Marell (1992) also showed that individuals changed their preferences depending on the amount of time they have possessed the current product, i.e. replacement reasons change and are a function of time. These results highlight the interest in understand what makes individuals change their attitudes and on what product attribute/s a consumer bases the assessment of quality. Some studies have been conducted in order to understand what factors influence the consumer’s perceived product lifetime. Bayus (1988) show that product lifetime expectation has increased due to new technology. Cripps and Meyer, (1994) reveal that new technology increased the perceived need to replace the currently owned product. Replacements can also be prompted by for instance a sale price (Katona and Mueller, 1954), product features and available new technology (Katona, 1960; Oomens, 1976), and the effect of colour and style (Menge, 1962). In a study by Marell et al, (1995) information about environmental consequences was also revealed to affect the timing of a replacement decision.

2.2 THEORETICAL FRAME OF REFERENCE

2.2.2 Conceptualisation

The conceptual framework proposed in this study (Figure 2.3) accounts for differences between replacement purchases and first time purchases, as well as the timing of the purchase decision. The point of departure is provided by Simon's (1956) account of the following stages entailed by the purchase of a new product: problem recognition, information search, identification of alternatives, evaluation of alternatives, and selection of one alternative (see section 4.2 for a review).
The difference, between purchasing a product for the first time and making a replacement decision, argued to generate different decision processes, is found in prior purchase experience and in the fact that the consumer is in possession of a similar product to the one that will be purchased. Therefore, the quality assessment of the currently owned product is essential in replacement decisions. Consequently, a conceptual framework of the replacement decision making process must recognise that an assessment of the currently owned product (in this case the automobile) in some way enters into the process\textsuperscript{13}.

Although replacement may simply be made when the current product is worn out and this is true for many products, there are occasions when replacement is made for partly different reasons (cf. Wilkie and Dickson, 1985; Bruner, 1987). Wilkie and Dickson (1985) found that consumers often replace their durable items before they are technically worn out. They found that in more than 60% of households' which had recently purchased durables (refrigerator, freezer, washer or dryer) the product was bought for other reasons than product failure. Thus, an explanation must evoke additional factors than simply product failure.

The first stage in the decision process, problem recognition, is assumed to rely on the interaction between an actual state and a desired state (Bruner and Pomazol, 1988 Solomon 1996). The actual state is related to how well a need is met and the desired state is related to the way individuals would like the need to be met. (For a more detailed description see section 4.2.1) In line with this assumption, problem recognition is proposed to rely on the comparison between the assessment of the currently owned product (current level) and requirements of product for such usage (aspiration level) (see Figure 2.3). As illustrated in Figure 2.4, the decision to replace the product is assumed to depend on the discrepancy between the perceived quality of the possessed durable - 'the current level', and individual’s perceived requirements of products for the same usage - 'the aspiration level'.

Bruner and Pomazol (1988) argue that problem recognition occurs when a significant difference is perceived between the perceived state of the current product and the subjective desired state. The problem

\textsuperscript{13} Few studies explicitly take the current product into account in the decision model, though studies by Bayus and Gupta (1992), Cripps and Meyer (1994), and Gilbert (1992) include an assessment of currently owned product, and studies by Pickering (1981) and Winer (1985) address the issue indirectly.
identification is identified when the discrepancy passes a ‘just noticeable difference’ threshold. Convincing support for the assumption that problem recognition occurs some time after the consumer has perceived a discrepancy is found by Cripps and Meyer (1994) who confirmed that buyers replaced durables at a slower rate than ‘optimal’. One reason was that the ‘out of pocket’ costs were believed to be more salient than the long-term benefits of a replacement decision.

Figure 2.3 Model of How Aspiration Level and Current Level Affect Purchase Intention and of the Relationship Between the Formation of Purchase Intentions and Other Stages of the Decision Process.

In line with Bruner and Pomazol (1988) it is here assumed that when a large enough discrepancy is experienced (when the discrepancy has passed the threshold), a process of setting the goal of replacing the old product is started. This goal is co-ordinated with other purchase plans (cf. Pickering 1981; Winer 1985). After goal co-ordination, an intention is eventually formed, and following the traditional five step process (see section 4.2) the market is searched, alternatives are identified, evaluated, screened, and finally one alternative is chosen. However, the market search may also result in a change in aspiration level which leads to a termination of the process\textsuperscript{14}. For similar conceptualisations and related considerations in behavioural models of consumer durable demand, see

\textsuperscript{14} It should be clearly pointed out that this and many other possible and likely relationships between the components of the model are excluded from the model since they are not in focus in the present study.

Subjective quality

Aspiration level

Current level

Figure 2.4 The Dynamic Relationship Between Perceived Current Level and Perceived Aspiration Level

Current level
As durables can be seen as a set of services wearing out over time (Stroeker, 1995) and the lifetime of a product essentially can be described as the time between buying and discarding the product, the perceived quality of the currently owned product is argued to decline with deterioration.

The use of the currently owned product as one base for problem identification assumes that the possessed product is evaluated by the owner and that the evaluation process is repeated over time. Depreciation of the current product occurs when the evaluation process results in a decrease in the perceived quality of the current product over time. For example, the evaluation of the current product is assumed to be less positive the older the automobile, the more mileage driven, and, in accordance with findings by Pickering (1978) if the consumer has made recent repairs and/or anticipate that the product will require repairs in the future.

Aspiration level
The idea of aspiration level, is primarily adopted from Simon (1955, 1956). Simon shows that choices are not always aimed to optimise, but rather to satisfy a need. In Simon's concept of bounded rationality, people do not optimise, they satisfy. In accordance with Simon's (1955, 1956)
satisfying principle, the aspiration level is here defined as a minimum acceptable quality of the product.

According to Hogarth (1989), the notion of aspiration level is based on the idea that people try to simplify all types of decisions by trying to classify different outcomes as acceptable or not acceptable. This is made in order to reduce the cognitive demand but still reach a reasonable decision. Aspiration level will be set to a fixed level, a level towards which the individual consumer aspires and which is believed to be reachable. The aspiration level is believed to be set prior to learning about the different levels of outcomes.

Since the notion of an aspiration level implies that a choice is made when an alternative with an acceptable outcome has been found, options with much better outcomes might be overlooked. In contrast, a consumer might set a very high aspiration level and consequently turn down (objectively) good options, and later be in a position where this alternative is no longer available. This implies that many decisions are sequential, options have to be accepted or rejected over time and that seldom is there a chance to return to previously rejected alternatives. Hogarth (1989) claims that by adopting different aspiration levels, consumers reduce the need to search for information or the need to evaluate many alternatives.

Besides, the level of aspiration is argued to be subject to adaptation\(^\text{15}\) (cf. Helson, 1964). This further implies that aspiration level is not stable over time, but is influenced by information collected over time. One example is a house selling context where, an aspiration level of a decent selling price is set before any bidding has been initiated (Simon, 1955). If the bid is above aspiration level, is it accepted straight away or does a high bid result in a change in aspiration level, as it might indicate that aspirations have been set too low. The issue of how different aspiration levels are set and formed and how the aspiration level is subject to changes are important research questions.

**Factors affecting aspiration level and current level**
Several factors can affect both aspiration level and current level. In the present study, following Pickering (1978; 1981) and Winer (1985), current level is assumed to be affected by total mileage driven, amount of

\(^{15}\) The major features of and forms of adaptation are also summarised and discussed by Katona, Strumpel and Zahn (1971).
mileage driven the last year, number of repairs during the last four months and anticipated repairs. Aspiration level is assumed to be affected by changes in sociodemographics, such as family characteristics, income level and job status. The assumption follows the results of Bayus (1991) who modelled the time of replacements purchases (across households) as a function of household characteristics and consumer attitudes. Further, styling and technological innovations (Bayus 1988; Cripps and Meyer 1994), as well as confidence in general economy (Katona 1975; Pickering 1981; Pickering, 1981; Winer, 1985) is assumed to have an effect on aspiration level. Moreover, as discussed by Stern and Oskamp (1987), the timing of a replacement purchase has an impact on the environment, concerns about such impacts are therefore also included as a possible factor affecting aspiration level\textsuperscript{16} (for a more extensive discussion of these factors, see Chapter 3).

The model proposed in this thesis draws upon earlier theoretical findings (Pickering, 1981; Winer 1985; Bruner and Pomazol, 1988) and has found empirical support (Marell et al., 1995). In the pre-test study conducted by Marell et al. (1995) a telephone survey of 100 automobile owners was conducted. The major objective was to determine whether the timing of replacement purchase is related to the difference between an owner’s assessment of the current quality of his/her automobile and his/her aspiration level. Sets of path analyses confirmed that replacement purchase intention is related to current level and aspiration level. Finally, replacement intentions and expectations were found to predict actual purchase.

2.2.3 Purpose

Based on the proposed conceptualisation, the timing of a replacement decision in the case of a durable purchase is assumed as being initiated by a comparison between an evaluation of the current product and the requirements the individual has on the specific product, and \textit{the purpose of this thesis is to study how the relationship (discrepancy) between the current level (perception of the currently owned product) and the aspiration level (requirements of product for the same usage) corresponds to a formation of a purchase intention.}

\textsuperscript{16} Support for such effect was also found by Marell et al (1995).
Based on support from the pre-test study, the more specific purpose of this thesis is to address the cognitive mechanisms of the replacement decision process, through assessing:

1) How does the aspiration level change over time and what specific factors determine aspiration level?
2) What factors cause a change in the perception of aspiration level?
3) How does the current level vary over time and what specific factors determine current level?
4) What factors cause a change in the perception of current level?

In this research, purchase intentions and purchase expectations will be used to approximate the actual purchase therefore it is also of importance to address:

5) To what extent does intention to replace the currently owned product relate to an actual purchase decision?

2.2.4 Demarcations

There are of course many more factors than those proposed in this conceptualisation that can be argued to affect the aspiration level and or current level. For example, access to local transport such as busses, trains and subways, or access to day-care, primary and secondary schools. Other important factors, not addressed in this study, are the possible effect from reference groups and culture on aspiration level. Moreover, different people respond differently to changing conditions. Some people may fail to perceive even major changes and some may lack ability to respond and adapt at all. Therefore the change in aspiration level might also be affected by factors such as gender\textsuperscript{17} and personality\textsuperscript{18}. The basis

\textsuperscript{17} The assumption of gender differences can for instance be claimed, based on the findings by Meyers-Levy and Sternthal (1991). Their study indicated a difference between men and women in how they make judgements. Meyers-Levy and Sternthal argue that, in comparison with women, men have a higher threshold for elaborating on message cues. That implies that men might need a greater difference between aspiration level and current level in order to notice the actual difference.

\textsuperscript{18} In this study, the degree of self-monitoring might for example serve as an indicator of different personalities (cf. Snyder and Monson, 1975). The reason for choosing this approach to a person’s internal disposition is that self-monitoring has been shown to be an important factor in explaining attitude - behaviour consistency (Rajecki, 1990). Self-monitoring addresses the issue that individuals differ in the extent to which either the situation or their dispositions guide their behaviour (Snyder and Monson, 1975). According to Snyder and Monson (1975), low self-monitoring individuals are relatively independent of situational cues in guiding their social behaviour. Low self-monitoring individuals are mostly guided by their internal disposition and as a result, low self-monitoring individuals are believed to be relatively consistent across different situations. In contrast, high self-
for arguing that personality might evoke different processes is previous research on, for instance, ‘locus of control’.

This study however, departure from Bayus (1991), Bayus and Gupta (1992), Pickering (1981) and Winer (1985) on the one hand - as a general framework of durable replacement demand, and from Simon (1955, 1956) and Bruner and Pomazol (1988), on the other, with focus on the problem identification stage in a consumer decision process. Some interesting factors such as effects of gender and personality have therefore been excluded in this thesis, but they would be interesting to address in later studies.

monitoring individuals are particularly sensitive to external cues for their social behaviour. Snyder and Monson therefore argue that high self-monitoring individuals will have greater variability in their behaviour depending on the situation.
3 THE PROPOSED MODEL

3.1 DETERMINANTS OF ASPIRATION LEVEL AND CURRENT LEVEL

3.1.1 The ABC-Model of Attitudes

Current level can be seen as the consumers’ attitudes towards the currently possessed product whereas aspiration level can be seen as the consumers’ attitudes towards his/her ideas of demands or requirements of that particular product. The Affect-Behaviour-Cognition-model of attitudes, or the hierarchies of effects, is a model of attitude formation focusing on the interrelationship between knowing, feeling and doing (Solomon 1996). Most researchers agree that an attitude consists of three components; the affective, the behavioural and the cognitive components (Rajecki, 1990). The affective component relates to a feeling about an attitude object, the behaviour component involves considerations of the behaviour of the attitude object. The behaviour component is an intentional or action element of the attitude. Finally, the cognitive component covers the beliefs or any pieces of information, fact or knowledge related to the attitude object. All three components are important in determining the attitude towards an object, but their importance might vary depending on the consumer’s involvement with regard to the attitude object.

Attitude formation based on ‘cognitive information processing’ is thought to be the most common way attitudes are constructed. In such cases the consumer approaches the product as in the problem solving situation: First, a belief about the product is generated through assessing relevant attributes. Second, the beliefs are evaluated and a feeling is formed. In the last stage the consumer engages in different behaviour related to the product such as purchasing the product. This way of forming an attitude is assumed to correspond to high-involved consumers. In contrast, attitude formation based on ‘the behaviour learning process’ is initiated by beliefs before acting. Feeling surfaces after behaviour, for example after consuming the product. This formation is more likely to be used by low involved consumers. The third way to

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19 The attitude object includes products and services, organisations and individuals. The correct definition of an attitude object is anything towards which one has an attitude, whether it is tangible, such as a brand of vodka or intangible such as reckless driving (Solomon, 1996).
form an attitude is based on the consumer’s acting on the basis of his/her emotions (‘hedonic consumption’). This is the basis for the idea that attitudes can be strongly influenced by attributes such as design, colour and packaging.

Purchasing a durable good is assumed to be a rather complex purchase situation highly involving the consumer such that the process is assumed to be deliberate and reasonably thorough (see also Chapter 4). This assumption will surface in the way the currently owned product is evaluated and in the way the requirements of similar products are set. The perception of current level and aspiration level is assumed to be formed in accordance with the ‘attitude formation based on cognitive information processing’ (Solomon 1996).

It is generally claimed that a consumer’s overall attitude or evaluation of a product is based on evaluations of different product attributes (Myers and Alpert, 1968; Alpert 1971; Tversky and Gati, 1978; Meyers and Shocker, 1981; Johnson, et al. (1992); Fishbein, 1983; Wedel, Vriens, Bijmolt, Krijnen and Leeflang, 1998). The conception of viewing products and services as bundles of attributes is commonly used and has led to the development of many different attribute models. The purpose of attribute models is to be able to predict consumers behaviour (purchase) of certain products depending on the importance the consumer contributes to each attribute and what value (e.g. good/bad) each attribute of each brand is given.

In this study, the assumption is adopted that a general attitude is based on the evaluation of several attributes. Research on how consumers cognitively represent products or services in terms of attributes has revealed that attributes are likely to be perceived in different dimensions. Attributes are said to either resemble distinct features or continuous dimensions (Garner, 1978; Tversky, 1977). Attributes are also argued to vary from concrete to abstract (Johnson, 1984; 1989; Rosch, 1975). Other researchers have found a conceptual dichotomy in functional versus expressive functions (Mittal, et al, 1990). Mittal et al, (1990) argue that functional attributes relate to a person’s physical environment and embrace physiological and safety needs whereas the expressive attributes relate to a person’s social and psychological environment. Expressive motives might therefore be reflected in esteem, social and self actualisation.
In summary, the ‘cognitive information processing’ that lies behind the formation of many attitudes is concerned with relatively complex, infrequent and important consumer decisions such as buying a house or an automobile. As the replacement of durables is a relatively complex and involving decision, it is assumed that the formation of aspiration level and current level is based on a relatively well thought through evaluation process and that this process is based on product attributes such that the overall judgement of aspiration level and current level resembles the attribute model (e.g. Fishbein, 1963)\textsuperscript{20}.

3.2 FACTORS AFFECTING THE PERCEPTION OF CURRENT LEVEL

As presented in the conceptualisation, a discrepancy between aspiration and current levels is assumed to form a replacement intention. Several factors are hypothesised to influence and to determine current level and aspiration level.

3.2.1 Deterioration and Anticipated Repairs

According to Stroeker (1995), three types of lifetimes can be distinguished for durable goods (i.e. the technical, the economic and the psychological). The technical lifetime has come to an end when the product technically has lost its ability to perform as intended. The economic lifetime comes to an end due to technological developments, and is defined as the time when the advantage (gain) from the replacement product is greater then the cost of discarding the old product (which might not be completely technically worn out). The social or psychological lifetime comes to an end when the consumer decides to buy a new model and the product is neither technically nor economically worn out. The fact that many consumers do discard their products before they are technically worn out (cf. Wilkie and Dickson, 1985), is often noticed and said to be a consequence of social competition between consumers (cf. The concept of conspicuous consumption, Veblen, 1899).

\textsuperscript{20} It is however acknowledged that even if many automobile purchase are likely to be highly involving, it is still possible that in some cases the consumer’s attitude will instead be formed by an overall affective response, a process known as affect referral.
It can be noted that not only are there different types of lifetime but it can also be argued that the perception of a product’s lifetime differs between individuals. Therefore, the age of the product *per se* is not a sufficient factor in explaining the perception of the currently possessed product, also number of years the product has been owned by the current owner has shown to be a useful when explaining changes in perception of the currently owned product, in this case the perception of the currently owned automobile (Gärling and Marell, 1992).

In accordance with findings by Pickering (1978), it is also argued that the current level can be affected by the consumer’s perception of the product’s need for repair. The consumer is able to think in terms of probabilities of the product requiring a lot of attention. Pickering (1978) found that many old items were believed to potentially require a lot of repair, and these items had a higher probability of being replaced. Pickering (1978) also found that cars, television sets and washing machines were more likely to be perceived as requiring major attention at an earlier stage than other durables.

### 3.3 FACTORS AFFECTING ASPIRATION LEVEL

#### 3.3.1 Consumer Confidence

One factor that might alter aspiration level is consumer confidence (cf. Katona, 1975; Van Raaij and Gianotten, 1990; see also Pickering, 1981; Winer, 1985). Katona (1975) explored the lack of correspondence between an increase in disposable income and consumer expenditures, and found that at some periods of time, a group of consumers were more prone to make a discretionary purchase. He argues that the consumer is not only dependent on the ability to buy, but also on the willingness to buy. The ability to buy is related, for example, to income and willingness to the commitment of resources to a specific purchase (Katona, 1960; 1975).

Willingness to buy is defined as consumer expectation or consumer confidence, which in turn is a function of the evaluation of personal financial circumstances and the general economic situation. Katona demonstrated that these concepts could be measured. In surveys questions are commonly asked about financial position and expectations of the household, expectations about the change in business conditions or
unemployment, and if their current situation is perceived to be a good or bad time to buy durable goods (Pickering, 1978; Van Raaij and Gianotten, 1990).

Purchasers of durable goods have been found to be more confident about the economic situation than non-purchasers. In particular, purchasers were found to be more confident about their budget situation and their ability to finance the durable throughout the consumption time. It can be argued that consumer confidence does not have an effect on specific brands but affects discretionary purchases at an overall level\(^{21}\) (cf. Katona, 1960).

On the basis of previous findings (Adams, 1964; and Didow, et al, 1983) Winer (1985) argues that consumer confidence ought to be one factor rather than two factors. It is here argued, in accordance with Pickering (1981), that it is reasonable to argue that individuals can distinguish between household finances and general economic climate. For instance it is here argued that individuals might argue as follows: *Unemployment is increasing and the economy is not good, yet I am doing well and I will not be unemployed.*

### 3.3.2 Sociodemographic Factors

A second set of factors assumed to be important in explaining changes in durable demand and here assumed to be reflected in a change in aspiration level are socio-demographics. Such factors are, for example, income (cf. Bayus, 1991), household characteristics (cf. Bayus and Gupta, 1992; Bruner and Pomazol, 1988), and occupational status (cf. Bayus, 1991).

It is common to summarise family effects on consumer behaviour as tracing the various stages in the family life-cycle (cf Katona 1975; Gilly and Enis, 1982). The different stages have shown themselves to correspond to different consumption patterns, and, as shown by King and Leape (1987), also explain changes in saving patterns. For example, when a person marries, significant changes are likely to occur with respect to housing and self-perception, and similarly, having a child is often related to a change in attitudes and preferences. For example, in the

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\(^{21}\) For firms, producing durable goods information on consumer sentiments might still be helpful when anticipating a change in consumer purchasing behaviour overall. However, consumer confidence data does not indicate a change in the demand for brands, such as Saab or Volvo, only for the product category - automobiles, or for durable goods.
early stage of the family life-cycle, most of the income is available for personal spending such as entertainment, food, drinks, travel and clothes. Newly married couples are seen as relatively well off, having two full-time incomes. Yet, this group tends to spend a lot of money in building a new household. A lot of money is spent on furniture, appliances, and kitchenware.

The arrival of the first child often brings about a major change in consumption patterns. The income often decreases, as one person no longer works full-time. Moreover, money is spent on different items. Restaurant visits decrease in number and, according to American studies (Dupree, 1992; Statt, 1997), the greatest outlay - far more than any other item at any other stage - is the money spent on milk and disposable nappies. At a later stage when the children have become a little older, a large amount of the disposable income goes to food, big-packs are important items for the consumer. Money is also directly spent on the children’s interests, such as hockey, horse-back riding, dance or music lessons. When the children have moved out, a healthy financial situation generally arises for the family. Necessary expenditure is relatively low and income is relatively high. The consumption pattern at this stage tends to be more towards luxurious items, travel and recreation. Finally, the consumer becomes a primary market for many medical and health care goods and services (Statt, 1997). Some money is also spent on grandchildren. Although these studies are conducted in the US and sketch a stereotype consumer, similar patterns in consumer spendings can be found in Sweden (SCB, Hushållens utgifter, 1992).

More automobile-related change in consumption pattern is noted by Vilhelmsson (1990). He states that a changes in life-cycle stage often results in new behaviour in terms of automobile ownership. When young people move together, their resources increase and their incentives to buy an automobile also increase. This incentive is strengthened when the family grows. If a family splits up through divorce the propensity for automobile ownership again decreases. The same is true when the consumer gets older. Vilhelmson’s results indicate that marital status and stage in family life-cycle have an impact on automobile ownership, yet it does not indicate to what extent the requirements of the automobile are affected.

In summary, family characteristics are assumed to be an important factor affecting aspiration level. When a person marries or gives birth to a child,
significant changes in preferences and purchase behaviour might occur with respect to housing and dwelling, as well as to the desire for automobiles and furniture.

3.3.3 Styling

A third factor assumed to be reflected in a change of aspiration level is labelled ‘styling’. A study of early colour TV replacements indicated that price and advertising generally has the greatest impact on the timing of the replacement (shifting the mean by over one year). Styling and new features were of lesser importance, but still shifted the mean by more then six months (Bayus, 1988).

The effect of a change in styling has also been examined to some extent in the economic literature by for instance Hoffer and Reilly (1984) and Menge (1962). Menge (1962) argues that the auto industry emphasises style change as a market weapon, and that style is seen as a way to attract new customers. In addition, Bayus (1988), DeBell and Dardis (1979) and Jacoby et al (1977) argue that styling features such as colour might be related to consumer purchase.

3.3.4 Technological Changes

Fourthly, information about technological innovations is assumed to affect aspiration level. One reason for this assumption is that the number of products in a category as well as the perceived ‘similarity’ between the categories is considered by the consumer in the evaluation process (cf. Huber, Payne and Puto, 1982; Simonson, 1989; Pan and Lehman, 1993).

Bayus (1988) concludes that product features and the availability of newer technology are related to an early replacement, in that it shortens the replacement cycle. Bayus (1988) further states that many manufacturers have recently striven to develop new features for TV’s and stereos in order to accelerate the replacement rate. In a study conducted by Cripps and Meyer (1994) the heuristics and biases in the timing of replacements of durable goods were investigated. Through a set of experiments, consumer behaviour over time was studied. They found that subject behaviour in some aspects was consistent with ‘normative theory’, in that, for example, rates of buying increase as replacement costs decrease. However, they also identified systematic deviations from what ‘ought’ to be, for example, new technology resulted in a faster replacement rate than deterioration of the current product.
These findings indicate that technological innovations might have an effect on aspiration level. Moreover, the results from Cripps and Meyer (1994) can be interpreted in the terminology of Bruner and Pomazol (1988), implying that a change in the desired state encourages a greater replacement speed. This would in turn imply that the way a discrepancy is generated, rather than the size of the discrepancy, will affect purchase exceptions.

3.3.5 Environmental Concern

As discussed by Stern and Oskamp (1987), the timing of the replacement purchase has impacts on the environment. It is common to treat environmental consciousness as an attitude (Ajzén, 1989; Sjöberg, 1989; Weigel, 1983). In Takalas (1991) more general definition, awareness of the environmental resource problem is assumed to affect individuals information processing (e.g. their attention towards, and evaluation of information).

In a study by Marell, et al. (1995) the results indicated that purchase expectations (i.e. the time the consumer expected to wait before replacing the currently owned automobile) did change according to what type of information the respondent received. If the respondent received information that an early replacement was better for the environment or if the information indicated that a late replacement was a more environmentally friendly action then purchase expectations changed accordingly. Concern about the environment impacts may therefore constitute an additional factor affecting the aspiration level.

Empirical research indicates that ‘consequences of the individual’s action’ is one of the best predictors of individual behaviour in terms of how environmentally friendly the behaviour will be (Solér, 1997). In line with these findings are research on efficacy, (i.e. the action taken is perceived to be meaningful and have impact) (Messick, 1976; Kerr, 1989), and research on ‘perceived control’ (cf. ‘Theory of Reasoned Action’, Ajzen and Fishbein, 1980). Such research indicates that the more impact an action is perceived to generate or the more control the individual perceives him/herself to exert on the outcome, the higher correlation with behaviour.

Environmental problems generated by traffic can be seen as a collective problem, in that it is generated by many individuals. This implies that the
solutions have to be collective as well. The literature shows that there are different aspects for individuals to consider before taking action in such a situation; relations between individual contributions, the contribution of others, and the achievement of the collective goal. To exemplify, if the individual perceives that very few will join and participate in reaching a collective goal, he/she feels as if their participation is not enough to achieve the goal (cf. Klandermans, 1984). In one study (Klandermans, 1984) concludes that many individuals’ willingness to act is dependent on their faith in others taking action. If they believe that many others will take action they are more likely to take action themselves.

3.4 PURCHASE EXPECTATIONS

A long standing question has been to what extent it is possible to predict individual’s and household’s behaviour from attitudes, intentions or expectations. Extensive research has focused on the correlation between attitudes and behaviour (i.e. Ajzén and Fishbein, 1977, 1980; Fazio and Zanna, 1978; Foxall, 1984; Wicker, 1969;). Results indicate that there are several factors influencing the relationship, e.g. social norms, level of specificity, (Ajzén and Fishbein, 1977; Bentler and Speckart, 1981), accessibility of attitude (Fazio et al., 1989), and prototypicality of behaviour (Lord, et al., 1984).

A major contribution was made by Ajzén and Fishbein (1977) to an increased understanding of the relationship between attitudes and behaviour. They found that measures of intention are better determinants of future behaviour than are attitudes. This does not imply that there is a perfect correlation between intention and behaviour, but, assuming most actions are under volitional control and except for unforeseen events, an individual will usually act in accordance with his or her intention (Ajzén and Fishbein, 1980).

In order to predict behaviour from intentions it is of importance to ensure that the measure of intention corresponds with the measure of behaviour. Both behaviour and intentions can be viewed as comprised of four elements. These are the action, the target, the context and the time in

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22 The distinction between attitudes and intentions is described such that intentions is “one of many dimensions of optimism or probabilistic statements of future actions, while attitudes can be viewed as the fundamental psychological determinant of behaviour or as one among many determinants of intentions” (Pickering, 1974, p. 204).
which the action is performed. Intention and behaviour correspondence has shown itself to rely on the extent to which these elements are identical (Ajzén and Fishbein, 1980). For instance, to ensure high correspondence in the case of automobile replacement, questions such as the intention to replace the current automobile within three months, six months or one year have to be asked: The corresponding behaviour measure is, whether an actual replacement of the automobile has been made within the specified time frame or not.

According to Pickering (1984) two different methodological developments have been especially important. The first one is the shift from using dichotomous answers to the use of a response scale. The dichotomous variables - purchase vs. non-purchase - were regarded as failing to allow for the possibility that some consumers may have come close to a purchase within the time period specified although in the end did not do so, maybe because they could not find the right model or a more important purchase came up due to product failure. In cross-sectional studies it might be possible to increase the correspondence if a longer time is allowed to elapse than the amount of time to which the purchase probability actually relates, since people who come close in the first time period might be likely to purchase in the next time period. High ownership items, especially cars and furniture tend to have a longer buying horizon and are more likely to be underestimated (Pickering and Isherwood, 1974).

The other development is a change from measuring purchase intention to asking for the likelihood of a purchase. As early as in 1966 Juster found that the probability data explained twice as much of the variance in purchase rates as buying intentions did (Juster, 1966). Also later studies of purchase expectation data show some encouraging results (Pickering, 1984). Work by Pickering (Pickering and Isherwood, 1974; Isherwood and Pickering, 1975; Pickering, 1977; Pickering and Greatorex, 1980) generates some convincing conclusions for the use of expectation data in cross-sectional studies:

The use of expectation vs intention data was later explored and acknowledged by Ajzén (1985) and by Sheppard et al (1988). An intention might reflect a firm commitment to buy whereas a likelihood reflects a possibility of buying. Generally, it may be suggested that an intention to buy indicates a very firm commitment and one that is probably realistic to ask about for only 3 or perhaps 6 months ahead.
However, a recognition that there is a possibility of purchasing may be much more realistic. For example, although the response to questions such as “Do you intend to do X” or “Are you likely to do X” in many respects involve the same type of cognitive considerations, there are reasons to believe that there also are differences. For instance, if a person is claiming a strong intention to lose weight, (s)he might add, “but it is not likely that I will succeed”. These questions are to some extent addressed in the theory of planned behaviour where intentions and expectations are assumed to work differently if behaviours are not under complete volitional control (Ajzén, 1985).

More recent research on attitude-behaviour consistency also suggests that in comparison with intentions measures of expectations yield better results when predicting actual behaviour. Sheppard et al (1988) found in a meta-analysis strong support for the assumption that the correlation with behaviour increased when expectation was measured instead of intention.

A wide variety of methods have been used in data collection of durable purchase expectations. For instance, the wording has differed, the time horizon has varied, and procedures for summarising data have been altered (some using the arithmetic mean, some the median and some proportions of favourable vs. unfavourable answers). For example, there is a choice between using verbal or numeric scales. A variety of different scales has so far been used (Juster, 1966; Gabor and Ganger, 1972/73; Pickering, 1977; Pickering and Isherwood, 1974). Among these Pickering (1984) evaluates an 11-point numerical scale and a 7-point verbal scale. In a comparison it appears that the verbal scale had a different and perhaps a more realistic distribution of responses.

3.5 COMPETING GOALS

The ownership of consumer durables corresponds positively to both household income and social class (Pickering 1978), even though it is not a perfect correlation (as will be discussed later). Since households accumulate items over time, it is of concern in what order the items are preferred. Pickering (1978) suggests that consumers tend to acquire durables in fairly common order (see also Pyatt 1964; Hebden and Pickering, 1974; Soutar et al, 1990).
In the model presented in Chapter 2, it is argued that if a large enough discrepancy between aspiration level and current level is experienced, a process of setting the goal of replacing the old product is started. In particular, this goal is co-ordinated with other purchase plans. In the models proposed by Pickering (1981) and Winer (1985) ‘order of acquisition of durables’ is argued to an important factor in determining future durable demand. In the case of replacements this factor is argued to be of less importance since the durable is already possessed by the household. Moreover, with a cognitive approach of the replacement decision rather than an interest of explicitly forecasting the demand for a particular durable, the exact ordering among durables is not as important as is the ‘goal co-ordination phenomenon’.

According to Johnson (1989) choice made between alternatives from different product categories, for example, a choice between a new summer house and a new automobile, evoke different processing strategies, than if the if two products from the same category were subject to choice (i.e. the choice between two different automobiles). The ‘across-category processing’ results in the products (the house and the automobile) being compared on a more abstract attribute level than a within category processing would yield. The abstraction to a higher level category is made so that a common dimension for comparison is found. In this study, the focus is not on how such comparisons are made, but it is believed that competing purchase plans will affect timing of a replacement decision.

3.6 OPERATIONALISATION OF THE RESEARCH MODEL

To be able to address the more detailed research questions presented in section 2.2.3, the factors proposed to affect current level and aspiration level have to be operationalised in order to be measurable. Some of the proposed factors are relatively easy to operationalize, some are more difficult.

As presented in the conceptualisation in Chapter 2 and further discussed in Chapter 3, aspiration level is assumed to be influenced by several factors, such as economy, sociodemographic factors, styling, technological innovations, and environmental concern, whereas current level is believed to be influenced by age of the automobile, mileage
driven, anticipated repairs and number of years in possession of the current owner.

Sociodemographic factors are believed to have an effect on aspiration level. Following the discussion in Chapter 3, the measures used here are number of children and marital status (Bayus 1991). Income has been excluded since consumer confidence is supposed to be a better measure than income (Katona 1975). In the proposed framework a change in economy is assumed to be reflected in a change in aspiration level. Following the reasoning by Katona (1975), economy has been operationalized as consumer confidence, such that a change in consumer confidence is assumed to be reflected in a change in aspiration level. As discussed in Chapter 3, the measures follow Katona (1975), and Van Raaij and Gianotten (1990) have been used. From a set of questions two indices are computed: The first index is built on the answers to questions, evaluation and expectation of household finances, and is labelled ‘confidence in household economy’. The second index is labelled ‘general economic confidence’ and consists of questions, evaluation and expectation of the economic situation, price development and unemployment.

A third factor assumed to be reflected in aspiration level was styling. An interest factor was constructed assumed to measure interest in motor magazines and motor shows. A fourth factor, technological innovations was also discussed in Chapter 3 as a possible factor affecting aspiration level. The measuring of technological innovations was intended to tap respondent awareness of new technology on the market. These two factors, the styling factor and the technological innovation factor, were later excluded from the analysis as, in retrospect, the operationalisations were too crude to be able to capture the complex constructs they were supposed to measure.

Finally, environmental concern was assumed to be a factor affecting aspiration level. An effect of environmental awareness was first assumed and as environmentally friendly behaviour is argued to be dependent on the individuals perception of ‘the effect of their own action’ and ‘action of others’ such questions were operationalized in accordance with Kerr (1989) and Klandermans (1984). In summary, questions related to the respondents self reported environmental concern, the respondents belief that enough others take action and beliefs in the effects of the respondent’s own actions.
In the conceptualisation, current level is assumed to be affected by the age of the automobile, the mileage driven, the number of years owned by the current owner (Bayus, 1991; Gärling and Marell, 1992) and anticipated repairs and recent repairs (Pickering, 1978).

Aspiration level is measured by three general questions of requirements of automobile, attempting to capture the overall evaluation. As the purpose of this thesis is also to find the determinants of current level and aspiration level, and it is commonly assumed that consumer attitude or evaluation of a product or service (the attitude object) is based on the beliefs the consumer has about the attributes of the product, an additional 15 questions measure more specific attributes of automobiles. The measurement of aspiration level assesses the minimum requirements of automobiles for the same usage as the presently owned automobile (Simon, 1955; 1956). The current level is measured in a parallel way, with questions related to the currently owned automobile.

The different determinants or attributes of aspiration level and current level are taken from a questionnaire developed by Motormännens Riksförbund, which is mailed out, one year after purchase, to every individual that has bought a newly manufactured automobile. The M-survey questionnaire has been sent out for more than ten years and aims to summarise automobile owners' perceptions of different brands. The results are used by agents and manufactures in order to increase quality and service. The survey is by nature more focused on functional attributes. Therefore, in the present study questions addressing expressive functions have also been included.

Intention and expectation data is assumed to be an important indicator of replacements of durable purchase (Pickering 1984). Although there is empirical support for a relationship between stated intentions and actual purchase of durables (among others, Morrison, 1979; Kalwani and Silk, 1982; Jamieson and Bass, 1989; Pickering, 1984), the specific case of replacements and the awareness of the difference between expectation and intention data has (following the discussion in Chapter 3), resulted in the questionnaire including both questions on intention and expectation.\textsuperscript{23}

\textsuperscript{23} It should be mentioned that recent studies indicate that for certain products and services (such as buying a dinner for someone at Valentine's day or celebrating a mid term exam by going out to dinner) actual purchases can be better predicted by economic considerations than by attitudes and purchase intentions (Notani 1997).
Finally, competing goals are measured by questions about current purchase plans with respect to expensive items or sets of items within a specified time frame.

As market search and the rest of the stages in the decision process are not directly studied in this thesis, these stages are not included in the research model. A model where factors are subject to operationalisation and analysis are included is presented in Figure 3.1.

A more detailed description of the questionnaire, the ordering of questions, and changes in the questionnaire between the different studies is found in the discussion of method in Chapter 5.

Figure 3.1 *A Summary of Measurement of Different Concepts in the Proposed Model*
Studying the replacement decision process within households requires not only an understanding of the individual decision maker but also of the dyad's decision making. This section introduces concepts of individual decision making and joint decision making. The chapter discusses different types of decisions and different types of product that might evoke different decision processes.

4 THE MODEL IN A PURCHASE DECISION CONTEXT

The dominant view of the consumer in research of consumer behaviour originates from cognitive psychology, and is labelled 'the cognitive orientation approach', the 'decision approach', or the information processing perspective' (Holbrook and Hirshman 1982; Holbrook, 1995; Solér, 1998; Holmberg 1996). Another area of consumer research is related more to the purchase context and the role played by the environment and the situation (Belk, 1975) (cf. Huber Payne and Puto, 1982; Simonson, 1989), and is argued to have emerged as a reaction to the cognitive approach (Holmberg, 1996). Yet, another area in consumer behaviour deals with how personality and individuals' value structures affect purchase behaviour (Solér, 1998).

The research question in this thesis is in major parts shaped by the cognitive approach, in that the cognitive mechanisms behind the formation of a purchase intention is in focus (i.e. how the discrepancy between aspiration level and current level is related to purchase intention). It should however, be noted that factors influencing and
affecting aspiration level and current level might be said to be environmental and situational aspects.

4.1 CLASSIFICATIONS OF PURCHASE DECISIONS

Different product classes may determine different types of decision processes. A common way to classify decisions is based on involvement, or the amount of mental effort that the consumer puts into the decision. Such classifications do not make a clear distinction between different types of products, rather they distinguish different types of decisions depending on the speed of the decision and the amount of information used in the decision process. However, products can differ with respect to consumer purchase frequency, consumer product experience, or required and accessible information and the monetary and social risk involved in the purchase situation. This in turn results in differences in the speed of, and the amount of elaboration used in, the decision process.

Theory of decision making commonly models decision making as an active and deliberate problem solving process (Svenson, 1992). For instance, Howard (1989) and Svenson (1990) define decision making as problem solving, in that a decision is seen as a reaction to a problem. Svenson (1990) discusses four types of decisions, level 1 to level 4, and Howard discusses three types of decisions, extended problem solving, limited problem solving, and habitual problem solving. Howard’s (1989) classification of decisions is based on two characteristics, amount of information available and speed of decision, whereas Svenson’s (1990) classification is dependent on how deeply the decision maker explores his/her own value system in order to come to a decision.

According to Howard (1989) decisions that involve extended problem solving are thought to correspond most closely to the traditional view of decision making. The process is often initiated by a motive central to the self concept and the outcome carries a fair degree of risk. The consumer is highly motivated and he/she normally seeks much information. Alternatives are carefully evaluated on many levels.

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24 Traditionally, consumer researchers have used a rational perspective when studying decision making. In this view, individuals are believed to thoroughly gather and evaluate as much information as possible, thoroughly weigh pluses and minuses of all alternatives, and arrive at a decision that they can be satisfied with (Solomon 1996).
Limited problem solving is a type of decision that is more straightforward in that the buyer is not as motivated to search for information or carefully evaluate different alternatives. Instead, alternatives are usually chosen based on one or a few attributes, and non-compensatory decision rules, heuristics or cognitive shortcuts are used (see a lengthier discussion on non-compensatory decision rules in section 4.2).

Characteristic for both extended and limited problem solving is that both types include some kind of information search and deliberation. Routine problem solving however is done with very little mental effort. The decisions are autonomous in the sense that we seldom realise the decision has been made until long time after.

Howard (1989) argues that the different steps in the PLC (product life cycle) reflect a specific pattern of problem solving or decision making. He bases the argument on the fact that consumers learn new concepts when a new product category is introduced. For example, when instant coffee was new, consumers had to first learn about the product category in order to be able to evaluate different attributes. In the introductory stage of the PLC decisions are classified as extensive problem solving, and a large amount of information is needed and gathered. The unfamiliar situation also results in a fairly slow and thorough (deliberate) decision. When the product is more familiar to the consumer and the decision has been made before, almost no new information has to be gathered at the time of the decision, which will result in a rather fast decision. This is assumed to be the common scenario at the maturity stage of the PLC.

One conclusion that can be made based on Howard’s discussion is that a replacement decision can be classified as limited problem solving or perhaps even as routine problem solving, due to the fact that the product category already exists. It should, however, be noted that Howard (1989) acknowledges that more important and less frequently bought products - consumer durables - do not conform well to this pattern. He argues that the consumer might forget important attributes and that technological changes might occur between purchase occasions, resulting in consumers having to learn new criteria at the time of a repeated purchase. Furthermore, the monetary risk involved in the purchase of a durable good is often higher than in other purchase decisions believed to relate to

\[25\] It should be noted that the idea of the concept of PLC has received criticism and is somewhat problematic in direct practical use, as it is too static and unable to incorporate new developments. Yet, the notion of PLC might still serve as a valuable base for discussing types of decisions.
a more thorough decision process (Solomon, 1996). Consumer values might also be subject to change in the time elapsing between two purchase occasions. In summary, it is argued that a replacement decision, of a durable product, is more closely related to extended problem solving than to limited problem solving.

Svenson's (1990) proposed classification is based on how the consumer comprehends the decision. He argues that classification should be done in accordance with how the consumer perceives certain problems, as problems perceived to be similar result in similar decision processes. Svenson proposes a distinction of four types of decisions related to how the decision maker apprehends the situation and how deeply the consumer explores his/her value system in reaching a decision.

A decision made on the first level is a decision made in a familiar situation. This decision is made without a conscious comparison with the value system. At the second level, the consumer is aware that the decision is made in accordance with his/her preferences. The decision may not be based on all attributes, but it has to be in line with preferences on some of the attributes. At this stage, non-compensatory decision rules are common (see section 4.2.5). Lack of resources, for example induced by a shortage of time, is said to favour level 1 and level 2 decision making (cf. Svenson, 1990).

At the third level, a conscious reference to the value system and to attributes is required. No automatic decisions take place. Trade-off between different attributes might be used. Finally, at the fourth level the consumer meets a new and unfamiliar situation. The consumer elaborates alternatives and new alternatives might be created. During this process the decision maker actively determines the attractiveness of the alternatives in relation to his/her value system.

In line with Svenson's (1990) classification it is argued that the replacement process of a durable product is neither habitual nor automatic but rather a conscious process, where the consumer actively evaluates different attributes in relation to his/her own value system.
4.2 STAGES IN CONSUMER DECISION MAKING

4.2.1 Motive for a More Traditional View of Decision Making

As the purchase of a durable often involves risk, and as such a purchase is not made very often, the decision to replace a durable is argued to resemble the more traditional view of decision making. In short, a replacement of a durable good, in this case automobiles, will evoke a decision process, best described as extensive problem solving (Howard 1989), and a decision made in close adherence with the consumer's value structure (Svenson 1991). As such an approach requires a high degree of involvement and elaboration - a base for using a more traditional view of decision making - the model proposed in this thesis is based on the assumption that the decision process can be described as a five-stage process (originating from Dewey, 1910 and adapted by Simon, 1955, 1956), comprising problem recognition, information search, evaluation of alternatives, product choice and purchase outcome.

The central issue for this thesis is the problem recognition phase of the process and therefore more attention is paid to the first step. The latter four stages are thereafter included and described, in order to put the first step in the right context.

4.2.2 Problem Recognition

The idea of using the discrepancy between what is perceived as the desired state and what is perceived as the actual state as comprising the initial step in the decision process, (problem identification) is documented in the literature (Bruner, 1987; Bruner and Pomazol, 1989; Solomon, 1996). However, according to Bruner and Pomazol (1988 p.53) surprisingly little attention, empirical support and theoretical discussion is, in the current literature, given “to this trigger of the decision process” (Bruner and Pomazol, 1988 p. 53).

Bruner and Pomazol (1988) indicate that there are different levels of problem identification depending on how complex the problem is, i.e. how long it takes to realise or acknowledge the need. Simple problem identification is the recognition of a need that occurs often, it might for example be a need for water when feeling thirsty. Complex problems do not occur every day and might be illustrated by trading in an old car for a new one or buying a car for the first time.
Bruner and Pomazol (1988) also make a distinction between generic and selective problem recognition. Generic problem recognition corresponds to a broad process, where a need can be satisfied by a whole product class. In contrast, selective problem recognition has a narrow definition and exists only when a particular brand is the only way a need can be met. A distinction is also commonly made between primary and secondary demand, where primary demand is related to the demand for a product category and secondary demand is related to a specific brand or make.

**Figure 4.1 The Consumer Problem Recognition Process.**
The consumer problem recognition process as seen by Bruner and Pomazol (1988) is illustrated in Figure 4.1. The model illustrates different factors affecting the desired state and the actual state.

Bruner and Pomazol (1988) argue that there are differences in the nature of the discrepancy. If the change in the desired level is the main reason for a discrepancy then it is said to be an opportunity recognition. On the other hand, if it is a change in actual state, then a need recognition is said to surface.

The complex model proposed by Bruner and Pomazol (1988) is a valuable framework for addressing the decision process and provides important concepts and factors that come into play in the problem identification stage. The model incorporates all types of decisions, and in order to be tested and used in the present study it has to be reduced and redirected to factors important in replacement decisions. For example, the actual state is in this study defined as the subjective quality of the currently owned product, and current level is assumed to be affected only by deterioration. The desired state is defined as the aspiration level set as ‘good enough’. Some of the factors proposed by Bruner and Pomazol (1988) have been used to illustrate factors affecting aspiration level (see discussion in Chapter 3).

4.2.3 Information Search

In contrast to problem identification, information search, the second stage, has been subject to many studies. Several studies reveal that the consumer engages in relatively little external information search prior to a purchase decision even in the case of more extended problem solving situations (Newman and Staelin, 1972; Punj 1987; Grewal and Marmorstein, 1994). Punj (1987), for example, argues that 40 percent of buyers who had not used the product before, initially considered only one brand. According to Punj (1987), 60% of the purchases of new automobiles are made by one-store shoppers. One plausible explanation is that external information search is an ongoing process and conducted prior to the problem identification phase. Once the process starts the consumer relies on stored information to help them in the decision making.

A study by Punj and Staelin (1983) on the information search process in purchasing new automobiles indicated that the amount of external search
is dependent on the relationship between two components of prior knowledge. Specific product knowledge causes less external search than general product-class knowledge. Specific product knowledge refers to knowledge of specific attributes associated with the specific automobile model available for purchase. The general product class knowledge is related to automobiles in general and/or purchase decisions in general (Punj and Staelin, 1983).

Further, depending on factors such as sex, prior knowledge, social class, income, perceived risk, and education, the type of information search undertaken by individuals might differ. As an example, low and high income groups tend to undertake less information search than individuals in the middle class. Women tend to search for more information than men and, as found by Bettman and Park (1980), novices and experts search for less information than individuals with average knowledge.

There is also a distinction, depending on the way information is processed, between experts and novices (Bettman and Park, 1980; Alba and Hutchinson 1988). Experts seem to know better then novices in evaluation what attributes to focus on when evaluating a product or services (Bettman and Park, 1980). Moreover, experts tend to engage in bottom up processing, focusing on details when evaluating the product/service whereas novices engage in top-down processing, i.e. if the exterior seems good then the fuel consumption is okay and the engine will function - it seems to be a reasonably good automobile (Park and Smith, 1989). Top-down processing implies that conclusions as to different details are drawn from the overall evaluation of the product (the car looks nice and clean, so it has to have a good engine and a low fuel consumption).

4.2.4 Evaluation of Alternatives

The third step, the evaluation of alternatives, has also drawn researchers’ attention. A dominant finding is the ‘existence’ of the evoked set. The alternatives a consumer actively considers in a choice situation are called the evoked set. The evoked set consists of products already in memory (the retrieval set) and those prominent in the retail environment. There are also alternatives that the consumer is aware of but for one reason or the other he/she decides not to buy (the inept set), and alternatives that do not come into the mind of the consumer, (the inert set) (Hauser et al., 1983; Hauser and Wernerfeldt, 1990; Solomon, 1996).
Evaluation of products occurs in relation to what the individuals already know about the product and product class. A person evaluating an orange soda is likely to evaluate it with other sodas rather than with other types of beverage such as milk and wine. As a result, the category in which the consumer places the product will decide which products it will be compared with. Therefore, the categorisation process is crucial for the result of an evaluation process and the products in a consumer’s evoked set are likely to share the same features.

Different types of attributes tend to weigh more in the decision process. ‘Determinant attributes’, are used to differentiate among alternatives and for marketers it is of great importance to identify what attribute or which criterion is most important for the consumer (Alpert, 1971).

4.2.5 Choosing among Alternatives

A broad range of studies have also been conducted in the fourth step, choosing among alternatives (cf. Bettman, 1979; Bettman and Zins 1977; Hogarth, 1989; Howard, 1989). Depending on the complexity of the decision and the involvement, the consumer considers different attributes through different decision rules. Commonly decisions are divided into compensatory and non-compensatory rules. Some rules are non-compensatory in that different alternatives are eliminated if the alternative does not meet certain basic criteria. This implies that an alternative with a low standard in one attribute, cannot compensate by being better in another attribute. Non-compensatory rules are also made if the product knowledge or the product familiarity is low (Park, 1976). Examples of non-compensatory decision rules are: the lexicographic rule, where brands are ranked according to the evaluation of the most important attribute, and the brand that is best is selected: the elimination by aspect rule, where the ranking is similar to the lexicographic rule, where the alternatives have to meet certain criteria, such as having ABS-breaks: the conjunctive rule, where the alternatives have to meet certain criteria in more then one attribute (Hogarth, 1989).

Compensatory rules contrast with non-compensatory rules by giving a product a chance even if it does not meet certain criteria in all attributes. A compensatory rule requires more mental effort from the consumer and is more often used in extended problem solving, when the consumer is motivated and the decision is perceived as containing risk. Two examples
of compensatory rules are the simple additive rule and the weighted additive rule (Hogarth, 1989; Solomon, 1996). When the simple additive rule is used, the consumers choose the product having the largest number of positive attributes. In case of the complex rule, the weighted additive (Hogarth 1989), the relative importance of each attribute is also considered.

### 4.2.6 Purchase

The brand or store chosen for a purchase is affected by many factors; for instance, the actual purchase and the purchase environment are related to shopping experience, point of purchase and sales interactions (Solomon 1996). The shopping experience is in turn affected by factors such as store and brand image and store atmosphere. Point of purchase, or in-store decision making can in turn be divided into spontaneous shopping vs planned shopping. The first includes unplanned buying and impulse buying. Point of purchase stimuli or in-store advertisement is increasing and includes different types of displays. One important person in the sales interaction is the salesperson, whose influence is somewhat dependent on the type of product that will be purchased. Studies have shown that the salesperson’s knowledge of customer behaviour and knowledge of different sales situations has an impact on how successful the salesperson is. One interpretation is that a more knowledgeable salesperson is more flexible both as regards different customers but also in unexpected situations that might occur during the sales-process (Furse, et al., 1984). The conclusion is that the result is achieved when the offer can be suited to different customers, that is when the sales person has knowledge of the products and the customer’s needs and problem areas.

### 4.2.7 Limitations in the chosen approach

It should be acknowledged that for many purchase decisions the above description is not an accurate portrayal of the process. If the consumer went through all steps for all types of decisions it may leave him/her with...
very little time to enjoy the things he/she might have bought. Some decisions are more essential than others and accordingly different amounts of effort are put into the decisions. Some decisions can be significant but are made often, which reduces the mental effort required each time. Important purchase decisions are commonly related to a considerable amount of elaboration. At other times, the decision making process occurs almost automatically. Such decisions are made under little mental effort and might be learned responses to environmental cues, for example when a product is bought on impulse, or when promoted by, for instance, a red tag\textsuperscript{27}. As a consequence, all steps are not taken for all types of decisions.

There are of also examples of decisions where the consumer is highly involved but where the consumer might not follow the ‘traditional’ approach. For example, in the choice of art, music, or a spouse it is hard to find a determinant factor for the actual choice. In these cases the totality or the gestalt of the service and product might provide a more fruitful explanation (Solomon 1996). These choices might also be more culture dependent. In the same vein, it is acknowledged that for some individuals the automobile might be bought on impulse. It is, however, also argued that for many people, the purchase of an automobile is not made on the spur of the moment, but is the result of a thought-through process.

Even though it is acknowledged that not all decisions can be framed according to the five-stage process, it is here argued that it serves as a valuable base and theoretical framework, when studying certain types of decisions. In the case of durable replacements it is argued to be a reasonable base (For further support see also Katona et al., 1971; Katona 1975).

In the model presented in Chapter 2, the different stages in the decision process are indirectly incorporated in the model but not explicitly discussed or addressed further in the study.

\textsuperscript{27} The click-whirr phenomenon is alerted (see Cialdini, 1988).
4.3 DECISION MAKING IN THE HOUSEHOLD

4.3.1 Introduction

A consumer is an individual who makes personal decisions, a person who satisfies needs and desires ranging from hunger and security to love and self-fulfilment. However, many people may be involved in the buying and consumption process. The user of a product and the buyer of a product, or the buyer and the influencer might not be the same person. A two year old boy might be the influencer in a candy bar decision but the parent is the actual buyer. The same reasoning is applicable to a husband who might have considerable influence on a wife’s decision to change jobs or vice versa.

Approximately 60 percent of households in Sweden are two-adult households. A purchase of a durable good is often one of great risk both monetarily and socially and in a multi-person household, an increase in the amount of risk is likely to involve both spouses and as mentioned by Spiro (1983), spouses often disagree over purchase decisions of major durables.

Since the replacement of an automobile is an example of a purchase situation that is not characterised as being solely in one of the two adults domain but rather a purchase decision made jointly, the joint decision process cannot be ignored. It should however be noted that this study deals with household decision making, and not primarily with family decision strategies or joint decision strategy.

4.3.2 The Family and the Household

While the individual decision maker has received much attention, family decision making is an under-researched area within all consumer behaviour in that fewer studies have focused on the family as a decision unit (Beatty and Talpade, 1994; Kirchler 1988, Park 1991). However, as many researchers stress the importance of such research, such studies are increasing in number (eg. Davis 1970; Ferber and Lee 1974; Park 1991). For an overview see Kirchler (1988).

The terms ‘family’ and ‘household’ are so commonly used that is hard to find a formal definition. Core features in most definitions include
relationship and locality (Kirchler, 1988). These features are also central in definitions offered by Swedish Statistics. According to Swedish Statistics a family is defined as “a man and a woman moving together with the purpose of being a family or a couple. The family can be a relationship based on cohabiting or based on marriage” (translated from SCB-report 1990:1, p. 6). According to Solomon, the U.S. Census Bureau regards “any occupied housing unit as a household, regardless of the relationships among people living there, and a family household is defined as one that contains at least two people who are related by blood or by marriage” (Solomon, 1996 p. 388).

Family structure in Sweden is changing and the traditional family consisting of a married couple with children at home is not as common as in the 1970's. A low marriage rate in combination with a high divorce rate has resulted in a decrease in the number of married people. However, the decrease in marriage has to some extent been compensated with an increase in cohabiting couples. In this study no distinction is made between cohabiting and married couples, both are considered to be a dyad. As illustrated in Table 4.1 the ratio of single adult households is increasing. Today 60% of households consist of a dyad. It is therefore crucial to acknowledge that a majority of demand for many products originates from households where decisions might be made jointly rather than by one single individual.

Table 4.1 Distribution of Adults (16 years and older) According to Sex and Marital Status, in Percentages.

<table>
<thead>
<tr>
<th></th>
<th>MEN</th>
<th></th>
<th></th>
<th>WOMEN</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>57.3</td>
<td>53.8</td>
<td>49.6</td>
<td>55.7</td>
<td>51.9</td>
<td>47.5</td>
</tr>
<tr>
<td>Cohabiting</td>
<td>7.2</td>
<td>9.2</td>
<td>11.4</td>
<td>7.0</td>
<td>8.9</td>
<td>10.9</td>
</tr>
<tr>
<td>Single</td>
<td>35.5</td>
<td>37.0</td>
<td>39.0</td>
<td>37.3</td>
<td>39.2</td>
<td>41.5</td>
</tr>
<tr>
<td>Total</td>
<td>3 166 000</td>
<td>3 244 000</td>
<td>3 305 000</td>
<td>3 256 000</td>
<td>3 362 000</td>
<td>3 447 000</td>
</tr>
</tbody>
</table>


Katona (1975) argues that most purchases of consumer goods and services are undertaken on behalf of the family living together in the same dwelling. He further argues that decision making is often a family affair, with the family member who actually makes the purchase taking the responsibility for the entire family. In summary Katona argues that a family’s needs and expenditures are affected by, for example, the number of family members, the age of family members, and whether the adults are employed outside the home or work at home. In the USA, two factors
have surfaced as important in determining how couples spend time and money; if the couple has children and if the woman works outside home.

Children’s influence in family decision making has been called ‘child power’ and during the latest 10 to 15 years the role of children has been highlighted more. Much of the earlier research in the area of family decisions focused on the outcome of such a process rather the process itself. For example, researchers have studied the process through the means of children’s requests and parent responses (cf. Atkin 1978). Later, the different stages in decision making were included and, for example, Swinyard and Sim (1987) revealed that children’s influence in decision making varies with age, products, and stage in the decision process. The children’s influence increases with their age and decreases with risk (i.e. durables purchases have less influence from children in comparison with perishable goods). An extensive summary of and valuable contribution in this area is made by Ekström (1995).

The joint decision process, an important part of family decision making is further addressed in Chapter 6. The reason for not including the theoretical framework on joint decision making in the theoretical section is that the thesis does not focus on the joint decision process as presented by, for instance Park (1991), but it is acknowledged as important. Therefore, theories of joint decision are not further explored other than to serve as a base for the sampling procedure within the household.
The motive behind research is to explain an empirical phenomena, not just describe it. Such explanation is, to me, theory. The goal is not to try to explain each and every separate behaviour in a replacement situation, but I “seek general explanations that encompass and link together many different behaviours” (Kerlinger, 1986, p. 8)

5  METHOD

5.1  INTRODUCTION

Choosing the most appropriate research technique is, of course, of great importance. It can be seen as a dilemma as limitations imposed by time, resources, equipment and other factors force the researcher to compromise on the preferred approach.

5.2  DATA ON INDIVIDUAL LEVEL

Commonly, disposable income is used as a predictor of future demand. The share of disposable income spent on durables does not correlate with personal disposable income (Pickering, 1978; Katona, 1975). For example, while personal disposable income in the USA rose by 21 percent between 1970-73 and aggregate consumer expenditures rose by 17 percent, the aggregate consumer durable expenditure rose by 62 percent and personal spending on automobiles rose by 90 percent. The same tendency can be noted in Sweden. The disposable income in Sweden rose by 80 percent from 1985 to 1995 (SM Be 20 9710 and SM Be 20 9002). During the same period consumer expenditures on automobile purchases rose by only 38 percent (SCB, Hushållens utgifter 1985 and Utgiftsbarometern 1995).
One reason for the lack of correspondence is the use of aggregate data in order to predict individual behaviour. The correspondence between aggregated data has been addressed by many researchers and is one important difference between Economics and Psychology. To generate a correspondence between income and behaviour on an aggregate level, it is sufficient that each individual behaviour follows a probability function and that the respondent's behaviour to some extent can be viewed as random errors that disappear on an aggregated level \(^{28}\) (Davidsson, 1993). This highlights the importance of using data on an individual level in order to understand behaviour and, often, to be able to predict behaviour.

5.3 RESEARCH APPROACH

5.3.1. Economic Psychology - a Perspective

The problem addressed in this thesis will be approached from an Economic-Psychological perspective.\(^{29}\) The term 'economic' refers either to the handling of scarce resources or to the fact that the outcome of an expressed activity has economic consequences. The 'psychology' term indicates a concern with human behaviour (Wärneryd, 1988).\(^{30}\) For psychologists it is the individual who learns, feels and thinks, that is the entity of analysis. The field of Psychology is an empirical discipline, in contrast with Economics, in the sense that to establish a statement's validity, empirical evidence is needed.

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\(^{28}\) The following example (from Davidsson, 1993) might illustrate the phenomena: Assume that 1000 individuals are interviewed about their intentions to purchase an automobile during the coming year. Assume further that all respondents have the same subjective probability to actually make a purchase (50 percent) and that it is the 'mood of the day' that decides how the respondent answers. In total, 500 answer 'yes' and 500 answer 'no'. At a follow-up interview the results indicate that 500 had purchased a new automobile and 500 had not. The follow-up study further indicated that 250 of the respondents who had purchased a new automobile had given the answer 'yes'. On an individual level the correlation is 'zero', but on an aggregate level, there is a perfect correlation.

\(^{29}\) According to Wärneryd (1988), there is a dispute as to who first used the term with the present meaning. Some argue that the field of Economic Psychology dates back to 1881 while others argue that the term was used long before that.

\(^{30}\) Historically, Economics has concentrated on the analysis of variables such as income, price, interest rates and expenditures. These variables alone have been considered to be enough to establish cause and effect relations between changes in these variables. Other exogenous, psychological, or non-economic factors have been disregarded. Quite a few economists continued to study economic behaviour without taking into account other factors that might influence that behaviour. Even if the relationship between the fields of Economics and Psychology is most often characterised by little co-operation, some researchers have tried to combine the two fields and to develop an increased understanding (for example, see Maital 1982; Katona 1975).
In brief the field of Economic-Psychology focuses on the mechanisms underlying consumption and other behaviour with economic consequences. It deals with preferences, choices, decisions and their determinants as well as their consequences. Economic-Psychology embodies the idea that studies of human behaviour are the base for predicting, and thus the understanding of, economic behaviour. According to Wärneryd (1988), the problems studied in Economic-Psychology can be seen as emerging from three different arenas; the consumer marketplace, the business arena and the citizen/society arena. In the first arena consumer and household behaviour is in focus, business behaviour and entrepreneurs attract the main attention in the second arena and in the third, economic relations such as benefits/taxes and reactions to economic policy are considered.

The basic disciplines influencing the field are, of course, Economics and Psychology. However, these two disciplines have quite different approaches to a research problem. While Economics is to a large extent deductive and based on mathematical reasoning, theory constructions in Psychology are characterised by close adherence to data, and speculative theories are not encouraged (Wärneryd 1988).

The present research is economic in the sense that it focuses on a monetary outcome of a decision process - the purchase of new automobiles. The research is predominantly deductive in that it presents a model for the replacement decision which is tested in three separate studies, a pre-test, a cross-sectional study, and a panel study. The model presented and tested draws on earlier findings in the area of decision making.

The study is psychological in the sense that even though it focuses on economic behaviour the study seeks psychological explanations for inter-household variation (given, for example, the same income level, number of automobiles, number of children etc.). It is not assumed that all individuals with the same income spend the same proportion of their income on the exact same things. From a psychological perspective, the behaviour of the people involved, their actions, or underlying motives are very relevant (for a lengthier discussion, see Katona, 1975). Further, theory is developed in close relation with empirical data, often called low-level theory, which in the long run is hoped to result in a more abstract and comprehensive theory.
The problem addressed in this thesis is empirically generated, and emphasises consumer motives behind a replacement decision. The emphasis is both on the cognitive mechanism initiating a purchase decision as well as on how the process is influenced by external factors. The questions of why and how are in focus, not only who and when, since the only way we can predict the total number of automobiles sold or bought in a given period, is to understand how and why John Smith buys and will buy an automobile (Katona 1975).

5.4 THE RESEARCH APPROACH

In Social Science research, there is generally a choice between a qualitative or a quantitative approach\(^{31}\). There is not an absolute difference between the two approaches and they should be seen as complementing one another, being more or less fruitful in different situations or for different research problems. Each research design is in itself a boundary for what might be explored and found. This means that the same phenomena might be investigated in different ways.

The research design, including the data-collection phase, is dependent on the research problem at hand. In order to choose an adequate method a summary of different methods’ strengths and weaknesses can be helpful. If a multiple design is intended, identified weaknesses in one technique might be compensated by the strengths of another.

In some approaches, it is common to examine a few subjects thoroughly and in-depth, often with an exploratory purpose, whereas in other approaches many subjects are investigated in order to test hypotheses. The research question in this thesis is structured and derived from theory and the exploratory part is rather limited, favouring an approach where many subjects are investigated. One important aspect is that the present research attempts to find at least some households that will make a replacement decision during the two year period. With few entities (households), the probability of sampling such households is limited. The interest in and focus on traits that are common among many individuals, i.e. searching for average traits rather than extreme traits and deviations,

\(^{31}\) It is common to distinguish between a quantitative and a qualitative approach. The distinction is mainly made with respect to the type of data used. (For a lengthier discussion see Helme and Solvang 1986 p. 13)
also point in the direction of a ‘quantitative approach’ (Holme and Solvang, 1986; Johansson-Lindfors, 1993; Malhotra, 1993).

Finally, the extent of previous research on decision making gave a deep understanding of the field and a possibility to generate assumptions that can be tested and the chosen approach is argued to better allow such tests.

5.4.1 Different strategies to collect data

Hensher (1985) distinguishes between three basic data strategies; the single cross-sectional, the repeated cross-sectional and the panel, where repeated cross-sectional and panel surveys are defined as longitudinal designs. A single cross-section might serve as a point of reference, identifying inter-variable relationship at one point in time and may be done at several points in time, but without any attempt to establish a temporal dimension to the data. Repeated cross-sectional surveys use a new sample of households over time but the sample is drawn from the same population or cohort. (For a lengthier discussion of cross-sectional surveys, see Stopher, 1985, p. 56-75). A panel uses the same set of household characteristics and follows the same entity over time. In this context, the panel is seen as the ultimate longitudinal design.

Hensher (1985) argues that many issues can be adequately investigated with single cross-sectional data. For some types of forecasts, etc., cross-sectional data is sufficient (Stopher 1985). A single cross-sample can be seen as a reference point, and will perform well when identifying inter-variable differences and inter-household differences at a single occasion. For example, a single cross-sample is good to examine if a number of variables have impact on or correlate with a replacement intention. A cross-sectional survey is also adequate for providing information from which it is possible to calibrate or validate models or procedures. For these reasons, this study was initiated with a single cross-sectional study.

Although single cross-sectional surveys are useful for such purposes as identifying inter-variable differences and inter-household differences on a single occasion, the forecasting capability of models based on cross sectional data is often problematic. Longitudinal data however, can identify causal orders of relationship between correlated variables (Hensher 1985). Therefore, longitudinal surveys are suggested and required when dealing with, for example, the timing of a change and the growth of key exogenous factors (Hensher, 1985).
No suitable data was available to examine the objectives for this study. It was therefore necessary to collect data from automobile owners. In order to understand the formation of a replacement intention and, for instance, improve forecasting ability, produce products in line with consumer preferences, or increase political measurements for more environmentally friendly behaviour, the dynamics in motives and attitude behind the individual consumer’s behaviour have to be addressed. Studies addressing the timing often use a cross sectional approach instead of using longitudinal data. The best way to study the decision process and the timing of a replacement decision would of course be through a panel. In a panel survey it is possible both to investigate the factors that influence a purchase intention or purchase probability, and also to generate knowledge about what factors affect the actual purchase decision. Such a study was consequently undertaken.

5.5 EFFECTS OF PARTICIPATING

One problem that arises in every study is the effect of merely asking questions. Prior research has established that merely asking for an intent to behave strengthens the link between intention and behaviour (Morwitz et al., 1993). However the effect of measure decreased with previous experience of the product. In this study, replacement intentions are studied which, by definition, suggests a previous experience of the product and therefore a reduction the effect of multiple measures.

Further, Morwitz et al. (1993) found that purchase rate was slightly higher (not statistically significant) for multiple intent measures for those with high initial intent. However, for those individuals with no intentions, purchase rate was significantly lower with multiple than with single intent measurements.

In this study it is of course problematic to realise that simply asking does influence the respondents behaviour, especially when it influences the dependent variable. However, it would have been a major and devastating effect if the aim of the study was to predict or forecast the point in time for a replacement, i.e. if the purpose of the study was to determine the phase or the speed of replacements of automobiles or the time elapsing from a purchase until a replacement is made. The objective here, however, is to determine the factors influencing the timing of a
replacement decision. Although the timing of decisions is influenced by merely asking there is no reason to believe that there is a change in the reasons for replacing and that the cognitive mechanisms of the decision process *per se* is different because of asking. In section 6.3 a brief comparison of replacements of individuals not included in the study and individuals in the study is presented.

5.6 THE ROLES OF DIFFERENT STUDIES

In order to test the questionnaire and to get an indication of the strengths in the proposed relationships, a pre-test of 100 households and a cross-sectional study with almost 600 households were undertaken. These two studies were then followed by a rotating panel study (i.e., as soon as a household has replaced the automobile, that household was replaced by a new household) lasting for two and a half years. The design is shown in Figure 5.1. In the panel, interviews were conducted every fourth months with each subject. The panel thus consisted of approximately 800 households, participating in 1 to 8 interviews. The sampling unit for all studies was automobiles with certain characteristics, 10 years old or less, in traffic, and used regularly by the household members.

![Figure 5.1 The Research Process and Research Design.](image)

The reason for choosing automobiles as sampling unit rather than households was that not all households have an automobile, in particular not an automobile meeting the set criteria. Through the national register of automobiles, it was easy to select automobiles in the preferred age span and from there to generate the owner as the respondent. The alternative
was to first select households and then by screening questions select household with an automobile that meet the set criteria. The reason for choosing automobiles less than 10 years old was the potential risk of including too many owners replacing the automobile solely based on the risk of product failure. The age restriction has, of course excluded some individuals from the possibility of being selected, imposing a restriction on generalisability in terms of the extent that findings from these studies can be said to be valid for all types of buyers (cf. Ferber, 1977).

However, generalisation is not a single issue. In consumer research as well as in this study, two distinct types of applications can be identified (Calder et al., 1981). The first type is labelled ‘effects applications’ and is argued to project observed data into events beyond the research setting. This means that the obtained effects are assumed to mirror findings from a similar research project on another population and in another setting. The second type labelled ‘theory application’, only use scientific theory to explain events beyond the specific research setting where data was observed. In this case, findings from the research are used to assess the status of the theory, and it is the theoretical explanation that is generalised and not the specific results. In this study the restrictions in sampling impose some restrictions on the generalisability labelled ‘effects applications’, but not necessarily on the ‘theory application’.

Therefore, depending on the researcher’s goal as to empirical generalisation, the importance of a random sample becomes critical but for theory-testing research, the necessity of representative samples is less vital\(^{32}\). In this study ‘effect applications’ should be made carefully whereas the ‘theory application’ can be made with more confidence.

**5.6.1 The Pre-test Study**

The main objective with the pre-test study was to test how the subjects responded to and interpreted different questions. The pre-test study was also undertaken in order to make a first test of the components in the conceptualisation.

\(^{32}\) Several articles discuss how the use of convenience samples may be appropriate for theory-testing research, but such sampling is argued not to be appropriate for establishing results aimed at direct empirical generalisations (Calder, et al., 1981, 1982, 1983; Sternthal et al., 1987).
5.6.2 The Cross-sectional Study

The main purpose with the cross-sectional study was to test the conceptualisation more extensively and to be able to address the issue of expectation data vs intention data. It was also of importance to address the choice of respondent in multi-person households. The cross-sectional study provided support for the conceptualisation, and generated data not only of importance for the main objective of the project but also serving as the base for the sample of automobile owners in the longitudinal study.

5.6.3 The Panel Study

Hsiao (1986) states that cross-sectional data is insufficient in dynamic models, as it contains variation in microeconomic variables. Thus, estimated coefficients from one cross-sectional sample are more likely to reflect inter-individual variation than intra-individual dynamics. If the purpose of a survey is to test stability or a change in a pre-postulated relationship over time, cross-sectional data is far from satisfying and longitudinal data (repeated cross-sectional and panel) is instead recommended (Stopher, 1985).

Repeated cross-sectional data allow more issues to be addressed than a single cross-sectional study. Panel data will pursue an even greater number of issues than a repeated cross-sectional study. In multiple cross-sectional studies, a new sample is drawn at each point in time, from the same population, whereas in panel surveys, data is obtained from the same sample over time (Hensher, 1985).

Only panel data can address the timing of events in the behavioural process. According to Hensher (1983), longitudinal research opens a new arena of strategies extending the empirical capability. Words such as ‘change’ and ‘growth/decline’ are vital and in focus. Further, Hensher (1994) illustrates how the growing availability of panel data expands the opportunity to develop models where temporal relationships (i.e. timing and duration) can be identified. Event history data embedded in a panel gives an opportunity to investigate the duration of a particular state for the household and the timing of a change into another state.

A panel is the appropriate design for identifying causal inference (Hensher and Smith 1985; Hensher 1985). As noted in Hsiao (1986), a panel is more likely to enable a distinction between inter-individual and
intra-individual differences. Intra-unit change occurs within the household whereas inter-unit change is the change between the sampled households (see Hsiao, 1986; Hensher, 1985). In a panel, individual variation can be identified and compensated for. Further, panel data also measures change with greater precision than do multiple cross-sectional surveys (Hensher 1985).

According to Hsiao (1986), there are three major benefits from using panel data in comparison with cross-sectional data and time series data. These advantages are closely related to econometric estimations. The advantages are (i) discrimination of competing hypotheses and model identification, (ii) reducing estimation bias, and (iii) lessening multicollinearity problems. Further elaboration of these issues is found in, for instance, Hsiao (1986).

Significant advantages emerge when moving from single cross-sectional data, to longitudinal data but a number of additional problems will also arise. A panel study includes all the practical problems facing a cross-sectional study plus additional problems. These issues include different sorts of missing data, such as sample selectivity and attrition. Further discussion is found in, for instance, Hensher (1985).

5.7 DATA COLLECTION

In this thesis, the options available for collecting data were either face-to-face interviews, telephone interviews or a mail questionnaire. The question of whether to use face-to-face interviews, telephone interviews or a mail questionnaire is not only a matter of time and money, but also a question of validity.

Most studies utilise one of many different data collecting methods. Very few studies use multiple methods allowing comparisons. Even if comparisons are made, these are mostly based on a small number of dimensions such as response rate or population access (Frey, 1989). It is therefore, difficult to establish advantages and disadvantages of a specific data gathering method, and in consequence, it is hard to be sure that variations in data are not a result of the method employed. However, there are measures that can be taken in order to reduce the probability of uncontrolled variation in data.
As the goal of a survey is to obtain complete and accurate responses from the respondents, the researcher has to reflect on factors that might produce answers that are less than complete and answers that do not mirror the 'true' feelings, attitudes, beliefs or behaviour. In case of a telephone survey, the interviewer can affect the answers through the interviewing situation, the response situation, and the questionnaire layout and schedule. In this study, some measures have been taken in order to rule out as many of these effects as possible. All interviewees have been well trained and educated for the specific project. This training includes discussions of research ethics and a thorough review of the questionnaire. It can also be mentioned that the questionnaire includes specific instructions to the interviewer, how to present the study, about when to read all the alternatives and when not to, in order to assure that all use the same procedure (see Appendix 1, 2, and 3). The interviewers were also instructed not to use their experience of the project to provide examples on more open-ended questions but to repeat the question and encourage the respondent to provide an 'unframed' answer. Training interviews were made on other more experienced interviewers who acted like 'tough' respondents providing difficult answers and tricky questions. Moreover, to make sure that the respondents were as comfortable as possible during the interview, the time and day for the interview was chosen by the respondent.

Although the above measures have been taken to minimise systematic variation, the possibility of finding the 'true' answer is limited. Answers are also affected by other factors for instance, different types of framing and social norms. In order to use existing knowledge about effects of questions in specific areas (e.g. consumer confidence and purchase intentions), many of the questions used in this study are taken from other previous studies.

Sample coverage
In order to be able to generalise, the sample should be representative of the population. As the sample is taken from the national automobile register in Sweden, the travel cost incurred by a face-to-face interview would be problematic. Mail questionnaires and telephone surveys are connected with their own problems regarding availability of the selected respondents. The telephone survey's major problem is the lack of accessibility of telephone numbers (i.e. unlisted numbers) and the fact that some households may not even subscribe to a telephone service. As the sampling unit was automobiles rather than the households/owners...
there was not much help to be found by the development of other, sampling techniques such as random digit dialling\textsuperscript{33}.

As the difference in cost between the telephone and the mail is little, the chance of a higher response rate (especially due to the risk of losing households over time due to other reasons than replacements), favoured a decision of a telephone survey. Also, using telephone interviews made the interviews more reliable because there was an improved possibility to make sure that the same individual answered throughout the possible eight waves.

On balance, the choice in this thesis was to use a broad approach, allowing many entities to be chosen, i.e. a large sample of automobiles. Through the sampling of automobiles a number of households and household representatives were chosen. A pre-test was conducted in order to test and evaluate the questionnaire. Thereafter, a cross-sectional survey with a total sample of 800 automobiles was conducted. Finally, in order to detect and disentangle intra- and inter-household effects (crucial to a study of the timing of replacement decisions) a panel study over twenty-eight months was conducted.

5.7.1 The Cross-sectional Study

The more detailed purpose of the cross-sectional study is to estimate (i) what factors are important for a change in aspiration level, (ii) what factors are important for an assessment of the currently owned automobile, and (iii) how the relation between aspiration level and current level influences replacement intentions and actual replacements.

To achieve the study objectives, a telephone survey was conducted with a random sample of automobile owners. Interview questions were asked with the aim of measuring the perceived quality of the current automobile, the aspiration level, and the strength of the intention to replace the automobile. In addition, data on sociodemographic factors was collected.

\textsuperscript{33} In this study background information (i.e. type of automobile, manufacture year, year of purchase age of owner and geographic location of owner) is available and it is possible to compare the household that are non-subscribers with subscribing households (cf. Table 5.1 for the cross-sectional study).
Sample
A sample of 847 car owners was chosen through a random selection of automobiles from the Swedish National Register of Automobiles. Only automobiles that were less than 10 years old were included. Of the originally sampled car owners, 94 were excluded whose telephone number was inaccessible, who were ill, or were not fluent in Swedish. 39 who did not answer after five different call attempts on different days and at different times of day were also excluded, as were 14 who had sold the automobile, and 128 who refused to participate. A total of 572 (68%) households agreed to answer the questions.34

Table 5.1. Sample Coverage in the Cross-Sectional Study

<table>
<thead>
<tr>
<th>Sample Description</th>
<th>Mean (SD)</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampled households (automobiles) (n=847)</td>
<td>1986 (2.1)</td>
<td>44 (11.5)</td>
</tr>
<tr>
<td>Secret number and non subscribers (n=40)</td>
<td>1988 (1.9)</td>
<td>44 (10.8)</td>
</tr>
<tr>
<td>Individuals in households who cannot concentrate or who have a hearing problem. (n=10)</td>
<td>1987 (0.6)</td>
<td>57 (6.1)</td>
</tr>
<tr>
<td>Already replaced the automobile (n=14)</td>
<td>1988 (2.6)</td>
<td>41 (10.5)</td>
</tr>
<tr>
<td>No answer after at least three attempts (n=39)</td>
<td>1988 (1.7)</td>
<td>46 (13.1)</td>
</tr>
<tr>
<td>Can not understand the questions or do not speak Swedish (n=34)</td>
<td>1987 (1.9)</td>
<td>51 (12.4)</td>
</tr>
<tr>
<td>Refused to participate (n=128)</td>
<td>1988 (2.2)</td>
<td>46 (11.9)</td>
</tr>
<tr>
<td>Participants (n=572)</td>
<td>1988 (2.1)</td>
<td>44 (11.2)</td>
</tr>
</tbody>
</table>

No significant difference between participating and sampled households is identified in terms of manufacture year of the selected automobile and age of the owner (see Table 5.1). The only significant difference between individuals participating and individuals sampled but not participating is the average age of individuals dropping out due to concentration or hearing problem. The ‘drop-outs’ are on average older than the average participant.

34 According to Frey (1989), there is no standard response rate value that can be used as a comparison. However, Frey argues that a response rate of around 70% is well-accepted as good and one that can comfortably be used to make analysis and draw conclusions. Response rate is often calculated in two different ways according (Frey, 1989), (1) number of completed interviews compared to number of possible completions, and (2) number of completed interviews compared to number possible subtracted by ‘not reachables’. The second way to calculate is somewhat self-serving, as it produces a higher response rate than the first. Depending on what way calculations are made, different rates will of course surface. Calculating the first way, a response rate around 40-50% is expected in a telephone survey, whereas a mail survey can expect a response rate around 30% with no follow-up, and around 40% with two or three follow-ups. (Note: These figures are based on American standards and studies, and we can generally expect a higher response rate in Sweden).
Interviews
The telephone interviews were conducted by 20 experienced and well-trained students. On average the interviews were completed in about 30 minutes.

The pre-test study
In order to test the questionnaire for the cross-sectional study a pre-test was conducted. The pre-test telephone study was conducted using a randomly selected sample of automobile owners. The sample of respondents was selected by means of a procedure entailing the following steps: During specific hours on different days and at different times of day, a research assistant first registered all automobiles stopping at six major gasoline stations in the municipality of Umeå. In the National Register of Automobile the names were found of owners of those registered automobiles less than 10 years old. Useable data for a final sample of 100 respondents were obtained. The telephone interviews were conducted by the author and three experienced students. On average the interviews were completed in 30 minutes. More detailed results from the pre-test survey are found in Marell et al. (1995).

The questionnaire
The questionnaire for the cross-sectional study was based on the questionnaire used in the pre-test study. The questionnaire is presented below, some questions not used in the analysis or not central to the study are left out or only briefly described. In an introductory part of the interview, one question was asked to determine whether the registered owner of the automobile was the household member primarily responsible for the replacement decision (in multi-person households). If the registered owner stated that he or she has at least as much influence on this decision as the spouse, the interview with this interviewee proceeded. In a few cases when such was not the case, the spouse who was said to have this influence was interviewed instead. Questions were also asked to confirm that the automobile owner knew the make, model, and manufacture year of the automobile. In addition, information was obtained concerning the purposes of household use of the automobile, average distance driven with the automobile per year, the household’s travel pattern in terms of expected change in travel behaviour in the near future, household size, and the age of household members. Information was also acquired about frequency of use of the automobile, different characteristics of the automobile including cost and year of purchase,
depreciation value, recent repair costs, type of fuel, and number of other automobiles available to the household.

Aspiration level was first measured with a set of three questions aimed at assessing the lowest acceptable quality for an automobile of the same usage as the currently owned. First, respondents indicated 'the level' of his/her requirements on a good-bad scale from 0 to 100 corresponding to the worst possible automobile (legal to drive) and the best possible (a brand new) automobile. The same question was asked another two times with the good-bad dimension replaced with high-low quality and high-low standard, respectively. Secondly, more specific questions were asked concerning safety, reliability, comfort for passenger and driver, loading capacity, insurance, repair and service costs, horsepower/top speed, fuel consumption, heat and ventilation, acceleration capacity, design, the joy of driving, and level of noise from the engine, from the exhaust gear, and from wind. Also in this case respondents indicated the lowest acceptable quality. Respondents indicated the lowest acceptable level on a scale ranging from 0 to 100 corresponding to the worst possible automobile and the best possible automobile.

After questions about knowledge of technological innovations and interest in automobiles, questions were asked with the aim of measuring environmental concern, i.e. a direct self-report measure of environmental concern. Subjects indicated how environmentally concerned they were on a scale from 0 to 100 corresponding to very little and very much.

The perceived level of quality of the currently owned automobile was then measured in a parallel way to aspiration level. On the same scales from 0 to 100, respondents indicated the quality level of the automobile they owned.

Questions were then asked about purchase intentions. The design of these questions followed earlier studies (Pickering 1984). In one set of questions, respondents indicated on 7-point numerical scales ranging from no intention to very strong intention whether they intended to replace the automobile in 3 months, 6 months, 12 months, or 2 years. The other set of questions asked how likely respondents were to replace the automobile in 3 months, 6 months, 12 months, and 2 years. Subjects responded on a 7-point scale with verbally defined steps defined as absolutely certainly not,

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35 See also Juster (1966), Ajzen and Fishbein (1977) and Ajzen (1980).
very unlikely, rather unlikely, neither likely nor unlikely, rather likely, very likely, and absolutely certain. For both sets of questions, the interviewer stopped if respondents indicated a 7 (absolutely certain), since it was assumed that if the respondents were certain of their intention and expectation to replace the automobile within three months they were also assumed certain to replace it within six months, one year and two years.

In the next section of the questionnaire questions regarding future choice of automobile and the likelihood of, at that time, purchasing a brand new or a used vehicle were asked. The households’ investment plans concerning other durables than the automobile were also investigated through a question as to whether they intended to purchase any other goods with a price level around 10 000 SEK within the following 12 months.

This was followed by questions asked to control consumer confidence. A set of nine questions concerning the respondents’ confidence in personal budget and economic climate within the future 12 months. Similar questions concerned their thoughts over the past 12 months. Respondents rated to what degree they thought prices would change and to what they thought would happen with the unemployment rate within 12 months. Sociodemographic questions concerning education, occupation, and income were asked at the end of the interviews.

Finally, if the respondents were either cohabiting or married, the interviewer asked at the very end of the interview if (s)he could possibly have a few words with the spouse since a replacement decision is important and of course most often made jointly in the household. The spouse was then asked five of the questions already asked earlier to the first respondent. These questions were: Who in the household decides when to replace the automobile? How much can you accept to pay for a new vehicle? What type of automobile would you expect to purchase in the future? When you replace the automobile, how likely is it that you will purchase a brand new vehicle and not a used one? And, finally, to repeat the households’ replacement intention in 4, 8, 12 and 24 months (the change from 3 and 6 months to 4 and 8 months was because the interviews were conducted every fourth months).
Register data
Additional data on actual replacement purchases was obtained from the National Register of Automobile two years after the interviews were conducted.

5.7.2 The Panel study

The objective of the panel study was to focus on the timing of the replacement decision and thus determine how aspiration and current level change over time.

Sample

The sampling procedure was initiated by estimating how long an automobile owner would have to have owned the current automobile in order to maximise the likelihood that the automobile would be replaced within the duration of the panel study - two years.

Two samples were drawn from the National Register of Automobile. Each sample included 300 automobile owners; one sample consisted of individuals who bought the currently owned automobile new, and the other consisted of individuals who bought the currently owned automobile on the second hand market. For each individual, the number of months he/she had owned the current automobile was registered and denoted $X$. The number of automobile owners, denoted $f_i$, and the ratio of automobile owners, $p_i = f_i/300$, $i=1,2,...,I$, that had owned the automobile for $i$ months were estimated (the longest time a subject had had the current automobile was $I=113$ months and $I=114$ months respectively.

In order to know how long an automobile will be owned there is also a need to know how long a period of time will elapse from the time of the sample until the automobile is sold (replaced), this time denoted $Y$. Such data was not accessible however. The solution to this problem was the following assumption; as the sample was made randomly, the automobile owners were assumed to be, on an aggregate level, as far away from their time of purchase as from their time of disposal. In statistical terms, this means that the distribution of $Y$ would be approximately the same as the distribution of $X$. The empirical distribution of $X$ is generated through the estimations of $p_i$. The total time an automobile is owned, $Z$, is the sum of the time the automobile is owned at the point of the sampling and the time that will elapse until it is sold, i.e $Z=X+Y$. 
Estimating the probability of keeping an automobile for a certain number
of months, i.e. the frequency distribution of Z, was the next next problem.
The frequency distribution of Z, is estimated as;
\[ s_k = \sum_{\max\{a,k-1\} < i < k} p_i p_{k-i}, \quad k=2,3,\ldots,2I. \]

From these probabilities, the probability of replacing the automobile
within a given time frame, \(a\) months, is estimated given that is has been
owned for \(b\) months (\(a\) is equal to the length of the study).
\[ r_{a,b} = \frac{\sum_{b<k} s_k}{\sum_{b<k} s_k}. \]

The goal was to make the likelihood as great as possible, i.e. to estimate
the lengths of ownership time that would result in the maximum number
of automobile replacements during the survey period of \(a\) months. In
other words, the goal was to select \(b\) so that \(r\) was maximised.

The result indicated that within a relatively long time span, the time the
automobile had been possessed by the current owner, had no significant
effect on the chance of increasing the replacement probability during the
survey period, i.e. \(r\) was relatively constant, independent of \(b\). The
sampling decision regarding the criteria for selecting automobiles was
still made according to length of ownership, but instead of selecting all
automobiles all with the same length of ownership, three different
lengths of ownership were used. The three different lengths of ownership
had in the previous analysis shown the same probability to result in a
replacement during the time of the survey. In summary, one third (in the
first wave 207 respondents) of the selected automobiles had been owned
by the respondents for 24 (in the first wave 215 respondents) months, one
third had been owned by the respondents for 48 (in the first wave 210
respondents) months and one third had been owned by the respondent for
72 months. The distance from purchase date were constant at each new
wave, i.e. independent on when the household were recruited the
automobile had been in their possession for 24, 48 or 72 months at the
time of the first interview.

The sample of respondents was selected by means of a procedure
entailing the following steps. During the first wave, 632 households were
selected through the owned automobile. Of these, 409 agreed to
participate. In the second wave, 27 households had replaced the selected
automobiles and 25 households refused to continue in the panel. An additional sample of 129 households were selected. In Table 5.2 the figures for each wave are presented.

Table 5.2 Number of Household Recruited and Participating in Each Wave

<table>
<thead>
<tr>
<th>Wave</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Sampled</td>
<td>632</td>
<td>129</td>
<td>195</td>
<td>127</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Not reached</td>
<td>17</td>
<td>9</td>
<td>10</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Incorrect phone number</td>
<td>50</td>
<td>15</td>
<td>8</td>
<td>13</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Refused to enter panel</td>
<td>120</td>
<td>34</td>
<td>55</td>
<td>45</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Household added to panel</td>
<td>-</td>
<td>71</td>
<td>117</td>
<td>63</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total in panel</td>
<td>480</td>
<td>550</td>
<td>538</td>
<td>497</td>
<td>436</td>
<td>388</td>
<td>351</td>
<td>36</td>
</tr>
<tr>
<td>Replacements of current automobile</td>
<td>-</td>
<td>27</td>
<td>14</td>
<td>14</td>
<td>27</td>
<td>19</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Refused to continue in panel</td>
<td>-</td>
<td>14</td>
<td>35</td>
<td>16</td>
<td>19</td>
<td>16</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Misc drop-outs.</td>
<td>36</td>
<td>11</td>
<td>26</td>
<td>11</td>
<td>15</td>
<td>13</td>
<td>7</td>
<td>41</td>
</tr>
<tr>
<td>In panel</td>
<td>409</td>
<td>436</td>
<td>475</td>
<td>497</td>
<td>436</td>
<td>388</td>
<td>351</td>
<td>288</td>
</tr>
</tbody>
</table>

Sample representatively
Characteristics of the newly recruited households that agreed to participate and characteristics of those with which we were not able to get in contact are compared. The results indicate that there are no differences between reached and non-reached households with respect to year of manufacture, purchase year and age of owner. The only noteworthy difference is that the average age of owners who do not participate due to problems concentrating and understanding questions differs significantly from the sample population. This group is however less than 1\% for all four waves. In Wave 1, four respondents and in Wave 2, no respondent. In Wave 3 and 4 there were one at each wave missing. In other words there is no indication that households that were not contacted differ from the households incorporated in the panel.

Interviews
The telephone interviews in Wave 1 were conducted by 21 trained students. In the first wave the interviews were partly performed through a marketing research firm. Half of the interviews were made at TRUM and

\[36\] In Appendix 6 the missing household development over time is illustrated. Characteristics of the households in the panel are briefly compared with characteristics of newly recruited households.
half at Marknadsfakta in Härnösand. However, it was found to be more convenient to hire our own interviewers for the following waves. For the following waves, Wave 2-7, 13-22 students performed the telephone interviews.

**Recruit questionnaire**
The questionnaire used in the cross-sectional study was used as the recruit, or first wave interview in the panel study. Only a few changes were made. For instance, probability questions with verbal scales were better in predicting actual behaviour than purchase intention questions with numerical scales. In order to test probability vs intention, a change to numeric scales for both sets of questions was made. In addition, only one question about technological innovations was left in the questionnaire and questions about styling were left out. In order to fully address the concept of technology and styling an additional set of questions was believed to be required, but as the ambition was not to exceed 30 minutes per interview, such questions were omitted (the ‘recruit questionnaire’ is found in Appendix 1).

Apart from the questionnaire used in the cross-sectional study, two more questionnaires were developed. A second reduced questionnaire was used for the follow-up interviews (Wave 2-7). This questionnaire differed from the recruit questionnaire with respect to questions about background, personality, and questions asked to the spouse. A third questionnaire was used if the household had replaced the selected automobile.

**The follow-up questionnaire**
In the background section most of the questions concerning the selected vehicle, such as type of fuel, purchase price and year were excluded in this interview. However, the follow-up interview included questions on whether or not the selected automobile was still the household’s main or extra vehicle, if the respondents still had the same profession, and if they still worked the same hours per week. Respondents were also asked if they were single, cohabiting or married. If a change in either of the above had occurred, respondents were asked why and asked to describe their current status. Finally, the section with personality questions was excluded in the follow-up interview as well as the interview with the spouse (see Appendix 2).
The replacement questionnaire
The third questionnaire was used when interviewing respondents who had replaced the selected automobile. Compared to the recruit questionnaire, many changes were made.

However, the same types of background questions as in the follow-up interview were asked in the first section. Questions were then asked about reasons for replacing the automobile, and what attributes were most important in the process and how important the attributes were perceived to be. Respondents were then asked to describe the three most important attributes in choosing the new vehicle. Later in the interview questions were asked about how long they had thought of replacing the automobile, and whether respondents searched for information extensively.

Questions were then asked about the replaced automobile. These were structured the same way as the questions about aspiration and current level. This means that the same set of questions were asked for minimum acceptable quality requirement of a automobile, quality rating of the newly purchased automobile, and quality rating of the replaced (old) automobile.

Eight questions about individual and collective values and three questions about risk perception were asked towards the end of the final interview. The replacement questionnaire is found is Appendix 3.
6  DESCRIPTION OF PARTICIPANTS

6.1  CHOICE OF RESPONDENTS IN MULTI-PERSON HOUSEHOLD

The findings presented in this section are based on the cross sectional study.

In many households the decision to replace a durable is a decision that is made jointly within a dyad. With knowledge of how the joint decision process differs from the individual decision process, some differences might be taken into account. One very important question for this study is whom to interview. The selection of the household representative has to be made carefully. It could even be questioned whether one representative can be chosen to represent the joint decision process.

6.1.1  The Joint Decision Process

Some decisions are made by one person in the household and are named autocratic decisions. Other decisions are made jointly and called syncratic decisions. Four factors seem to determine whether a family decision is made by one of the spouses or made jointly (Sullivan and O’Connor 1988; Lavin 1993). These are, gender norms, resources, experience, interest and status.

Couples who believe in traditional stereotypes tend to divide decisions into typical ‘feminine’ and typical ‘masculine’ and research has shown that societal gender norms prescribe which decision a spouse should make. Decisions are therefore divided within the family (see also Davis 1970). Kirchler (1988) summarises a number of studies investigating the wife’s and husband’s influence and role in purchase decisions. He argues that wives decide more over non-durable goods and less expensive products whereas the husband has more influence over durables, increasing with cost of financial risk. There is also a tendency in the past research that the wife has more impact on traditionally female-related items and the husband’s influence is dominant when dealing with typically masculine products such as automobiles. A study by Kim and Lee (1989) did however show that the more modern a sex-role attitude women held, the more equally they tended to share the influence over
expenses and savings with the husband. In such cases domestic chores were also carried out more jointly.

Spousal financial resources are the second factor believed to influence the joint decision process. The spouse with the largest contribution of resources has greater influence. The third factor, experience, has the effect that individual decisions are more common when a family has experience of making decisions together. Finally, socio-economic status seems to determine the spouses' relative influence, in that middle class couples make joint decisions (cf. Gupta et al., 1983)

Many of the household studies with the family as decision unit have predominately focused on the process rather than on the outcome of such processes. For instance, Davis (1970) argues that the joint decision process is different from the individual decision process, not only in terms of the unit but also in terms of the process. This process has to some extent been investigated by Park (1991) and Park and Lutz (1982). One salient finding has been the spouse's inability to predict or report his/her respective roles in a joint decision.

According to Park (1991), there are two major factors explaining the dyad's (husband and wife's) lack of mutual interaction. First, some types of individual decision making demand considerable effort from the individual (primarily extended problem solving). It is therefore understandable that the process and effort of adding another cognitive burden, the one of realising the spouse's preference function, is one of great resource use and therefore not often possible for the individual to perform.

Second, evaluating and realising the preference function and decision strategy of the husband or wife is not easy even if a lot of hard work is put into the task. In this context, research by Curry and Menasco (1979) indicates that the spouse has problems recognising the dimensional weight and utility associated with each level on salient dimensions. Park and Lutz (1982) argue that the spouse has problems realising the change in preference over time, and what decision heuristic that was used in a particular situation. According to Kirshler (1988), researchers have investigated the dyad's attitude similarity. Their results show that in marketing situations spouses 'frequently have different product preferences, they are unaware of these differences and perceive the other's preferences inaccurately'.

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Park (1991) argues that each spouse follows his or her own decision rule in order to maximise his or her own utility rather than maximising the joint utility. One important ingredient in the joint decision process is the attempt to avoid conflict. This will in turn often lead to a recursive and discontinuous decision process. This conflict avoidance strategy is commonly called 'the muddling through process'.

In the study by Park (1991), it is revealed that there is no convergence in decision strategy between dyad members over different choice stages. The results from this study support the notion that each spouse follows his or her own decision rules in order to come to a choice. Park also found that there seems to be no support for the idea that husbands incorporate the decision strategy of the spouse less than wives. Park also states that the lack of correspondence in choice criteria suggests that the dyad reaches a decision for mostly different reasons. In a study from 1985, Williams and Thomson found a moderate correlation between the partner's desires for children and their perception of the other's desire. Williams and Thomson did however argue that a single spouse could be trusted (i.e. used as a representative for the household), but that data from both spouses was preferred when predicting family economic decision.

6.1.2 Reported Influence

Reported influence by registered owner

The choice of respondent in multi-person households entailed the following steps and was made in accordance with findings of Davis (1970). The registered automobile owner was chosen if he or she reported equal or more influence in the decision. If the registered owner indicated that the spouse had more influence the spouse was interviewed instead. The registered automobile owners, self-reported relative influence on when the household will replace their current automobile is presented in Table 6.1. As can be seen, very few of the registered owners think that their spouse has more influence than they have. Among multi-person households, (with at least two adults), 97 percent of the registered owner perceived their influence as equal or greater than their spouse influence. Where the registered owner said that he or she had lessor no influence

37 The use of influence tactics in joint decision making has recently been investigated by Kirchler (1993), in which he found that the influence tactics that were used were dependent on type of conflict gender, spouse's dominance pattern, marital satisfaction, and lengths of marriage.

38 The 'muddling through process' derives from organisational decision making (see Lindbloms work on muddling through (1959; 1979)).
over when the automobile was to be replaced (3 percent or 15 individuals), the spouse was selected for the interviews instead.

<p>| Table 6.1 The Registered Owners Perceived Influence in the Decision when to Replace the Automobile (in Multi-Person Households - Two Adults). |</p>
<table>
<thead>
<tr>
<th>Cross-sectional Study</th>
<th>The Panel Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have all the influence</td>
<td>16 %</td>
</tr>
<tr>
<td>I have the major influence</td>
<td>21 %</td>
</tr>
<tr>
<td>My spouse and I have equal influence</td>
<td>61 %</td>
</tr>
<tr>
<td>My spouse has the major influence</td>
<td>1 %</td>
</tr>
<tr>
<td>My spouse has all the influence</td>
<td>1 %</td>
</tr>
</tbody>
</table>

Reported influence by registered owner and by the spouse
In the recruit interview, the question of perceived relative influence was also asked to the spouse. The results showed that in 62 percent of the participating households, the dyad agreed on each others influence. Household agreement can be reached in three different ways; (1) both members state that they have the same influence as their spouse, (2) one spouse perceives herself/himself to have more influence and the other spouse, correspondingly perceives less influence, or (3) one spouse perceives herself/himself to decide the time of a replacement independently of the other, the other spouse also perceiving herself/himself as having nothing to do with the decision. In 46 percent of the households, both spouses perceive that they had equal influence on the decision, i.e. both stated that they perceived equal influence. The result is presented in Table 6.2 In 46 percent of the households both spouses perceive that they had equal influence on the decision, i.e. both stated that they perceived equal influence.

<p>| Table 6.2 Distribution of Expressed Influence. Absolute Frequency. |
| Registered owner |</p>
<table>
<thead>
<tr>
<th>Spouse</th>
<th>I decide all</th>
<th>I have major influence</th>
<th>We have equal influence</th>
<th>My spouse has major influence</th>
<th>My spouse decides all</th>
</tr>
</thead>
<tbody>
<tr>
<td>I decide all</td>
<td>0</td>
<td>1</td>
<td>16</td>
<td>9</td>
<td>23</td>
</tr>
<tr>
<td>I have major influence</td>
<td>1</td>
<td>1</td>
<td>35</td>
<td>33</td>
<td>7</td>
</tr>
<tr>
<td>We have equal influence</td>
<td>2</td>
<td>10</td>
<td>168</td>
<td>41</td>
<td>8</td>
</tr>
<tr>
<td>My spouse has major influence</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>My spouse decides all</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
As illustrated in Table 6.3, there is better predictability among households where the dyad agrees on their respective relative influence, than if they disagree. For example, when expectations were stated for three months, 63 percent of the answers corresponding with an actual replacement behaviour were provided by the household who agreed, and 37 percent of the answers with a corresponding behaviour were provided by households who did not agree on their respective relative influence. Similar results are found for six months, one year and two years.

Further, in cases where household members agree on their relative influence, the answer from the respondent is not found to provide better predictions than the spouse’s does. As can be seen in Table 5.5, among dyads who agree, on their relative influence a high correspondence between the spouse and actual behaviour is found. In the case of stated expectations within three months 63 percent answers provided by the spouses’ in agreeing households corresponded to actual behaviour. The same figures for households disagreeing on their relative influence only 37 percent of the answers corresponded to actual behaviour. However, in cases where spouses disagree on their relative influence, neither his nor her answer has predictive power.

<table>
<thead>
<tr>
<th>Correct answers provided by household member when they:</th>
<th>Agree on their respective relative influence</th>
<th>Disagree on their respective relative influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three months (n=313)</td>
<td>63% (63%)</td>
<td>37% (37%)</td>
</tr>
<tr>
<td>Six months (n=288)</td>
<td>65% (64%)</td>
<td>35% (35%)</td>
</tr>
<tr>
<td>One year (n=218)</td>
<td>67% (65%)</td>
<td>33% (35%)</td>
</tr>
<tr>
<td>Two years (n=147)</td>
<td>64% (63%)</td>
<td>36% (37%)</td>
</tr>
</tbody>
</table>

Having 62 percent of the households agreeing on their relative influence also implies that 38 percent of the participating households disagree about the extent of each other’s influence. The results further indicate that level of agreement among household members significantly affects the predictive ability of the questions to determine the timing of a replacement decision.
6.1.3 Discussion

William and Thomson (1985) found a moderate correlation between partners desire for children and their perceptions of their spouse’s desire for children, and argued that a single spouse could be trusted as a representative for the household’s opinions or intentions. This study provides further support for the accuracy of interviewing one of the household dyad in predicting the time of a replacement decision. It was found that when both spouses agreed on their influence, both answers had the same predictive power. Where the spouses disagreed on their relative influence predictability decreases for both spouses. This implies that even if the interviews are conducted with both spouses, it is hard to increase predictability. Based on the previous findings and the findings from this study, it is concluded that one spouse’s answer can be used as an approximation representing the dyad’s opinion.  

6.2 CROSS SECTIONAL STUDY

Demographics

In the cross-sectional sample 70 percent of the participants, i.e. registered automobile owners were male and, consequently 30 percent were female. Of the participants 50 percent were older the 45 years and 10 percent were older than 60 years. The average age for the male owners was 44 years of age and for female owners the average age was 45 years. Of the participants almost 75 percent were married or cohabiting (17 percent were married, 58 percent were cohabiting) and 25 percent were single. A little more than 60 percent of the participants had one child or more and 3 percent had four children or more.

Type and number of automobiles

In the participating households, 32 percent of the selected automobiles were bought new by the current owner and 68 percent were bought used. As illustrated in Table 6.4, most of the selected automobiles were manufactured between 1985 and 1990.

39 It could be pointed out that even if both spouses were interviewed, there are no guidelines for how to merge the respective answers. Interviewing the couple jointly and allowing them to discuss each question with each other is another possibility. These procedures are, however, outside the scope of this study.
### Table 6.4 Year of Manufacture, and Year of Purchase by the Current Owner, for the Automobiles Included in the Cross-sectional Study

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Year of purchase</td>
<td>1%</td>
<td>1%</td>
<td>3%</td>
<td>14%</td>
<td>15%</td>
<td>15%</td>
<td>16%</td>
<td>16%</td>
<td>17%</td>
<td>2%</td>
</tr>
</tbody>
</table>

Almost 60 percent (332 households) of the participating households had one automobile. Another 35 percent had two, and less than 1 percent had more than three automobiles.

In households with more than one automobile the selected automobile was defined as either the ‘main’ or an ‘extra’ automobile. The criterion for defining the automobile as the main rather than an extra was the automobile usage in kilometres. The automobile used the most, in kilometres driven, was defined as the main automobile. Of the 40 percent who had more than one automobile, 70 percent said that the selected automobile was the main automobile in the household. A total of 30 percent of the households ranked the selected automobile as an ‘extra’ automobile.

A considerable number (80 percent) of the selected automobiles used unleaded fuel, 18 percent used leaded and 2 percent used diesel. A majority (60 percent) of the selected automobiles were categorised by the respondent to be used by one person and 40 percent used the automobile for specific reasons, i.e. shopping trips, picking up from day-care etc.

Finally, a Volvo was owned by 25 percent of the respondents, 10 percent of the respondents owned a Ford and 10 percent owned a Saab. Around 8 percent of the respondents owned a Toyota.

### 6.3 PANEL STUDY

**Demographics**

Of the respondents participating in the panel, 77 percent were men and 23 percent were women. Of the respondents 50 percent were younger than 50 years and 10 percent were younger than 20 years. The average age for the male owners was 46 years and the average age for the responding female automobile owners was 49 years. 64 percent of the respondents were married, 17 percent cohabited and 19 percent represented single
adult households. A majority of the respondents (57 percent) had no children. Around 10 percent of the participants had 3 children or more, and 3 percent had 4 children or more.

### Type and number of automobiles

In total 29 percent of the respondents had bought the currently owned automobile newly manufactured and 71 percent had bought the currently owned automobile on the second hand market. Table 6.5 illustrated the distribution of year of manufacture of the automobiles and year of purchase by the current owner.

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>1</td>
<td>11</td>
<td>15</td>
<td>24</td>
<td>17</td>
<td>11</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Year of Purchase</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>29</td>
<td>4</td>
<td>30</td>
<td>4</td>
<td>30</td>
<td>4</td>
</tr>
</tbody>
</table>

Of the participating households 36 percent had more than one automobile and 4 percent had more than two automobiles. For 73 percent of the households with more than one automobile the selected automobile is perceived as being the main automobile, i.e. the most used automobile, in kilometres, within the family. 60 percent of the households classified the sampled automobile as primarily being used by one person and in 40 percent of the households the sampled automobiles were categorised as used mainly for a purpose.

Of the automobiles 88 percent used unleaded fuel, 11 percent used leaded fuel and 2 percent used diesel.

A large proportion of the participating households owned a Volvo, 23 percent had a Volvo. Of the participating households 10 percent owned a Ford, Saab and Toyota respectively and 8 percent owned a Volkswagen. Other automobile brands represented in the study are for example Mazda (7 percent), Opel (7 percent), Audi (4 percent), Peugeot (3 percent), Mitsubishi (2 percent), etc.
6.4 DESCRIPTION OF ACTUAL REPLACERS

The respondents were interviewed when a replacement was made within the household. A total of 129 households replaced their automobile during the two and a half years the panel existed\textsuperscript{40}.

**Disposition of the replaced automobile**

Of the 129 respondents who replaced the selected automobile during the panel's life-time, 93 percent stated that they had replaced the old automobile with a newly purchased automobile. The remaining 7 percent had either bought an alternative transport mode, such as a motorcycle, or had decided not to buy a replacement product. A couple of respondents also said that they had divorced or separated and that in the separation the selected automobile had been claimed by the ex-spouse.

Almost every respondent (98 percent) who replaced the selected automobile said that the new automobile was to be used regularly in the household. The remaining 2 percent held that the new automobile was bought for the purpose of summer driving or for 'cruising'.

The disposal of the old product for a majority of respondents occurred at the same time as the new automobile was bought. About 25 percent did not match the time of disposal with the time of purchase. The old automobile was disposed of in different ways. In 63 percent of the cases, the old automobile was sold to a car dealer, 28 percent sold the automobile to another household, and 3 percent said the old automobile was sent to the dump.

A closer look at the characteristics of the household who actually replaced the automobile during the study, revealed that 86 percent were married or cohabiting. A comparison of individuals who replaced the automobile during the period with individuals who did not show no indication that replacers differed from non-replacers. See Table 6.6

\textsuperscript{40} At the beginning of this research the plan was to get as many household as possible that actually did replace their automobile. Moreover, the plan was to have at least three interviews before an actual replacement was carried out to be able to follow the decision process. However, too few actual replacements were made, allowing such analysis.
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Replacers</th>
<th>Non-replacers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacture year of automobile (mean)</td>
<td>1989</td>
<td>1989</td>
<td>1989</td>
</tr>
<tr>
<td>Average km driven per years (mean)</td>
<td>15890</td>
<td>16980</td>
<td>16100</td>
</tr>
<tr>
<td>Reimbursed by employer (relative share)</td>
<td>21%</td>
<td>15%</td>
<td>16%</td>
</tr>
<tr>
<td>Single automobile household (share)</td>
<td>67%</td>
<td>63%</td>
<td>64%</td>
</tr>
<tr>
<td>Disposable income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 150 000</td>
<td>16%</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>150 000 - 300 000</td>
<td>66%</td>
<td>62%</td>
<td>63%</td>
</tr>
<tr>
<td>300 000 -</td>
<td>18%</td>
<td>17%</td>
<td>16%</td>
</tr>
</tbody>
</table>
PART FOUR

RESULTS AND DISCUSSION

In the result section data and data analysis are interspersed with discussions and interpretations of the results. Under each main heading data is first presented and then discussed. In the end a general discussion is found. The general discussion aims to summarise the results and discuss the consequences of the results for the central question of this thesis - the timing of a replacement decision from the three perspectives discussed initially.

7 ATTITUDE AND BEHAVIOUR CONSISTENCY

The first issue addressed in the results and discussion part of the thesis is perhaps a more methodological issue then the questions addressed later on. The issue of purchase intention vs purchase expectations and their respective correspondence with actual purchase is however important for later analysis and is therefore dealt with here. As mentioned previously (in section 3.3) research on attitude-behaviour consistency suggests that in comparison with intentions, measures of expectations yield even better results when predicting actual behaviour (Juster 1966; Sheppard et al. (1988). In this chapter analysis of intention and expectation data is evaluated in terms of predictability in replacements decisions.

These findings are based on the cross sectional study
As previously discussed research has found that expectation data correlates with actual behaviour better than intention data. In the following section (section 7.1) the correspondence between stated intention vs stated expectation to replace the currently owned automobile, and actual replacements are discussed. As the intention questions had a numerical scale and the expectation questions had a verbal scale, the first analysis is based only on answers given at the endpoints of the scales. In the second analysis (section 7.2) full scales are used and the issue of corresponding time entity is addressed. It is acknowledged that the scales are not perfectly comparable, but the issue is not to compare the scales and the wording of the questions, but to test the relationship between stated behaviour and actual behaviour when the measures of stated behaviour and the measures of actual behaviour do not correspond on the time entity.

Expectation or intention data
In order to test the assumption that expectations provide better predictions than do intentions logistic regression, a logit analysis, was performed. The results from the regression analyses are illustrated in Table 7.1. In the model, the dependent variable, y, is denoted 1 for a
replacement made within the stated time frame and 0 elsewhere. The independent variable is replacement intention and replacement expectation and due to the variation in numerical and verbal scale, the figures subject to analysis in the regression analyses are the endpoints of each scale.

Table 7.1 Predictability for Intentions and Expectations, with a Correspondence in Time Between Measurement and Behaviour. Only Endpoints of the Scales are Subject to Analysis.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Three months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>.3765</td>
<td>.6629</td>
<td>.5701</td>
</tr>
<tr>
<td>Intentions</td>
<td>.2796</td>
<td>.6697</td>
<td>.6763</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.9969</td>
<td>.8417</td>
<td>.0000</td>
</tr>
<tr>
<td><strong>Six months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>.4529</td>
<td>.2174</td>
<td>.0373</td>
</tr>
<tr>
<td>Intentions</td>
<td>.1014</td>
<td>.2051</td>
<td>.6209</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.6052</td>
<td>.4713</td>
<td>.0000</td>
</tr>
<tr>
<td><strong>Twelve months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>.3385</td>
<td>.1502</td>
<td>.0242</td>
</tr>
<tr>
<td>Intentions</td>
<td>.0999</td>
<td>.1619</td>
<td>.5371</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.4178</td>
<td>.3229</td>
<td>.0000</td>
</tr>
<tr>
<td><strong>Two years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expectations</td>
<td>.2294</td>
<td>.0977</td>
<td>.0188</td>
</tr>
<tr>
<td>Intentions</td>
<td>.2220</td>
<td>.1174</td>
<td>.0586</td>
</tr>
</tbody>
</table>

The number of actual replacements made within the corresponding time are rather few, especially for the time frame of three months. Only 15 percent of the individuals who stated a strong intention or expectation to replace the currently owned automobile within three months actually replaced the automobile within three months. The corresponding figure is 0% among non-intenders, that is, among individuals who stated that they had no intention to replace the currently owned automobile within three months no individual replaced the automobile. Of individuals who stated a strong intention or expectation to replace the currently owned automobile within six months, approximately 30% replaced the automobile within the stated time frame. Among individuals stating a weak intention or expectation to replace the currently owned automobile within six months, 1 percent replaced the automobile within six months. For the time horizon of twelve months, the figures are 35 percent for those with a strong intention or expectation and 3 percent for those with a weak intention or expectation to replace the currently owned automobile.
RESULTS AND DISCUSSION

For the time frame of two years the corresponding percentage is 50 percent and 15 percent respectively.

Table 7.1 indicates that, for all time frames except three months, expectations are better than intention data in predicting actual behaviour. Expectation data also provides significant explanation for all time frames with the exception of three months.

7.2 MEASURING STATED BEHAVIOUR AND ACTUAL BEHAVIOUR WITH A CORRESPONDING TIME ENTITY

One characteristic of replacement decisions is that the old product will sooner or later be replaced with a new product. For instance, an intention to replace the automobile within three months will have a higher probability to be carried out in one year than in three months, due to unexpected events. Estimation problems related to the time entity are partly supported by Pickering (1984), who suggests that different types of people systematically tend to overestimate and underestimate their true purchase probability. Indirect support for this estimation problem is given in studies showing that individuals tend not to be particularly good forward planners (Cripps and Meyers, 1994). That finding is argued to be one of the most robust findings in dynamic decision making. One well-known consequence of limiting forward planning is that the consumer often gives little weight to opportunity cost compared to out-of-pocket cost in economic decision situations. At each point in time, the immediate dollar cost of a replacement will seem more salient than the long term benefit of a replacement decision (Meyer and Assunaco, 1990). This implies that actual replacements are forwarded longer than initially intended. Therefore, buyers can be expected to replace durables at a lower rate than that predicted by stated expectation or intention.

In order to test the idea that stated intentions or expectations within one time frame might better predict behaviour in a more distant future, logistic regression analyses were again performed. The dependent variables are denoted 1 for replacements made within the stated time frame and 0 elsewhere. The independent variables are replacement intention and replacement expectation. Results from the regression analyses, presented in Table 7.2, reveal that the predictability of expectation data for three months is slightly better at predicting actual replacements within six
months than within three months. However, stated expectation to replace the currently owned product within three months does not work well in predicting actual replacements within twelve months and two years.

Table 7.2 Predictability for Intentions and Expectations for Actual Behaviour. The Predictability is Shown Both with a Correspondence Between Measurements and Behaviour and with a Time Lag Between Measurement and Behaviour.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>S.E.</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Measurement data for three months and actual replacement within three months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>-1.613</td>
<td>2.551</td>
<td>0.5272</td>
</tr>
<tr>
<td>Expectations</td>
<td>0.7580</td>
<td>2.769</td>
<td>0.0062</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.8652</td>
<td>6.881</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for three months and actual replacement within six months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>-1.714</td>
<td>2.454</td>
<td>0.4850</td>
</tr>
<tr>
<td>Expectations</td>
<td>0.7946</td>
<td>2.817</td>
<td>0.0048</td>
</tr>
<tr>
<td>Constant</td>
<td>-6.0076</td>
<td>7.642</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for three months and actual replacement within twelve months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>-0.0062</td>
<td>3.214</td>
<td>0.9846</td>
</tr>
<tr>
<td>Expectations</td>
<td>0.458</td>
<td>3.604</td>
<td>0.2161</td>
</tr>
<tr>
<td>Constant</td>
<td>-5.7339</td>
<td>8.137</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for three months and actual replacement within two years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentions</td>
<td>-1.791</td>
<td>4.362</td>
<td>0.6814</td>
</tr>
<tr>
<td>Expectations</td>
<td>0.8755</td>
<td>5.398</td>
<td>0.1048</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.7995</td>
<td>1.7121</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for six months and actual replacement within six months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>0.1836</td>
<td>0.3038</td>
<td>0.5457</td>
</tr>
<tr>
<td>Expectation</td>
<td>0.3243</td>
<td>0.3102</td>
<td>0.2957</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.3912</td>
<td>0.4303</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for six months and actual replacement within twelve months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>0.1422</td>
<td>0.2048</td>
<td>0.4874</td>
</tr>
<tr>
<td>Expectation</td>
<td>0.3566</td>
<td>0.2033</td>
<td>0.0795</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.1587</td>
<td>0.2548</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for six months and actual replacement within two years</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>0.2619</td>
<td>0.1912</td>
<td>0.1707</td>
</tr>
<tr>
<td>Expectation</td>
<td>0.3277</td>
<td>0.1766</td>
<td>0.0635</td>
</tr>
<tr>
<td>Constant</td>
<td>-2.0954</td>
<td>0.1919</td>
<td>0.0000</td>
</tr>
<tr>
<td><strong>Measurement data for twelve months and actual replacement within twelve months</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>0.1794</td>
<td>0.1908</td>
<td>0.3471</td>
</tr>
<tr>
<td>Expectation</td>
<td>0.2014</td>
<td>0.1988</td>
<td>0.3110</td>
</tr>
<tr>
<td>Constant</td>
<td>-3.2200</td>
<td>0.2933</td>
<td>0.0000</td>
</tr>
</tbody>
</table>
Measurement data for twelve months and actual replacement made within two years

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Intention</td>
<td>0.0780</td>
<td>0.1402</td>
</tr>
<tr>
<td>Expectation</td>
<td>0.2829</td>
<td>0.1436</td>
</tr>
<tr>
<td>Constant</td>
<td>2.0686</td>
<td>1.961</td>
</tr>
</tbody>
</table>

The same tendency, i.e., that a time lag between the specified time frame in the measurement of expectation and measurement of actual behaviour increases the predictability, is also found for the time frame of six months. Data collected for six-months better predicts behaviour within twelve months and even within two years. Furthermore, expectation data for replacements within twelve months better predicts behaviour within two years than in twelve months.

7.3 DISCUSSION

In the first analysis a comparison between intentions and expectations shows that expectations yield better results than intentions in predicting actual replacement behaviour. Thus, replacement expectation data will be used in later analysis of the model (Chapter 9). It should be noted, however, that only the end points of the scale was subject to analysis as one of the scales is numeric and one is verbal.

In later analyses the results supported the assumption that, in the case of replacement decisions, a time lag increases the correspondence between stated behaviour and actual behaviour. One reason might be that the effect of unexpected events is reduced as time works in the same direction as strong expectations; (sooner or later a replacement has to be made). The results indicate that a curve with the shape of an inverted U, can describe the predictability for stated and actual behaviour over time. For a question with a specified time frame, predictability increases if a time lag is allowed, (the measurement of the actual behaviour is made at a later point in time than the question indicates). With a longer time lag, the number of replacements made by individuals who indicate a weak intention or expectations increases and thus predictability decreases. The results indicate that individuals tend to underestimate the amount of time needed for a replacement purchase to be carried out.
As discussed in Chapter 2, aspiration level and current level can be seen as attitudes and it is assumed that in an evaluation process a consumer can engage in at least two types of evaluation processes, an overall evaluation of the product, and an evaluation of each of the product attributes. In the case of automobile purchases the attitude towards each attribute is then assumed to be combined in a way that produces the overall attitude. The general attitude of aspiration level and current level was measured with three different questions, as the 'level', as the 'quality' and as the 'standard' (see section 5.7.1 'questionnaire and pre-test study'). The attributes were operationalized according to the earlier studies ('Motormännen-survey') and consisted of 15 different attributes. The three general items are discussed separately and in relation to the 15 different attributes.

As illustrated in Figure 8.1 this chapter discuss the attributes’ relation to the overall attitude towards the currently owned product (current level) and that which the attitudes’ respondents have to an automobile of the same usage as the currently possessed automobile (the aspiration level). In this Chapter the structure of aspiration level and current level is first discussed and then, the importance of the different attributes is addressed.\footnote{It is here acknowledged that there is a restriction in the fact that 15 pre-decided attributes have been asked for both aspiration level and current level.}
RESULTS AND DISCUSSION

Goal setting
Comparison
Current level
3 general items, 15 specific items
Purchase intention
Intention data, Expectation data
Purchase
Actual purchase
Aspiration level
3 general items, 15 specific items
Figure 8.1 A Summary of Measurement of Different Concepts in the Proposed Model with Focus on the Factors Subject to Analysis in this Chapter.

8.1 UNDERLYING FACTOR STRUCTURE

8.1.1 Cross Sectional Data

In order to test the underlying structure of aspiration level and current level, a factor analysis was conducted. The factor analysis tests if the 15 different items or attributes tap underlying latent factors. As no specified hypothesis or particular relationships have been postulated in this thesis, as to the structure of aspiration level and current level, an exploratory factor analysis was performed with aspiration level and current level respectively. For aspiration level the variables showed a KMO = 0.92. The results are presented in Table 8.1

---

42 Technically, the main objective with factor analysis is to explain the covariance or the correlation between many observed variables through relatively few underlying factors (with a minimum loss of information).
43 Eigenvalue exceeding one has been used since an eigenvalue less than one indicates that one single determinant by itself explains more of the variance than the factor. Varimax rotation, orthogonal rotation has also been used implying that there is no correlation between the generated factors.
44 Keiser Meyer Olkin index measures the correlation between variables, pairwise. It is a reliability measure indicating whether factor analysis can/should be performed. The rule of thumb implies that KMO exceeding 0.90 is 'excellent' exceeding 0.80 is 'very good', exceeding 0.70 is 'good', and less then 0.50 is 'not acceptable'.
Determinants of aspiration level and current level

Table 8.1 Factor Loadings for the Determinants of Aspiration Level.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>.18</td>
<td>.77*</td>
<td>.27</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>.12</td>
<td>.78*</td>
<td>.33</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>.19</td>
<td>.25</td>
<td>.81*</td>
</tr>
<tr>
<td>Driving characteristics</td>
<td>.51</td>
<td>.60*</td>
<td>.34</td>
</tr>
<tr>
<td>Comfort for driver</td>
<td>.59</td>
<td>.66*</td>
<td>.15</td>
</tr>
<tr>
<td>Comfort for passenger</td>
<td>.56</td>
<td>.62*</td>
<td>.20</td>
</tr>
<tr>
<td>Luggage capacity</td>
<td>.34</td>
<td>.29</td>
<td>.45*</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>.22</td>
<td>.17</td>
<td>.80*</td>
</tr>
<tr>
<td>Engine power</td>
<td>.81*</td>
<td>.18</td>
<td>.21</td>
</tr>
<tr>
<td>Top-speed</td>
<td>.81*</td>
<td>.12</td>
<td>.26</td>
</tr>
<tr>
<td>Second hand value</td>
<td>.45*</td>
<td>.41</td>
<td>.33</td>
</tr>
<tr>
<td>Noise level</td>
<td>.44</td>
<td>.51*</td>
<td>.46</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>.76*</td>
<td>.20</td>
<td>.31</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>.76*</td>
<td>.24</td>
<td>.11</td>
</tr>
<tr>
<td>Appearance</td>
<td>.73*</td>
<td>.36</td>
<td>.24</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>.21</td>
<td>.32</td>
<td>.68*</td>
</tr>
</tbody>
</table>

Converged in 3 iterations. A total of 69 percent of the variance is explained.

As can be seen in Table 8.1, factor 1 consists of, insurance cost, engine power and top speed, heating and ventilation, acceleration capacity, appearance and joy of driving. Factor 2, consists of reliability, traffic safety, driving characteristics, comfort for driver, comfort for passenger, and heating and ventilation system. Factor 3 consists of low fuel consumption, luggage capacity, maintenance cost, second-hand value, and environmental friendliness. The three extracted factors do not reveal a distinct pattern, however, it appears that more power and expressive components relate to the first factor and more functional attributes (safety and comfort) to the second factor. It might further be argued that the third factor consists of, among others, budget-related components. However, the third factor is somewhat difficult to interpret.

For current level a factor analysis was likewise performed, with an initial KMO test = 0.88. The results are presented in Table 8.2

Factor 1 consists of driving characteristics, comfort for driver, engine power, top speed, heating and ventilation system, acceleration capacity, and appearance. Factor 2 consists of reliability, traffic safety, comfort for passengers, luggage capacity, second hand value and noise level. Factor 3 consists of low fuel consumption, maintenance cost and joy of driving.
The emerging pattern for current level is almost the same as for aspiration level. Similarly, it also appears as if the first factor consists of attributes related to power and expression, the second factor reflects functional motives, and the third factor can be interpreted as consisting of attributes related to the household economy. In this case however, the second factor is somewhat harder to interpret.

Table 8.2 Factor Loadings for the Determinants of Current Level

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>.22</td>
<td>.61*</td>
<td>.37</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>.27</td>
<td>.79*</td>
<td>.02</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>.18</td>
<td>-.02</td>
<td>.87*</td>
</tr>
<tr>
<td>Driving characteristics</td>
<td>.61*</td>
<td>.44</td>
<td>.36</td>
</tr>
<tr>
<td>Comfort for driver</td>
<td>.60*</td>
<td>.59</td>
<td>.17</td>
</tr>
<tr>
<td>Comfort for passengers</td>
<td>.55</td>
<td>.65*</td>
<td>.09</td>
</tr>
<tr>
<td>Luggage capacity</td>
<td>.10</td>
<td>.74*</td>
<td>-.01</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>.13</td>
<td>.25</td>
<td>.79*</td>
</tr>
<tr>
<td>Engine power</td>
<td>.83*</td>
<td>.23</td>
<td>.13</td>
</tr>
<tr>
<td>Top-speed</td>
<td>.84*</td>
<td>.20</td>
<td>.09</td>
</tr>
<tr>
<td>Second hand value</td>
<td>.17</td>
<td>.68*</td>
<td>.23</td>
</tr>
<tr>
<td>Noise level</td>
<td>.47</td>
<td>.52*</td>
<td>.29</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>.87*</td>
<td>.18</td>
<td>.15</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>.67*</td>
<td>.26</td>
<td>.32</td>
</tr>
<tr>
<td>Appearance</td>
<td>.73*</td>
<td>.25</td>
<td>.32</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>.46</td>
<td>.18</td>
<td>.60*</td>
</tr>
</tbody>
</table>

Converged in 5 iterations. A total of 69 percent of the variance is explained.

8.1.2. Panel Data

In order to test the robustness of the findings from the cross-sectional sample, a second factor analysis was performed with data from the first interview in the panel sample. An additional attribute, environmental friendliness, was added. Two items, noise level and second hand value, with rather low loadings for aspiration level and current level, both in the first analysis and in the second analysis were consequently excluded. The analysis reveals a more pronounced ‘three factor pattern’ for both aspiration and current level. It appears as if more expressive components determine the first factor and more functional attributes determines the second factor and the third factor seems to be more related to financial attributes.


8.2 DETERMINANT ATTRIBUTES

8.2.1 Cross Sectional Data

In order to test what attributes the respondent incorporates in the general attitude of aspiration level and current level, linear regression analyses were performed for each different measurement, the 'level', the 'quality' and the 'standard'.

For aspiration level measured as 'level', reliability, traffic safety, comfort for driver, second hand value, and acceleration capacity were shown to be significant factors. Aspiration level measured as 'quality' was explained by the same factors. Finally, aspiration level measured as 'standard' was explained by reliability, comfort for driver, engine power, and acceleration capacity. The results are found in Table 8.3.

<table>
<thead>
<tr>
<th></th>
<th>Aspiration level</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>Quality</td>
<td>Standard</td>
</tr>
<tr>
<td>Reliability</td>
<td>0.28***</td>
<td>0.23***</td>
<td>0.17**</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>0.12*</td>
<td>0.20*</td>
<td>0.05</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>0.01</td>
<td>-0.06</td>
<td>-0.09</td>
</tr>
<tr>
<td>Driving characteristics</td>
<td>0.04</td>
<td>-0.04</td>
<td>0.11</td>
</tr>
<tr>
<td>Comfort for driver</td>
<td>0.21***</td>
<td>0.25*</td>
<td>0.16*</td>
</tr>
<tr>
<td>Comfort for passengers</td>
<td>-0.05</td>
<td>-0.15</td>
<td>0.05</td>
</tr>
<tr>
<td>Luggage capacity</td>
<td>0.04</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>-0.01</td>
<td>0.05</td>
<td>0.02</td>
</tr>
<tr>
<td>Engine power</td>
<td>-0.03</td>
<td>0.02</td>
<td>0.13*</td>
</tr>
<tr>
<td>Top-speed</td>
<td>0.08</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>Second hand value</td>
<td>0.17***</td>
<td>0.10*</td>
<td>0.01</td>
</tr>
<tr>
<td>Noise level from engine, and exhaust system</td>
<td>-0.11</td>
<td>-0.14</td>
<td>-0.05</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>0.04</td>
<td>-0.02</td>
<td>-0.04</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>0.17***</td>
<td>0.14***</td>
<td>0.16***</td>
</tr>
<tr>
<td>Appearance</td>
<td>0.15</td>
<td>0.02</td>
<td>0.09</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>-0.01</td>
<td>0.04</td>
<td>-0.16</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>0.42</td>
<td>0.41</td>
<td>0.47</td>
</tr>
</tbody>
</table>

Linear regression analyses were also performed for current level and current level measured as 'level' was explained by reliability, traffic safety, second hand value, and joy of driving. Current level measured as 'quality' was explained by the same components as 'level' with the
addition of comfort for driver. Current level, measured as ‘standard’, was explained by reliability, comfort for driver, engine power and acceleration capacity. The results are found in Table 8.4.

<table>
<thead>
<tr>
<th>Table 8.4 Regression Coefficients of the Determinants of Current Level for Each Different Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current level</td>
</tr>
<tr>
<td>Reliability</td>
</tr>
<tr>
<td>Traffic safety</td>
</tr>
<tr>
<td>Fuel consumption</td>
</tr>
<tr>
<td>Driving characteristics</td>
</tr>
<tr>
<td>Comfort for driver</td>
</tr>
<tr>
<td>Comfort for passengers</td>
</tr>
<tr>
<td>Luggage capacity</td>
</tr>
<tr>
<td>Maintenance cost</td>
</tr>
<tr>
<td>Engine power</td>
</tr>
<tr>
<td>Top-speed</td>
</tr>
<tr>
<td>Second hand value</td>
</tr>
<tr>
<td>Noise level from engine, and exhaust system</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
</tr>
<tr>
<td>Acceleration capacity</td>
</tr>
<tr>
<td>Appearance</td>
</tr>
<tr>
<td>Joy of driving</td>
</tr>
<tr>
<td>Adjusted R2</td>
</tr>
</tbody>
</table>

\[ p<0.001 = ***, \quad p<0.01 = **, \quad p<0.05 = * \]

8.2.2 Panel Data

**Aspiration level**

In order to test the robustness of the findings from the cross-sectional data and to be able to directly address intra-household effects on aspiration level and current level linear regression analyses were also performed with the panel data.

In this analysis, aspiration level is explained slightly differently depending on how it is measured (full regression is found in Appendix 4). If aspiration level is measured as ‘level’, it is explained by reliability, comfort for passenger, second-hand value, and environmental friendliness. The more important reliability, comfort and second hand value become, the greater the requirements (i.e. a higher aspiration level). Interestingly, the reverse is noted for environmental friendliness, the more important environmental friendliness becomes the lower the requirements
DETERMINANTS OF ASPIRATION LEVEL AND CURRENT LEVEL

placed on the automobile. (i.e. a decrease in aspiration level). If aspiration level is measured as the required ‘quality’, aspiration level is explained by reliability, traffic safety, comfort for driver, maintenance costs, engine power and top speed, second-hand value, heating and ventilation systems, acceleration capacity, appearance and joy of driving. Finally, aspiration level measured as required ‘standard’ is explained by reliability, driving characteristics, comfort for driver, comfort for passengers, luggage capacity, insurance and repair cost, engine power and top speed, second-hand value, appearance, joy of driving, and environmental friendliness.

The same analysis was performed for current level. First a regression analysis with the 15 determinants and a time factor was performed (see Appendix 6) the change in current level measured as ‘level’ is explained by reliability, traffic safety, comfort for driver, luggage capacity, engine power and top-speed, second hand value, noise level, appearance, joy of driving and environmental concern. Current level measured as perceived level of “quality” is explained by reliability, traffic safety, fuel consumption, comfort for driver, engine power and top-speed, second hand value, noise level, heating and ventilation system, acceleration capacity, appearance and environmental friendliness. Finally, current level measured as perceived level of ‘standard’ is explained by reliability, traffic safety, driving characteristics, comfort for driver, comfort for passenger, maintenance cost, insurance and repair cost, engine power and top speed, second hand value, appearance and environmental friendliness.

The results from the regression analyses from both the cross-sectional data and from the panel data indicate that the three measures might capture the same concept, even if slightly different attributes are important depending on how aspiration level and current level is measured. Indices were therefore computed for aspiration level and current level respectively for use in later analysis. Indices were computed by averaging across the three overall ratings. Reliability test, cronbach alpha* for the three measures of aspiration level (α = 0.88) and for the three measures of current level (α = 0.89).

In Appendix 5 the results of regression analyses made with the cross-sectional data is compared to regression analyses made with the first interview in the panel study, the recruit interview, is made. The computed

* Cronbach’s alpha is a measure of internal reliability of the set of items forming the scale. The coefficient varies from 0-1, and a value of 0.6 or less is generally indicates unsatisfactory internal consistency reliability (Malhotra, 1993).
indices for aspiration level and current level are used as the dependent variable and the 15 determinants are used as independent variables. In addition, the results from the regression analysis of panel data is included in the comparison. Almost no difference is noted between the results from the cross-sectional data and the first interview of the panel study. This indicates that the findings are reasonably robust. If the results from the regression analyses based on the 'two cross-sectional samples' are compared with the results from the panel data, some small differences are found in the case of aspiration level but not in the case of current level. For aspiration level, one can perhaps notice that for example financial aspects revealed to be a little more important in the panel data than in the cross-sectional data. The interpretation of the findings from the three regression analyses is that as the two first analysis (based on the cross-sectional sample and on the recruit interview of the panel data) indicate robustness in terms of inter-household effects. However, as there are some differences between panel data and cross-sectional data this indicate that the intra-household effects might be different from the inter-household effects.

**Interaction with purchase expectation**

To assess the stability of the attributes' weights, an interaction term was added. As the decision process and timing is of great importance for the present study, the interaction term used is purchase expectation. The reason for this choice is to be able to assess if the attribute weighting is similar throughout the decision process or if the attribute weight varies, depending on a perceived distance to an expected purchase\(^\text{46}\). The results from the regression analysis is shown in Table 8.5. The same linear regression analysis was performed with current level as the dependent variable (Table 8.6).

---

\(^{46}\) It should be noted that using purchase expectation as an independent variable in this case and later as a dependent variable is somewhat problematic as the causality of purchase expectations can be questioned. Purchase expectation is used as an approximation of the decision process. It is acknowledged that this procedure opens up opportunities for alternative explanations than those given/or argued for.
Table 8.5 Regression Coefficients for the Determinants of Aspiration Level for the Panel Data.

<table>
<thead>
<tr>
<th></th>
<th>main effects</th>
<th>interaction effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>.84***</td>
<td>.0009</td>
</tr>
<tr>
<td>Traffic Safety</td>
<td>.27**</td>
<td>-.012</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>-.040</td>
<td>.011</td>
</tr>
<tr>
<td>Driving characteristics</td>
<td>.093</td>
<td>.003</td>
</tr>
<tr>
<td>Comfort for driver</td>
<td>.37**</td>
<td>.013</td>
</tr>
<tr>
<td>Comfort for passengers</td>
<td>-.10</td>
<td>.018*</td>
</tr>
<tr>
<td>Luggage capacity</td>
<td>.17*</td>
<td>-.004</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>.24*</td>
<td>-.017*</td>
</tr>
<tr>
<td>Insurance and repair costs</td>
<td>-.20*</td>
<td>.011</td>
</tr>
<tr>
<td>Engine power</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top-speed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine power and top speed</td>
<td>.28**</td>
<td>.001</td>
</tr>
<tr>
<td>Second hand value</td>
<td>.36***</td>
<td>-.001</td>
</tr>
<tr>
<td>Noise level from engine, and exhaust system</td>
<td>.12</td>
<td>-.002</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>-.26*</td>
<td>.002</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>.084</td>
<td>-.01*</td>
</tr>
<tr>
<td>Appearance</td>
<td>.42***</td>
<td>-.01*</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>.076</td>
<td>-.001</td>
</tr>
<tr>
<td>Environmental friendliness</td>
<td>-.068</td>
<td>-.003</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.58</td>
<td></td>
</tr>
</tbody>
</table>

\( p<0.001 = *** \quad p<0.01 = ** \quad p<0.05 = * \)

Aspiration level is an additive index of three measures (level, quality and standard).

When an interaction term for each determinant of aspiration level is added, i.e. each determinant is multiplied by strengths in purchase expectation, the results also indicate that some determinants change significantly in importance. Comfort for passenger, maintenance cost, acceleration capacity, and appearance changes in importance as purchase expectation increases.

When each determinant of current level is multiplied with strengths in purchase expectation, the results indicate that some determinants change significantly in importance. Reliability, driving characteristics, heating and ventilation systems, noise level and acceleration capacity change in importance when purchase expectations increase.

Overall, it should be noted that adjusted \( R^2 \) is relatively high, implying that aspiration level and current level can, to a large extent, be explained by the measured attributes or determinants.
### Table 8.6 Regression Coefficients for the Determinants of Current Level for Panel Data.

<table>
<thead>
<tr>
<th></th>
<th>main effects</th>
<th>interaction effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>,33***</td>
<td>.01*</td>
</tr>
<tr>
<td>Traffic safety</td>
<td>,26***</td>
<td>-.001</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>,06</td>
<td>-.008</td>
</tr>
<tr>
<td>Driving characteristics</td>
<td>-.068</td>
<td>.02*</td>
</tr>
<tr>
<td>Comfort for driver</td>
<td>,48***</td>
<td>-.01</td>
</tr>
<tr>
<td>Comfort for passengers</td>
<td>,02</td>
<td>.005</td>
</tr>
<tr>
<td>Luggage capacity</td>
<td>,03</td>
<td>-.002</td>
</tr>
<tr>
<td>Maintenance cost</td>
<td>,07</td>
<td>.009</td>
</tr>
<tr>
<td>Insurance and repair costs</td>
<td>,05</td>
<td>.005</td>
</tr>
<tr>
<td>Engine power</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Top speed</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Engine power and top speed</td>
<td>,33***</td>
<td>.004</td>
</tr>
<tr>
<td>Second-hand value</td>
<td>,43***</td>
<td>.001</td>
</tr>
<tr>
<td>Noise level from engine and exhaust system</td>
<td>,38***</td>
<td>,01*</td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>-.07</td>
<td>.001**</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>-.03</td>
<td>.01*</td>
</tr>
<tr>
<td>Appearance</td>
<td>,34***</td>
<td>-.002</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>,09</td>
<td>-0.002</td>
</tr>
<tr>
<td>Environmental friendliness</td>
<td>,23***</td>
<td>-0.006</td>
</tr>
</tbody>
</table>

Adjusted R2  ,72

p<0.001 = *** p<0.01 = ** p<0.05 = *

Current level is an additive index of three measures (level, quality and standard).

### 8.3 DISCUSSION

The factor analysis, in both the cross-sectional study and the panel study, revealed that three factors could be extracted for aspiration level. It seems as if the first factor can be interpreted as being related to power and expression and driving characteristics, whereas the second factor is related to safety and comfort attributes. The third factor seemed to tap more financial aspects of the requirements. Similar factors were extracted for current level. These findings are interpreted as if the structure for consumer judgement of their currently owned automobiles and consumer requirements of an automobiles for the same usage, are based on similar factors.
Regression analyses indicate that the different measures of aspiration level and current level are explained by similar attributes. The measure of ‘level’ and ‘quality’ seem to be highly correlated in terms of determinants, both in the case of aspiration level and in the case of current level. Slightly different attributes for ‘standard’ were however, evoked both for aspiration level and current level. Apart from reliability and traffic safety, which seem to be very dominant (independent of measurement and of aspiration level or current level), more technical attributes surface in the standard measurement.

Even if some differences were found between the measurements it is concluded that the three measures of aspiration level and current level capture the same construct. Therefore, additive indices were computed for aspiration level and current level respectively.

Moreover, the results revealed that almost the same attributes seem to be important in determining aspiration level are important for determining current level. These results support the notion that aspiration level and current level have similar structure.

However, even if many similarities were found between aspiration level and current level, there were also a few differences among determinants of aspiration level and current level (see Table 8.5 and 8.6). It appears that aspiration level is more related to financial attributes. This can imply that if problem identification is caused by a change in aspiration level, other factors might be of importance for the latter stages in the decision than if problem identification is a result of a change in current level. For instance, if the problem is identified by a change (an increase) in aspiration level, financial attributes are more important. The consumer might be more focused on economic arguments and aspects when searching for information, evaluating alternatives, or when making a purchase decision.

One other interesting finding that should be discussed is whether the importance of certain determinants or attributes changed significantly over time when strengths in purchase expectation was added. For aspiration level, the importance of comfort for passengers, maintenance cost, acceleration capacity, and appearance changed as strengths in purchase expectation increased. For current level, reliability, driving characteristics, noise level, heating and ventilation system, acceleration capacity, reliability, driving characteristics and heating and ventilation
changed in importance as purchase expectation became stronger. Moreover, the determinants subject to change in importance are different for aspiration level and for current level. The difference between aspiration level and current level can point towards there being some differences between determinants of aspiration level and current level.

These results have at least two implications. First, results indicate that certain aspects change in importance when replacement expectation increases. In aspiration level, for example, acceleration capacity increases in importance over the decision process, implying that the some factors, regarded as not important early in the decision process, might be of significant importance in a later stage (for example in the evaluation stage or in the product choice stage). Second, the fact that the weights of certain determinants are not stable over the decision process indicates problems for market research companies as the stage in the decision process is rarely a factor taken into account in segmentation analyses.

A slight difference between the results of the panel data on the one hand and the cross-sectional data on the other, might imply problems in cross-sectional research, as it is the intra-household effects that are commonly interpreted from cross-sectional research.

In summary, the results indicate that the structure of aspiration level and current level are similar but that the attribute weights might vary between aspiration level and current level. Moreover, the results indicate that the weights can be sensitive to different stages of the decision process.
9 THE RELATIONSHIP BETWEEN ASPIRATION LEVEL, CURRENT LEVEL, AND PURCHASE EXPECTATIONS

One central issue in this thesis is the relationship between aspiration level, current level, and purchase expectation. It is assumed that the discrepancy between aspiration level and current level corresponds to purchase expectations. This relationship was tested and confirmed, in both the cross-sectional sample and the panel sample. In this chapter the relationship is discussed and a brief discussion of other major purchase plans is included.

Following the analysis performed in Chapter 7, expectation data is used to measure an individual’s willingness and ability to fulfil the stated purchase. As discussed in Chapter 8, the three different measures of aspiration level and current level seem to tap the same constructs. Therefore, additive indices of the three general measures are used. The part of the model subject to analysis in this chapter is presented in Figure 9.1.

![Diagram](image)

**Figure 9.1** A Summary of Measurement of Different Concepts in the Proposed Model with Focus on the Factors Subject to Analysis in this Chapter.
9.1 THE CROSS SECTIONAL STUDY

In order to test the relationship between aspiration level, current level, and purchase expectations, the average ratings for aspiration level and current level were first plotted against the age of the currently possessed automobile (Figure 9.2). As current level is hypothesised to be affected by usage, i.e. 'wear and tear' of the product, the age of automobile can be seen as one indicator of the quality of the currently possessed automobile. It can however, also be argued that the number of years the automobile has been owned by the respondent is a good measure, as it is the subjective quality that is measured. In Figure 9.3 the average ratings of current level and aspiration level are plotted against the number of years the automobile has been owned by the respondent. The results indicate that the aspiration level and current level decrease both with the age of the vehicle and with the number of years the vehicle is possessed by the current owner.

As can be seen from Figure 9.2 and 9.3 the discrepancy between aspiration level and current level is decreasing, which is an expected finding.

![Figure 9.2](image1.png)  
**Figure 9.2** The Average Rating for Aspiration Level and Current Level Against Age of Automobile.

![Figure 9.3](image2.png)  
**Figure 9.3** The Average Rating for Aspiration Level and Current Level Against Number of Years with the Current Owner.

The results presented in Figures 9.2 and 9.3 indicate an unexpected correlation between aspiration level and current level, in that the older the automobile (or the longer it has been owned by the current owner), the lower the aspiration and current levels. However in a cross-sectional
sample such a correlation can be explained since it might be cohort effects rather than a change in individual judgement over time.

In order to analyse the data further, to analyse how a change in current level and aspiration level might correlate with a change in purchase expectation, the following procedure was performed. For the measures of replacement expectation the ratings were summed across the four time horizons. In the cases in which the respondent indicated a maximal value for a time horizon, the interviewer did not continue and inserted maximal values for the remaining time horizons. The scales thus ranged from 4 to 28\(^4\).

The ratings of aspiration level, current level and purchase expectation are plotted in Figures 9.4 and 9.5 against the age of automobile and number of years the automobile has been owned by the current respondent, respectively.

\[ \text{Aspiration level} \]
\[ \text{Current level} \]
\[ \text{Purchase expectations} \]

\[ \begin{array}{c}
100 \\
80 \\
60 \\
40 \\
20 \\
0 \\
\end{array} \]

\[ \begin{array}{c}
1.0 \\
2.0 \\
3.0 \\
4.0 \\
5.0 \\
6.0 \\
7.0 \\
8.0 \\
9.0 \\
\end{array} \]

**Figure 9.4** The Average Rating for Aspiration Level, Current Level and Purchase Expectations Against Age of Automobile.

\[ \begin{array}{c}
80 \\
60 \\
40 \\
20 \\
0 \\
\end{array} \]

\[ \begin{array}{c}
1.0 \\
2.0 \\
3.0 \\
4.0 \\
5.0 \\
6.0 \\
7.0 \\
8.0 \\
\end{array} \]

**Figure 9.5** The Average Rating for Aspiration Level, Current Level and Purchase Expectations Against Number of Years with the Current Owner.

\(^{47}\) The same measure was also used in the pre-test to predict actual replacements of automobiles within one year from the time of the interview (Marell et al., 1995).
9.1.1 Path analysis

In order to test the relationship between aspiration level, current level, and purchase expectations more extensively, path analysis was performed. As the problem is described by many interrelated variables, structural equation modelling might be a fruitful method, as it is possible to determine relationships between interrelated perceptual variables (Bollen, 1989). The relationships illustrated in Figure 9.6 were confirmed in a path analysis using the LISREL 8 program\(^4^8\) (Jöreskog and Sörbom, 1993). The variable included in the analysis, apart from aspiration level, current level and purchase expectations, is model year. Model year is, in line with the conceptualisation, assumed to affect current level.

Figure 9.6 Model of the Causal Relationships Between Replacement Expectation, Aspiration Level, Current Level, and Model Year of the Automobile.

Table 9.1 shows that an acceptable fit was obtained for the causal model and the path coefficients are all significant, with signs as expected. This means there is support for the idea that the discrepancy between aspiration level and current level is positively related to purchase expectation; the greater the discrepancy, the greater the purchase expectation. In the model this is shown since aspiration level is positively related and current level negatively related to purchase expectation. Current level is in turn affected by the age of the automobile such that the

---

\(^{48}\) LISREL is a widely used computer program used for parameter estimation in covariance structure analysis. LISREL provide a statistical solution to models including unobserved and observed variables. "The objective with LISREL is to reproduce the observed-variable covariance matrix as closely as possible and to determine the goodness-of-fit of the model to the data" (Fornell, 1983, p. 443). If the model does not fit the data either the model or the data is rejected. However, as is argued by Fornell, rarely data is rejected, which in turn sets high demands on the analytic tool. For a lengthier discussion of the advantages and disadvantages with LISREL see Fornell and Larcker (1981) and Fornell (1983).
older the automobile the lower the current level. One unexpected finding, through modifying indices, was a relationship between aspiration level and current level. Such a correlation was not initially assumed to exist, but was suspected to be present, as Figures 9.2 and 9.3 indicated a parallel decrease over model year in both aspiration level and current level.

Table 9.1 Standardised Path Coefficients and Significance Tests of Model of the Causal Relationships Between Replacement Expectation, Aspiration Level, Current Level, and Model Year of the Automobile.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Current level</th>
<th>Replacement expectation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model year</td>
<td>-0.19***</td>
<td></td>
</tr>
<tr>
<td>Aspiration level</td>
<td>0.17***</td>
<td>0.11**</td>
</tr>
<tr>
<td>Current level</td>
<td>-0.14***</td>
<td></td>
</tr>
<tr>
<td>Squared multiple correlation</td>
<td>0.08</td>
<td>0.03</td>
</tr>
</tbody>
</table>

* $\chi^2 (1)$
* $p$  
* Goodness-of-fit index  
* Root mean square residual

9.2 PANEL DATA

The advantage with panel data is the possibility to follow intra-household change over time. The change in aspiration level and current level over time is shown in Figure 9.7. The mean values of aspiration level and current level are plotted against the number of interviews the respondent has participated in.

The results presented in Figure 9.7 support the idea behind the conceptualisation that current level decreases with deterioration over time. The direction of the change of aspiration level was not hypothesised to increase over time per se, rather, the direction of aspiration level was assumed to correlate with factors discussed in Chapter 2, such as a change in sociodemographic factors, environmental concern and confidence in
household economy. Yet, in accordance with the notion of saturation and adaptation proposed by Katona, et al (1971) aspiration level is likely to increase over time (see also Helson, 1964).

![Graph showing aspiration level and current level over interviews]

**Figure 9.7** Mean Ratings for Aspiration Level and Current Level, Plotted Against Number of Interviews the Respondents have Participated in.

In order to further analyse the relationship between a discrepancy (between current level and aspiration level) and purchase expectations, the relationship is plotted both for the total sample, and for replacements only - see Figure 9.8 and 9.9 respectively.

![Graph showing aspiration level, current level, and purchase expectation over interviews]

**Figure 9.8** Mean Ratings of Aspiration Level, Current Level, and Replacement Expectation Plotted Against Number of Interviews the Respondent have Participated in.

![Graph showing aspiration level, current level, and purchase expectation over interviews for respondents who replaced their automobile]

**Figure 9.9** Mean Ratings of Aspiration Level, Current Level, and Replacement Expectation Plotted Against Number of Interviews the respondents have Participated in. Only Households who Replaced their Automobile were Selected in this Analysis.
As can be seen, an increase is noted for purchase expectation at the point where aspiration level and current level cross over each other. An increase in the discrepancy corresponds to an increase in purchase expectation, which supports the conceptualisation and proposed model.

9.2.1 Regression Analysis and Logit Analysis

To test the relationship between aspiration level, current level, and purchase expectations in the panel data, both linear and logistic regression (logit analysis) analysis were undertaken. The reason for using multiple methods in the analysis is that no available method is perfectly suited to data based on ordinal scales - almost any method will be an approximation.

In this study it is assumed that using two reasonably theoretically viable methods might give an indication of the robustness in the results. Therefore, both a linear regression analysis and a logit analysis were performed.

**Linear regression**

Linear regression analyses were performed with purchase expectations for all four time frames, four months, eight months, one year and two years, as the dependent variable and current level and aspiration level as independent variables.

The results from the regression analyses are presented in Table 9.2a and 9.2b, and they indicate that aspiration level and current level have impact on the timing of the replacement. For replacement expectations in all time frames aspiration level and current level seem to be important in determining purchase expectations.

When the discrepancy (between aspiration level and current level) is tested in the model, support is found for the notion that the discrepancy generates a purchase expectation. The relationship is strong for all time frames.
### Results and Discussion

**Table 9.2a Coefficients for Regression Analysis for the Time Frames of Four Months and Eight Months.**

<table>
<thead>
<tr>
<th></th>
<th>Four months</th>
<th></th>
<th>Eight months</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Aspiration level</td>
<td>0.24***</td>
<td>3.52</td>
<td>0.43***</td>
<td>5.13</td>
</tr>
<tr>
<td>Current level</td>
<td>-0.15**</td>
<td>-2.05</td>
<td>-0.35***</td>
<td>-3.90</td>
</tr>
<tr>
<td>Adjusted R</td>
<td>0.12</td>
<td></td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Discrepancy</td>
<td>0.21***</td>
<td>3.2</td>
<td>0.39***</td>
<td>4.91</td>
</tr>
<tr>
<td>Adjusted R</td>
<td>0.21</td>
<td></td>
<td>0.04</td>
<td></td>
</tr>
</tbody>
</table>

+ p<0.1 * p<.05 ** p<.01 *** p<.001

**Table 9.2b Coefficients for Regression Analysis for the Time Frames of One Year and Two Years.**

<table>
<thead>
<tr>
<th></th>
<th>One year</th>
<th></th>
<th>Two years</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Aspiration level</td>
<td>0.65***</td>
<td>6.45</td>
<td>0.82***</td>
<td>7.36</td>
</tr>
<tr>
<td>Current level</td>
<td>-0.56***</td>
<td>-5.26</td>
<td>-0.77***</td>
<td>-6.59</td>
</tr>
<tr>
<td>Adjusted R</td>
<td>0.05</td>
<td></td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Discrepancy</td>
<td>0.62***</td>
<td>6.67</td>
<td>0.80***</td>
<td>7.9</td>
</tr>
<tr>
<td>Adjusted R</td>
<td>0.05</td>
<td></td>
<td>0.06</td>
<td></td>
</tr>
</tbody>
</table>

+ p<0.1 * p<.05 ** p<.01 *** p<.001

**Logit analysis**

Logit analysis was performed for the same time frames as the regression analysis, i.e. four months, eight months, one year and two years.

The dependent variable purchase expectations were dichotomised into a 0/1 variable. The seven point scale for replacement expectations was divided as follows; 1-4 = 0 and, 5-7 = 1.

The reasoning for including 4 in the low or no purchase expectation group was based on the results in the cross-sectional sample, where 4 corresponded better to a low expectation and is therefore be interpreted as ‘rather unlikely to actually replace the automobile’. In the second analysis the split was made based on the mode value. All values below the mode value equal 0, and were denoted as ‘no purchase expectation’, and all values above the mode value equal 1 and were denoted ‘purchase expectation’. The reason for using the second split was that if the first split had been used too few cases would have appeared in one group. The
strengths in the analysis would increase if the second split was instead used in the analysis, as data is more equally distributed in the second split.

The results are presented in Table 9.3a and 9.3b. As can be noted, some differences, compared to the linear regression analysis can be identified. In the case of the logit analysis, aspiration level is not significant for the time frame of four months. For current level, however, the decrease is significant and in the expected direction for all time frames.

In summary, both regression analysis and logit analysis provide support for the proposed model.

Table 9.3a Coefficients for Logit Analysis for the Time Frames of Four Months and Eight Months.

<table>
<thead>
<tr>
<th></th>
<th>Four months</th>
<th>Eight months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Aspiration level</td>
<td>0.12</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>-0.80***</td>
<td>-7.76</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discrepancy</td>
<td>0.83***</td>
<td>7.68</td>
</tr>
</tbody>
</table>

Table 9.3b Coefficients for Logit Analysis for the Time Frames of One Year and Two Years.

<table>
<thead>
<tr>
<th></th>
<th>One year</th>
<th>Two years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coeff</td>
<td>z=b/s.e</td>
</tr>
<tr>
<td>Aspiration level</td>
<td>0.43***</td>
<td>4.45</td>
</tr>
<tr>
<td></td>
<td>-0.59***</td>
<td>-6.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current level</td>
<td>0.61***</td>
<td>6.75</td>
</tr>
<tr>
<td>Discrepancy</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

+ p<0.1 * p<.05 ** p<.01 *** p<.001
9.2.3 Opportunity Recognition or Need Recognition?

In order to test if the impact of a change in aspiration level and a change in current level have the same effect on purchase expectation, another linear regression analysis was performed.

In the analysis it was assumed that the coefficients for aspiration level and current level are different, implying that a change in aspiration level and current level have different impacts on purchase expectation. No support for the difference was found, however. The results indicate that a positive change in aspiration level has the same effect on purchase expectation and an equivalent negative change in current level. This implies that a change in aspiration level contributes to a change in purchase expectation to the same extent as an equal change in current level. In theoretical terms, this indicates that a discrepancy can be reached and can extend beyond a noticeable threshold either as a need recognition or as an opportunity recognition, with the same impact on purchase expectations.

9.3 COMPETING GOALS

In the conceptualisation the effect of competing purchase plans on replacements expectations was discussed. It was assumed that other plans might affect the timing or the realisation of an expectation to replace the excising product. In Table 9.4 results, based on the first interview in the panel, the recruit interview, are presented. As can be seen a higher replacement expectation does not correlate with a decrease in other major purchase plans. For example, 25 percent of respondents who indicated no replacement expectation for the time frame of four months (indicating a 1 on the seven point scale), had other purchase plans that were to be carried out before replacing the currently owned automobile. Of those indicating a strong replacement expectation 31 percent had other purchase plans. For the time frame of eight months, the corresponding figures are 24 percent for those indicating no replacement expectations and 28 percent among those indicating strong replacement expectation.
Table 9.4 Relationship Between Purchase Expectation and Other Purchase Plans.

<table>
<thead>
<tr>
<th>Purchase expectations</th>
<th>Four months</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Share of respondents</td>
<td>25%</td>
<td>26%</td>
<td>26%</td>
<td>32%</td>
<td>23%</td>
<td>27%</td>
<td>31%</td>
<td></td>
</tr>
<tr>
<td>with other purchase</td>
<td></td>
<td></td>
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<td>plans</td>
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</tbody>
</table>

Eight months

|                       | 1         | 2   | 3   | 4   | 5   | 6   | 7   |
| Share of respondents  | 24%       | 30% | 26% | 33% | 29% | 26% | 28% |
| with other purchase   |            |     |     |     |     |     |     |
| plans                 |            |     |     |     |     |     |     |

One year

|                       | 1         | 2   | 3   | 4   | 5   | 6   | 7   |
| Share of respondents  | 23%       | 22% | 27% | 33% | 32% | 28% | 27% |
| with other purchase   |            |     |     |     |     |     |     |
| plans                 |            |     |     |     |     |     |     |

Two years

|                       | 1         | 2   | 3   | 4   | 5   | 6   | 7   |
| Share of respondents  | 22%       | 19% | 23% | 28% | 26% | 29% | 29% |
| with other purchase   |            |     |     |     |     |     |     |
| plans                 |            |     |     |     |     |     |     |

As can be seen in Table 9.5, number of interviews results in a decrease in other purchase plans, indicating that the decision to replace the current automobile proceeds over time.

Table 9.5 Relationship Between Number of Interviews and Other Purchase Plans.

<table>
<thead>
<tr>
<th>Number of interviews respondents participated in</th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of respondents with other purchase plans</td>
<td>40%</td>
<td>37%</td>
<td>37%</td>
<td>34%</td>
<td>33%</td>
<td>32%</td>
<td>33%</td>
<td>28%</td>
</tr>
</tbody>
</table>

The results show that the most common purchase the respondents plan to make before replacing the currently automobile is to repair their house; a total of 46 percent of all respondents purchase plans involved reconstructing either the house or the summer house. Another 17 percent planned to replace freezers or refrigerators. Computers, video cameras and furniture were also popular products to buy before replacing the currently owned automobile.
9.4 DISCUSSION

The proposed model of replacement purchases is hypothesised to be related to the difference between an assessment of the current quality level of the owned product and an aspiration level defining the minimal quality requirements. This hypothesis has been supported earlier (Marell et al., 1995), and is here again supported, both in the cross-sectional study and in the panel study.

The cross-sectional data

When the cross-sectional data was plotted against the age of the owned automobile (Figure 9.2), a decline of the current level and the increase of replacement expectation was observed for owners both of new and used automobiles. In the path analysis, model year was positively related to current level, and aspiration level positively and current level negatively related to the expectation to replace the owned automobile (Table 9.1).

The correspondence between aspiration level, current level and purchase expectations over the number of years with the current owner (Figure 9.5) can reflect that early and late replacers are different groups of individuals and that their reasoning differs (see Bayus, 1991; Gärling and Marell, 1992). This effect could, in a cross-sectional study, surface as if there were no change in discrepancy depending on lengths of ownership, but in fact there are different groups of individuals keeping the automobile for different lengths of time. This means, that individuals replacing after a short time quicker reach a noticeable threshold than those replacing the automobile later. In a cross sectional sample this might surface as no change in the discrepancy over length of ownership.

As theory does not stipulate at what size a noticeable threshold occurs, (i.e. what size of the discrepancy that is needed) for the replacement decision process to start, it is hard to argue when and to what extent the purchase expectation is assumed to increase with a change in the discrepancy. This means that a noticeable threshold might occur at the time of a cross-over but also much later. In Figures 9.10 and 9.11 the relationship between aspiration level, current level and purchase expectations was illustrated for the total sample and for replacers only, respectively. As can be seen in Figure 9.11, purchase expectation seems to increase approximately at the time of a cross-over between current level and aspiration level.
The results of the path analysis are again consistent with the hypothesis. One unexpected finding was that aspiration level declined with model year. In a cross-sectional sample of respondents, this seems reasonable as it might reflect a correlation between current level and aspiration level, (shown in Figures 10.1 and 10.2). This implies that respondents who have an older automobile and perceive the current level to be lower (in absolute figures) also have a lower aspiration level and vice versa, (i.e. a high aspiration level corresponds to a high current level).

The panel data
The model proposed in Figure 2.3 is also confirmed in the panel study. Support for the effects of aspiration level and current level on purchase expectations was noted in the regression analysis. A correlation between the discrepancy between aspiration level and current level, and purchase expectations is also found, which further supports the conceptualisation. However, in the regression analysis adjusted $R^2$ shows that current level and aspiration level only contribute with approximately 10 percent of the variation in purchase expectation. This implies that there might be other factors providing further information about the decision process.

In the logit analysis, the effect on purchase expectation on aspiration level is not as clear as in the regression analysis. However, this result is not inconsistent with the model because the direction of aspiration level can be either negative or positive depending on, for example, changes in sociodemographic factors, economic confidence or environmental consciousness. As can also be noted (Table 9.3) the discrepancy between aspiration level and current level is strongly related to purchase expectations for all time frames.

Given that support has been generated for the conceptualisation, one important finding is that a change in aspiration level, and/or an equivalent change in current level, has the same impact on purchase expectations. This means that the decline and deterioration of the current product has the same effect on purchase expectation as does an increase in aspiration level.

In a marketing context this can be interpreted as resulting in two different strategies. The first strategy is to make the consumer aware of the quality of the owned automobile. The second strategy is to try to affect their aspiration level by affecting consumers requirements of automobiles. It is
an equally successful strategy to point out the current automobile’s faults as to encourage the owner to increase his requirements \(^{49}\).

Competing purchase plans have also been discussed in this chapter, and as can be seen in Table 9.4, an increase in replacement expectation does not correlate with a decrease in other major purchase plans. Only the number of interviews, i.e. time, results in a decrease in other purchase plans. These results can be interpreted in accordance with Pickering (1978) such that there is an order in acquisition of durables that the consumer deals with, but plans do not compete directly. This can indicate that the trade-off process between products from different product categories occurs very late in the process, accounting for some of the problems with predictions through expectation and expectation data discussed in section 3.4. Another interpretation is that replacement expectations are formed independently from other purchase plans or maybe a replacement purchase of the automobile has a higher priority than purchases of other goods.

In summary, the relationship between aspiration level, current level, and purchase expectation is consistent with the conceptual framework. In particular it witnesses to the role played by the discrepancy between aspiration level and current level in replacement decisions. Further detailed analyses of the model are however desirable. It would be particularly interesting to analyse what factors are important for a change in the aspiration and current level.

\(^{49}\) To some extent this is contradictory to the findings from the Cripps and Meyer (1994) study which found that the effect of new technology had more impact on purchase expectations, than a change of the currently owned product.
10 EXPLAINING CHANGES IN ASPIRATION LEVEL AND CURRENT LEVEL

In the conceptualisation it was assumed that sociodemographic factors, consumer confidence (i.e. general economic climate and household finances), technical innovations and environmental concern were some of the more important factors in explaining changes in aspiration level. It was further assumed that deterioration of the possessed product would result in a change in current level. In this chapter the impact of these factors on aspiration level and current level is addressed (see Figure 10.1). In the last section of this chapter, direct replacement reasons are given by the respondents who replaced the automobile during the panel study, are presented. These reasons should be related to a change in aspiration level or current level.

Figure 10.1 A Summary of Measurement of Different Concepts in the Proposed Model with Focus on the Factors Subject to Analysis in this Chapter.

10.1 CROSS SECTIONAL DATA

In order to test what factors affected aspiration level and current level, linear regression analyses were performed. In the first analysis the dependent variable is current level and the independent variables are indicators of deterioration and repairs, measured as age of automobile,
total mileage driven, number of miles driven during the last year, number of repairs during the last four months, and anticipated repairs for the coming four months. When the dependent variable is aspiration level, the independent variables represent sociodemographic factors, consumer confidence and environmental concern measured as number of children, marital status, two indices labelled 'confidence in household economy' and 'general economic confidence', self reported environmental concern, belief in others to take action and belief in the effects of their own actions.

10.1.1 Effects on Aspiration Level and Current Level

The first set of factors assumed to influence aspiration level is sociodemographics. As can be seen from Table 10.1, the number of children has a significant effect on aspiration level, an increase in the number of children results in an increase in aspiration level.

In the proposed framework a change in consumer confidence was assumed to be reflected in a change in aspiration level. In order to test such a correlation two indices were computed (following Pickering, 1981 and Van Raaij and Gianotten, 1990). The first index is built on the answers to questions concerning evaluation and expectation of household finances and savings\(^{50}\), *cronbach alpha* = 0.49. The first index is labelled 'confidence in household economy'. The second index is labelled 'general economic confidence' and consists of questions covering the evaluation and expectation of the economic situation, price development and unemployment\(^{51}\), *cronbach alpha* = 0.38. As can be seen in Table 10.1, confidence in household economy has a significant effect on aspiration level. A similar impact is not noted for general economic climate. The result provides support for the assumptions provided by Pickering (1981) discussed in 2.1.1, that individuals are able to distinguish and separate their own economy from the country’s economic situation.

Environmental concern, as to the beliefs in one’s own actions is reflected in an increase in aspiration level, implying that individuals who have a stronger belief that their own action will have a higher aspiration level.

\(^{50}\) Question c3, c4, c7 and c8.

\(^{51}\) Question c1, c2, c5, and c6.
Regression analysis conducted with current level as the dependent variable reveals that recent repairs and anticipated repairs strongly affect the perception of the currently owned product. As can be seen (Table 10.2) the age of the automobile also has a significant impact on current level; the older the automobile becomes, the lower the current level.

10.2 PANEL DATA

Linear regression analyses were also performed with the panel data.

10.2.1 Effects on Aspiration Level

Sociodemographic factors

The regression analysis reveals that the number of children has a positive effect on aspiration level, such that aspiration level increases when the number of children within the household increases.

A significant effect is also noted for marital status. This effect can be interpreted as indicating that when people get married or start cohabiting, aspiration level increases and when people become single aspiration level
decreases. This effect was not found in the analysis of the cross-sectional data.

For consumer confidence the same indices as for the cross-sectional data, were computed (following Van Raaij and Gianotten, 1990). The first index - evaluation and expectation of household finances and savings, is again labelled ‘confidence in household economy’\(^{52}\). The second index is labelled ‘general economic confidence’ and concerns evaluation and expectation of the economic situation, price development and unemployment\(^{53}\).

The analysis reveals a relationship between aspiration level and consumer confidence. The results from the panel data however show a different relationship than that found with the cross-sectional data. The effect previously noted by confidence in household economy can no longer be verified, whereas the effect from general economic confidence significantly affects the aspiration level\(^{54}\). The results from the regression analysis reveal that aspiration level decreases when general economic confidence decreases and increases with an increase in general economic confidence. The results can be interpreted such that the household requirements are significantly affected by the general economic climate, independent of the household economy.

The results from the regression analyses also provide support for the impact on aspiration level by environmental concern. Environmental concern was measured as ‘how environmentally concern’ the respondent is, ‘to what extent respondents believe that their actions will have a positive effect on the environment’ and as ‘how likely respondents believe it is that enough consumers will engage in actions aiming to protect the environment’.

As can be seen in Table 10.3, consumers’ environmental concern and consumers’ beliefs in ‘the effects of their own actions’ have significant effect on aspiration level, whereas the effect on aspiration level by consumers’ beliefs in ‘the effects of actions of others’ does not have strong predictive power.

\(^{52}\) Cronbach alpha = 0.47 at the recruit interview.
\(^{53}\) Cronbach alpha = 0.45 at the recruit interview.
\(^{54}\) In order to test the robustness of the result from the cross-sectional data, a regression analysis was performed with data from the recruit interview. The results are similar to the results of the cross-sectional study.
Table 10.3 Regression Coefficients for Factors Assumed to Effect Aspiration Level. Panel Data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficients</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of children</td>
<td>1.65***</td>
<td>5.34</td>
</tr>
<tr>
<td>Marital status</td>
<td>1.47***</td>
<td>3.09</td>
</tr>
<tr>
<td>Environmental concern</td>
<td>0.17***</td>
<td>7.2</td>
</tr>
<tr>
<td>Effects of own actions</td>
<td>0.04***</td>
<td>2.4</td>
</tr>
<tr>
<td>Likelihood of others action</td>
<td>0.03</td>
<td>1.8</td>
</tr>
<tr>
<td>Confidence in household economy</td>
<td>0.21</td>
<td>1.1</td>
</tr>
<tr>
<td>General economic confidence</td>
<td>-0.36***</td>
<td>-2.6</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>0.10</td>
<td></td>
</tr>
</tbody>
</table>

10.2.2 Effects on Current Level

A regression analysis was also performed to explain changes in current level. As can be seen in Table 10.3, the total mileage driven, the number of miles driven per year, anticipated repairs, and repairs made during the last four months all proved to be significant predictors of a change in current level. Three of the factors have a negative correlation with current level, meaning that an increase in mileage driven, an increase in anticipated repairs and an increase in the number of recent repairs, will result in a decrease in current level. One unexpected finding is that the number of miles driven during the last year is positively related to current level, meaning that an increase in the number of miles driven per year corresponds to an increase in current level.

Table 10.4 Regression Coefficients for Factors Assumed to Effect Current Level. Panel Data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coefficient</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of automobile</td>
<td>1.8***</td>
<td>4.36</td>
</tr>
<tr>
<td>Number of miles driven during last year</td>
<td>0.002***</td>
<td>5.35</td>
</tr>
<tr>
<td>Total mileage driven</td>
<td>-0.004***</td>
<td>-4.41</td>
</tr>
<tr>
<td>Number of repairs the last four months</td>
<td>-1.86***</td>
<td>-4.04</td>
</tr>
<tr>
<td>Anticipated repairs</td>
<td>-1.82***</td>
<td>-4.80</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>0.11</td>
<td></td>
</tr>
</tbody>
</table>
10.3 DIRECT EFFECTS OF CONSUMER CONFIDENCE

Katona (1975) argues that consumer confidence on aggregated level has direct explanatory power over purchase expectation. This correlation was not initially assumed in the theoretical framework of this thesis, as it was assumed to be an indirect effect through aspiration level. However, the direct relationship between consumer confidence and purchase expectations was also assumed by Pickering (1981) and by Winer (1985) and it is therefore tested in this study. Regression analysis, performed both with the cross-sectional data and with the panel data, indicates that ‘confidence in household economy’ significantly explains variations in purchase expectations for all time frames. Significant explanation is also given by ‘general economic confidence’ for all time frames.

10.4 REPLACEMENT REASONS IN RETROSPECT

In the follow-up interviews with respondents who replaced the automobile the respondent was given the opportunity to state his/her reasons for the replacement purchase without being restricted to certain given responses. A majority of the respondents argued that the reason for replacing the automobile was the size of the automobile, (the automobile was either perceived as too large or too small). Other common arguments for the replacement was that the respondents believed the automobile had been driven quite a distance, and that they anticipated that the automobile would require major attention and maintenance in the near future.

Other respondents perceived the currently owned automobile as being old, and having many minor but irritating problems, and yet others said that they wanted a newer model. It is also interesting to note that some mentioned luggage capacity as one of the major reasons for replacing the current automobile. Even financial arguments surfaced in the answers for this question; some respondents said that the automobile had to be replaced before it became worthless.

Some of the reasons given by the respondents can be interpreted as being related to a change in the actual standard of the owned automobile, whereas other reasons are more related to a change in the consumer’s life-situation (aspiration level)
The reasons given by the respondents, interpreted as related to altered requirements are reasons such as “we need more luggage and passenger capacity”, “sales perks”, “we have just bought a dog and need more space in the automobile”, “we thought it was a good opportunity, as the type and price was good”, “we had a child”, “we really just wanted a newer model”, “sun roof and central locking system were two new attractive features that we were looking for”, “I thought it would be fun to have a new automobile”. Reasons interpreted to related to the perception of the currently owned automobile on the other hand are “we have had some expensive repairs”, “The current automobile has a high risk for failure”, “recently there have been many small repairs”, “well, the currently owned automobile has considerable mileage on it”, “the one that I have is really expensive to maintain”, “I got ill and handicapped”, “we crashed the old automobile”, “the current automobile is too old and the fuel consumption is to high”, “the value is really depreciating”, “no guarantee left on the automobile that we currently own”.

10.5 DISCUSSION

The results from the cross-sectional study reveal that number of children, household economy, and environmental concern have a significant impact on aspiration level, whereas age of automobile, number of recent repairs and future anticipated repairs have a significant effect on current level.

The results from the panel data show that number of children, marital status, consumer confidence, and environmental concern significantly affect the perception of aspiration level. The analysis shows that number of household members correspond to an increase in aspiration level.

Consumer confidence also has a significant effect on aspiration level, where general economic confidence corresponds to a increase in aspiration level. In the panel data no effect is however noted by change in household economy. The results can be interpreted such that household requirements are significantly effected by the general economic climate, independent of the household economy. Such findings can perhaps be viewed in the light of influence from other consumers, a change in private economy may have a greater impact on the make and model than on the basic requirements (therefore not surfacing as a factor effecting aspiration level). It should be noted that the reverse relationship is noted for
consumer confidence if the direct effect on purchase expectations is tested. In this case, the household economy has a significant effect on the expected purchase behaviour, but no effect is noted by general economic confidence.

**Difference between the cross sectional and panel data analysis.**

It should be noted that some differences between the cross-sectional data and the panel data were found. For instance, total mileage driven and number of mileage driven during the last year are not significant in the cross sectional study whereas they are significant in the panel study. Moreover, for aspiration level confidence in household economy is significant in the cross-sectional study but not in the panel study. The reverse is found for general economic confidence. In addition, environmental concern is not significant in the cross-sectional study but is revealed to be significant in the panel study.

As discussed in the method of cross-sectional data can only cover inter-household relationships, which is used to approximate intra-household effects. With panel data intra-household effects can be directly addressed (Hsiao, 1986). The lack of correspondence is, in that perspective, rather severe since many use cross-sectional data in order to draw intra-household inferences. These results imply that findings from cross-sectional data might lead in the wrong direction (for similar reasoning see, for example, Bolton and Drew, 1991).

Another possible explanation might be found in the sampling procedure, in that the respondents in the panel might differ from those sampled in the cross-sectional study. Firstly, two years passed between the cross sectional sample and the recruiting interview for the panel study. Perhaps time has altered the weight of the different factors. Secondly, individuals staying in the panel are individuals that do not change their automobile rapidly, resulting in an over-representation of ‘late replacers’. As shown both by Bayus (1991) and Gärling and Marell (1992), different factors are important for early and late replacers.
11 GENERAL DISCUSSION AND MARKETING IMPLICATIONS

11.1 GENERAL FRAMEWORK AND DISCUSSION

The purpose of this thesis has been to increase the understanding of the consumer decision process in replacement purchases. More specifically, the research focus has been on the cognitive mechanisms behind the formation of a replacement decision and on factors affecting the timing of a replacement purchase of durable goods.

In order to address the research question, a theoretical framework was developed (see Chapter 2). The model presented in Figure 2.3 is based on the traditional idea that many actual purchase decisions are realised through the approach of problem solving, entailing problem identification, information search, evaluation of alternatives, choice, and action. The underlying assumption of the model is that purchase expectations are related to a comparison between an aspiration level, defined in accordance with Simon’s (1956) satisficing principle, and an evaluation of the currently owned product. Purchase expectations are believed to be the result of a cognitive process encompassing the comparison between aspiration level and current level. When the discrepancy between aspiration level and current level goes beyond a noticeable difference, a purchase expectation is assumed to be formed and the purchase process initiated.

The model development presented in Chapter 2 also resulted in four, more specific research questions. The questions are derived from the model and have guided the research design and analysis. The four questions are:

1) How does the aspiration level change over time and what specific factors determine aspiration level?
2) What factors cause a change in the perception of aspiration level?
3) How does the current level change over time and what specific factors determine current level?
4) What factors cause a change in the perception of current level?
As no suitable data was available to examine the objectives for this study, it was necessary to collect primary data from automobile owners. The above questions were investigated quantitatively in three different studies; a pre-test study, a cross-sectional study and a longitudinal panel study (see Chapter 5). The pre-test study was undertaken in order to establish support for the idea behind the model and to test the questionnaire. The cross-sectional study was conducted in order to evaluate and test the proposed model. Although, the best way to study a decision process and the timing of a decision is through a panel, studies which address timing often use a cross-sectional approach instead of using longitudinal data. In this thesis a longitudinal study was therefore also undertaken.

Summary of main findings
The results are found in two different areas. First, the results are directly related to the model proposed in Figure 2.3. In brief, the study revealed that changes in aspiration level and current level are related to a change in purchase expectation, and that a discrepancy between aspiration level and current level can be used as a framework in studying the replacement decision process. The results indicate that it is possible to identify factors causing a change in aspiration level and factors causing a change in current level. These factors can therefore be argued to affect the timing of a replacement decision.

Second, the study highlighted some methodological issues such that when results from the cross-sectional study were compared to results from the panel study, the importance of separating inter- and intra-household effects became pronounced - a number of different aspects surfaced depending on whether the analysis was performed on the cross-sectional data (with inter-household effects) or if the analysis was performed on the panel data (where intra-household effects can be studied directly). Moreover, the results show that in replacement purchases expectation data provides a better prediction of actual replacement behaviour than intention data. Finally, the issue of selecting an appropriate respondent in a dyad revealed some insights in to the joint decision process.

The implications of this study are grouped into three categories. The first category deals with theoretical implications of the study, and the second category highlights some methodological implications generated from the study. Finally, the third category briefly discusses practical implications on three dimensions; the individual consumer, the manufacturer, and society.
11.2 THEORETICAL IMPLICATIONS

11.2.1 Results directly related to the model

The results from the studies support the proposed model. Aspiration level and current level were shown to be related to the formation of purchase expectations. An increase in aspiration level as well as a decrease in current level both contributed to an increase in purchase expectation. The discrepancy between aspiration level and current level is significantly related to purchase expectations; more specifically, the results show that an increased discrepancy is related to increased purchase expectations.

As the results in Chapter 9 show, current level is generally higher than aspiration level (see for example, Figures 9.2, 9.3, 9.9-9.11), an increase in aspiration level and a decrease in current level therefore indicate that a cross-over sooner or later will occur. In combination with the results indicating that an increased discrepancy is related to increased purchase expectations, and the result presented in Figure 9.9, the results indicate that the problem is identified and the decision process initiated, after a cross-over between aspiration level and current level has occurred. Thus, it is concluded that the decision process is initiated and that purchase expectation is increasing when the current product is perceived to be worse than the aspiration level (i.e. minimum requirements on products for similar use as the currently owned), (see Figure 11.1).

![Subjective quality](#)

**Figure 11.1 The Dynamic Relationship Between Perceived Current level and Perceived Aspiration level.**

The cross-sectional study revealed that current level decreases with age of automobile, number of recent repairs, and future anticipated repairs, i.e current level decreases with deterioration. The change in aspiration
level was shown to be affected by number of household members, environmental concern, and consumer confidence. As the results showed that the discrepancy between aspiration level and current level corresponded to purchase expectations the results imply that the decision process can be initiated by either by a change in current level or by a change in aspiration level, which in turn implies that the timing of a replacement decision can be affected by factors such as sociodemographics, consumer confidence, age of the automobile etc., (i.e. any factor causing a change in either aspiration level or current level).

The panel study yielded results similar to the cross-sectional study but it also revealed additional aspects that have to be acknowledged. For example, in the case of factors affecting aspiration level, the effect of consumer confidence differs between the cross-sectional study and the panel study.

**Factors affecting aspiration level and current level**

The results in the cross-sectional study show that individuals with high faith in their personal economy also have a higher aspiration level than individuals less confident, whereas no effect was noted in the panel study by confidence in personal economy. The results from the cross-sectional study indicate that people with high confidence in their personal economy have a higher aspiration level, than people with low confidence in their personal economy. However, the absence of effect in the results from the panel data implies that an increase of individuals’ confidence in their personal economy does not lead to an increase in aspiration level\(^5\).

The opposite results hold true for confidence in the general economy. In this case, no effect is found in the cross-sectional study, but in the panel study an affect on aspiration level is noted. These results can indicate that people generally agree on a country’s economic situation at a certain point in time, resulting in an absence of cohort (inter-household) effects, but a change in individuals’ perception of the general economy has an effect on aspiration level, i.e if an individual becomes more confident in the general economy, the aspiration level will increase.

The results of consumer confidence are in line with the models proposed by Pickering (1981). The results support Pickering (1981) in that individuals are able to and will distinguish between general economy and

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\(^{5}\) One reason for the absence of effect in the panel data might be the relatively short time frame (two years). Maybe the effect on aspiration level, of an increase in confidence of personal economy, will surface at a later point in time.
their private economy. In summary, it is concluded that individuals can separate the general economy from their own financial situation (as discussed in Chapter 2), but it might not always be useful for the consumer to distinguish between the two indices. If the distinction is not perceived as useful for the consumer, the separation is not made, as it demands cognitive resources.

A change in sociodemographics was further assumed to cause a change in aspiration level. The panel study reveals that number of children and marital status have an effect on aspiration level.

Another factor assumed to be of importance for a change in aspiration level was environmental concern. Support for an effect by environmental concern on aspiration level was found in the pre-test study. Marell et al (1995) found that consumers who were manipulated to believe that it was more environmentally friendly to replace the current automobile early also had stronger purchase intentions than those who were manipulated to believe that it was better for the environment to replace the automobile more seldom.

The results from both the cross-sectional study and the panel study show that environmental concern has an impact on the general requirements individuals have on the product (the aspiration level). The more environmentally friendly the consumer perceives himself or herself to become, the higher the aspiration level becomes. In the panel study effects were also found for the measure ‘effects of own action’ but no effect was found for the measure ‘likelihood of others’ action’.

Current level was assumed to be affected by age of automobile, mileage driven and recent and anticipated repairs. Such effects were also noted. However, in the panel data total mileage driven was negatively related to current level.
Factors revealed to have no effect
The results also revealed some unsupported assumptions. It was assumed that technological innovations would affect aspiration level, but such correlations were not found. This might, as argued in section 3.7, be explained by the way the factor was measured. As the post-replacement interviews as well as other studies (cf. Cripps and Meyer 1994) support the idea that technological innovation has impact on the timing of the replacement decision, it is concluded that the measurement used in this study was insufficient. The same reasoning can be valid for the factor ‘styling’; the measures were insufficient. In addition, as no effect was shown (and no reasonable measurement explanation is found) by ‘number of years with current owner’ on current level, that particular factor is not assumed to have an effect on the perception of the currently owned automobile.

Competing goals
In the conceptualisation, other purchase plans were assumed to be coordinated with the replacement purchase. As argued by Bettman and Sujan (1987), previous research on consumer choice has almost exclusively concentrated on choice between brands within a category (initiating ‘within category processing’) rather then between categories (for exceptions see Johnson 1984, 1989). In many situations, however, consumers might engage in a choice between very dissimilar products, such as a choice between an automobile and a vacation trip (such a choice will initiate ‘between category processing’).

The results from this study indicate that in the case of replacements of automobiles and other major investments, the necessity of making an actual choice (meaning that other goods are not purchased) is less pronounced than might have been assumed in previous studies. This conclusion is drawn because no relationship was found between purchase expectations and ‘other purchase plans’. Another explanation for the lack of relationship between other purchase plans and purchase expectations might be that the choice between products from different categories occurs very early or very late in the decision process. That is, the coordination of purchase plans occurs early, and many purchase plans are kept simultaneously. The purchases are conducted approximately as planned, indicating that there is no trade-off between the products. The intention/expectation to purchase the product is kept constant and will be carried out in the near future. If, on the other hand, the trade-off occurs late in the process, the trade off between products are just temporary
GE NE RA L 
DI SC US SI ON AN D M AR KE TI NG IM PL IC AT IO NS

(caused for example, by an unexpected event) and the replacement intention is kept constant and is expected to be carried out in the near future (cf. Ajzén and Fishbein, 1980).

The results from this study are interpreted such that the replacement decision process continues unaffected by other purchase plans implying that the timing of the replacement purchase is not correlated to other investment plans. It is however acknowledged that a great discrepancy (between current level and aspiration level) and a strong intention to replace the current automobile can be experienced, but priority pattern results in that some other more urgent need (e.g. repairing a leaking roof or replacing a broken refrigerator) has to be satisfied first. In this case the timing is affected by an ‘unexpected event’. As there are many rival explanations for the lack of correlation, the effect of ‘competing goals’ is argued to benefit from further research.

In conclusion it is argued that the cognitive mechanism behind a replacement decision can be explained in accordance with the proposed model: Consumers compare the currently owned product with requirements of products for the same usage and if the current product falls below the requirements, replacement plans are formed. The timing of the replacement is therefore argued to depend both on factors affecting the requirements of products for the same usage, and on factors affecting the perception of the current product.

11.2.2 Results indirectly related to the model

As discussed above, aspiration level and current level are affected by different factors, and a change in aspiration level and a change in current level seem to have effects on purchase expectation. The results support the theory in that either problem recognition is initiated by ‘need recognition’ or by ‘opportunity recognition’ purchase expectations are formed and the decision process initiated. The results further indicate that a change in aspiration level has the same effect on purchase expectations as a similar change in current level, (i.e. need recognition is as effective as opportunity recognition in triggering the decision process).

The effect and implication of these results can be discussed in relation to generic demand and in relation to the individual’s preference structure (specific demand). To generate a generic demand (i.e. a need to replace
the automobile), manufacturers could either appeal to or trigger factors influencing current level or trigger factors influencing aspiration level.

The effect on specific demand can be interpreted in relation to findings by Bettman and Sujan (1987). Bettman and Sujan discuss differences in the outcome of evaluation processes depending on how problems are framed, i.e., what decision criteria is primed. In this context it might be argued that depending on how the problem is identified, it has consequences later in the decision process when the consumers are about to choose a specific brand. More specifically, the consequence for the decision process might, for instance, be that if a change in current level has initiated the decision process, information search might be based on finding an automobile less old, with less mileage driven or with fewer anticipated repairs. If a change in aspiration level is the initiating factor, on the other hand, the information search may perhaps be focused on finding alternatives more related to new and attractive features. These two information search strategies might result in different choice sets, in different product evaluation processes and finally in a different choice.

Another important result is that aspiration level and current level are based and formed on similar constructs but the importance of certain economic attributes seems to be dependent on whether it is aspiration level or current level that is evaluated. The results discussed in Chapter 8 indicate that slightly different attributes determine aspiration level and current level in that aspiration level seems to be somewhat more related to economic attributes than is current level. These results in relation to the discussion above, indicate that the way purchase expectation is formed might have greater impact on the decision process than assumed in earlier studies.

One interesting finding that should also be discussed in more detail is that the importance of certain determinants or attributes changed when strength in purchase expectation changed. For example, for aspiration level, the importance of acceleration capacity, increased over the decision process. For current level, reliability, comfort for driver, noise level, heating and ventilation system changed in importance throughout the decision process.

These results are interpreted such that a certain attribute becomes more or less important when the replacement expectation is increasing. As attributes’ importance in the problem identification stage, might not be
significant in the later evaluation stage or for the actual product choice, these results indicate a possibility of using stages in the decision process or strength in purchase expectation as a segmentation variable in, for example marketing communication.

To conclude, the study indicates that problem identification initiated through a change either in aspiration level or in current level might evoke different decision strategies and consequently, the problem identification stage might be more important for marketing strategies than previously assumed. Second, the results highlight the importance of considering the consumers present stage in the decision process for achieving an efficient segmentation for market communication as product attributes important early in the process might not be important late in the process.

Overall, the findings from this study indicate that more research should be put into the decision process and relation between different stages in the process, rather than focusing on one stage at the time.

11.3 METHODOLOGICAL IMPLICATIONS

The methodological implications of this study are related (1) to the choice of cross-sectional or panel designs and (2) to more specific measurement issues.

The study shows the importance of separating inter- and intra-household effects. When results from the cross-sectional study were compared to results from the panel study different aspects surfaced\textsuperscript{56}. More specifically, in case of factors affecting aspiration level, the effects of consumer confidence and marital status were different between the cross-sectional study and the panel study. The same can be noted for factors affecting current level; mileage driven during the last year was not significant in the cross-sectional study but showed itself to be significant in the panel study.

As discussed in the method, cross-sectional data can only cover inter-household relationships but such data is often used to approximate intra-

\textsuperscript{56} It is acknowledged that different sampling techniques were used in the different studies, and that they were performed at different points in time. However, if a wave of the panel was used as a cross-sectional sample many similar results as in the cross-sectional study surfaced. This procedure might be compared to the procedure of try-out and hold-out samples.
household effects. With panel data, intra-household effects can be directly addressed (Hsiao, 1986). The lack of correspondence in the results from the cross-sectional study and the panel study is, in that perspective, rather severe since many researchers and marketing firms use cross-sectional data in order to draw intra-household inferences. These results imply that findings from cross-sectional data might lead in the wrong direction (for similar reasoning see, for example, Bolton and Drew, 1991).

The choice of respondent is extensively discussed in Chapter 6. The results indicate that if both spouses agree on their relative impact in the decision process, both spouses’ answers can be seen as reliable in a predictive sense. So, in cases with dyads characterised by agreement both adults are good representatives. Whether the spouses’ decision process is similar is however not possible to conclude from the present study. However, and maybe more importantly, in cases (in the current sample approximately 40 percent) where the dyad does not agree on its members’ relative influence, the predictability from each spouse’s answer decrease significantly. This highlights the importance of assessing the joint decision process in understanding the timing of replacement decisions. However, the effect on predictability on an aggregated level of demand might be different from the effects on an individual level, which means that the effect on an aggregated demand is not as ‘wrong’ as the effect on an individual (see for instance, Davidsson, 1993).

Finally, the wording of purchase intentions vs expectations has been shown to be of importance, particularly when intentions/expectations are measured in a short time perspective. The longer the time horizon that is built into the question, the less deviation is found depending on the wording.

11.4 MARKETING IMPLICATIONS

11.4.1 Practical Implications - for the Consumer

Buying a new automobile is a purchase that is usually a complex decision involving different types of risk. One implication from this study is that a purchase expectation might be formed in different ways with effects later in the decision process. The way the decision process is initiated might have consequences for brand choice (cf. Bettman and Sujan, 1987), implying that even if the consumer perceives him/herself to carefully
collect information and to evaluate different alternatives, the entire process might be different if the process had been triggered by another factor.

From a consumer perspective it might also be interesting to note that attributes unimportant in an early stage of the replacement process surface as important later in the process.

In summary, it important for the consumer to realise that many factors affect the timing of a replacement decision. Not only factors related to the quality of the current product, but also factors affecting the requirements of the products have impact on the decision process and thereby affect the timing of the purchase.

11.4.2 Practical Implications - for the Manufacturer

Replacements purchases translate into millions of dollars, and predicting future sales is important for company survival. Many forecasting models are available, yet the results of such models often deviate from the observed sales. Even if many of the models try to address more salient aspects of consumer behaviour, forecasting is challenging and difficult (Bayus et al, 1989). The results from this study reveal that aspiration level and current level are influenced by different factors, with probable consequences for future generic and specific demand. Such insights should be incorporated into forecasting models.

Moreover, the findings from this study can be used in designing different marketing strategies. The shift in determinants of aspiration and current level depending on strength in purchase expectations also provides important knowledge from a managerial point of view. Marketing appeals or arguments, useful and effective early in the decision process, may not be of significant importance later in the process, i.e. when the consumer is close to an actual purchase.

11.4.3 Practical Implications - for Government and Society

For the government the issue of generic demand might be more essential than specific demand. Specific demand is of course also interesting as the usage of different automobiles does have different consequences, for example, in term of depreciation, in fuel consumption and ‘keeping’ speed limits (great effects on, for example, traffic safety). However, the
replacement rate and factors affecting the demand for automobiles may be more central in governmental policy.

One interesting finding is that as aspiration level is sensitive to household characteristics and households' perception of both their own budget and of the economy as a whole, both the speed and type of automobile bought is affected by the increasing number of divorces, the decrease in nativity, the fluctuation in national economy and household budgets. These factors have to be considered as they will intervene with other measures taken to affect consumption pattern.

From an environmental perspective (given that the age of the automobile fleet is an environmentally interesting issue), the findings in this study also highlight the importance of understanding how the decision to replace the current automobile has emerged. If, for example, the process is initiated by a decrease in current level the consumer requirements are more or less constant. The replacement purchases made will keep the automobile fleet relatively constant in age. If the purchase expectation, on the other hand, is initiated by an increase in aspiration level the replacement purchases made will generate a younger automobile fleet than today.

11.5 LIMITATIONS AND FUTURE RESEARCH

In this thesis the timing of replacement decisions has been investigated. A theoretical model has been developed and three studies have been conducted in order to test the proposed model. Some assumptions have been made, for example that the decision to replace the current automobile is a deliberate and thought through, highly involving process, that resembles a more rational view of consumer decision making. Every assumption implies restrictions in both results and generalisations.

In all, support is found for the proposed relationship between aspiration level, current level and purchase expectations, and for some of the factors assumed to effect aspiration level and current level. However, in the regression analysis presented in Chapter 9, adjusted $R^2$ hints at additional dimensions in explaining the variation in purchase expectation.

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57 For example, as discussed by Olshavsky and Granbois (1979), it can in many cases be debatable to what extent purchases do involve decision making.
The analysis in Chapter 10 also revealed a relatively low adjusted $R^2$. In this case it is also reasonable to believe that there are other important factors influencing both aspiration level and current level, factors not included in the presented model (Figure 2.3).

As this study has focused on the problem identification stage of the decision process, very little attention has been paid to the actual outcome of the process, in terms of actual automobile choice. However, the issue of the relationship between the formation of a purchase expectation and the actual product choice has been discussed and one interesting aspect for future research is the relationship between generic demand and specific demand. This issue’s importance is highlighted as the study supports the idea that problem identification can occur either as a change in aspiration level or in current level and the different types of priming can be reflected later in the decision process with probable effect on actual choice. Moreover even though many similarities were found between aspiration level and current level, there were also a few differences among the determinants of aspiration level and current level. It appeared as though aspiration level was more related to financial attributes, than was current level. Future research emphasising the structure of aspiration level and current level as well as research focusing on determinant attributes of both levels are of great interest for understanding the effect the problem recognition stage has on the decision process. Furthermore, the change in attribute weights over stages in the decision process is another important issue that would benefit from further research. One interesting question is for example, to address the effect of different communications strategies in different stages of the decision process.

Methodologically, this study has also raised new questions. The discussion as to choice of respondent opens up questions that would be interesting to pursue further. The results showed, for instance, that predictability among households where the spouses agreed on their relative influence was better than if the dyad did not agree. In order to understand why the predictability differs between households where spouses disagree or agree on their relative influence - deeper studies of joint decisions is required. Furthermore, the issue of under what circumstances individuals under - and over-estimate behaviour is worth pursuing further.
REFERENCES


REFERENCES


Davidsson, P. *Kultur och entreprenörskap: orsaker till regional variation i nyföretagande*. NUTEK. (1993). 3,


HELLO

My name is ... and I am calling on behalf of the Transportation Research Unit at the University of Umeå. Could you spare a few minutes? *If no, ask if and when you could call back.* We are conducting a survey to find out when households replace their cars and what factors are important when purchasing a car.

1994, we carried out a study of 600 households in Sweden and are now starting a research project for which we are going to study 400 households over a two year period. The objective is to investigate when and why people replace their cars. We are going to interview each household a maximum of 7 times over the two years. That means once every four months. The first interview takes approx. 30 minutes and the subsequent interviews take approx. 20 minutes each.

From the national register of cars we have chosen 400 cars, among them your car with registration number _________ and consequently your household has been chosen to be included in the survey.

We hope that you are available to be interviewed. For the survey to be reliable it is very important that the persons that are asked to participate do so. The interview does not contain any questions of a sensitive nature and your anonymity is naturally guaranteed. The results are presented in such a way that no single individual can be identified.

I would be happy to carry out the first interview now but we could also arrange another time that might suit you better. Is that okay? *If s does not want to participate in the survey, note why and thank him/her for giving of his/her time. If s says yes, but for another time, note when you may call them back. Make sure you call them again at the agreed time.*

Notes (For example, time of telephone calls and when you may call them again)
## REPLY FORM

Household no...Interviewer...

Owner of the car...

Year of birth...Tel...

Address...

Car registration number:

Year of manufacture: Make:

Year of purchase: Year of sale:

Note for each interview which cars still remain in the household. If any cars are added, note this on an empty row. Please note also if any car changes from being a main car (the car that is used most by the household) to being an extra car or vice versa.

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<th>Make</th>
<th>Model</th>
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Interview

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Other members of the household

- ☐ Male  ☐ Female
- ☐ Children (number and age):

Changes in the composition of the household at each interview:

1.

...n.

Time of: Start End

Interview occasion 1 ......... ............ ............

...

Interview occasion n ......... ............ ............

Any notes:

Reason for dropping out:

Put a cross here if s, without prompting, asks for the results to be sent by to s:
TELEPHONE INTERVIEW

Interview occasion 1

To the interviewer: Skip the introduction if you carry out the interview directly in connection with your first questions to the household.

Hello, this is ...... from the Transportation Research Unit at the University of Umeå. We spoke some days ago and agreed that I would call you today to carry out a 30 minute interview. Is this still a good time for the interview? (If no, decide on a new time).

To the interviewer: Start here if you carry out the interview directly.

F1. Since we would prefer to talk to the person in the household who decides when the car ____________ is to be replaced, I would like to know if you are married, cohabiting or single.
   _____ Married
   _____ Cohabiting
   _____ Single

If s is single skip the following question.

F2. Which member of the household decides when the car should be replaced? To the interviewer: Read the alternatives out loud.

   (+2) ___ You decide all by yourself
   (+1) ___ You have most influence
   ( 0 ) ___ You and your wife/husband/partner have equal influence
   (-1 ) ___ You have little influence.
          Your wife/husband/partner has more influence
   (-2 ) ___ You have no influence. Your wife/husband/partner decides

Procedure: Once the questions have been asked, study the points allocated for the question. If the score is 0, +1 or +2, proceed with the person you are talking to. If not, change to the wife/husband/partner

To the interviewer: you might have been talking to wrong person, in other words, a person that doesn’t normally make a decision about the time for car purchase. In that case, you have to ask if you may speak to the person in the household who decides most about the car and repeat everything you said earlier to the new subject. You also have to ask the new S the question about decision-making and make sure that this answer matches the earlier one.

Now a couple of question concerning the chosen car with registration number__________

F3. What is the car’s year of manufacture?________________________

F4. What make is the car? (Volvo, Honda, Opel etc.)____________________

F5. Can you also say what model the car is? (GTI, cadet, injection engine or carburettor etc)______________________________
To the interviewer: make sure that it is the right car.

F6. Is the car in question used regularly in the household?
   ____ Yes
   ____ No

F7. What is the car used for? To the interviewer: Read the alternatives out loud.
   ____ Regular trips to or within work and in spare time.
   ____ Other. What: ______________________________

If the car is not in everyday use, thank the subject for giving of their time and end the interview. Write the car’s fields of use on the reply form as a reason for dropping out. Thank S and end the interview. The car is not considered to be a car in everyday use if it is only used in certain seasons or only by people other than the owner him-/herself.

I1. How many cars does your household have at its disposal?
   ____ One (go directly to question I3)
   ____ Two
   ____ Three
   ____ Four or more

If the family has more than one car, emphasise that the following questions concern the car _____________ that was chosen from the national register of cars.

I2. Is it your main car - the car that is most frequently used by the household?
   ____ yes  ____ no

I3. Is the car mainly used for certain purposes within the household, or is it mainly used by one person within the household?
   ____ purpose  ____ person

I4. Does the household get subsidies from employer/company for the car?
   ____ Yes, to what extent? ____________________ (state in % of driving distance)
   ____ No

I5. Which type of gas do you use?
   ____ Lead-free
   ____ leaded
   ____ Other

I6. Does the car have a catalyst?
   ____ Yes  ____ No

I7. How many kilometres has the car gone approx.? Approx. _______________ km

I8. How many kilometres is the car driven each year? Approx. _______________ km

If s has more cars:
I9. How many kilometres does the household drive these (other cars) per year?
   Approx.: _______________ km

I10. Was your car new or used when you bought it?
    ____ New  ____ Used
I 11. What year did you buy the car? (One could buy a new 1980 model in 1981. In other words, the year of purchase and manufacture are not necessarily the same)

I 12. How much did the car cost? If you traded in your old car, do not forget to include the trade-in price for the old car. Make a rough estimate if you do not remember the exact price.

I 13. If you sold the car today, how much do you think you would get for it?

I 14. Have travel patterns, travel needs or use of car changed in the last four months and/or do you think it will change during the following four months? Note as accurately as possible what says.

I 15. How many times has the car been repaired during the last four months? By ‘repaired’ we mean that the car has been taken to a garage for the rectification of a specific defect or for the identification of a suspected defect; or any D.I.Y measure to the same effect. We do not refer to occasions when service or regular maintenance is carried out.

I 16. How much have you paid for the repairs and/or spare parts during the last four months?

I 17. Do you think the car will need repairs in the next four months? Read the alternatives out loud.

If there are more cars in the household, ask:

I 18. What are the makes, models, year of manufacture and year of purchase for the cars in the household? Please rank the cars so that the one that is used the most and has done most kilometres is placed first, and the one that is used the least and has done the least kilometres is placed last. Do not forget to include the chosen car. If there are more than one person in the household, say: Can you also tell me if the cars are used for some specific purposes within the household or are mainly used by one person? Make/Model/Year of manufacture/year of purchase for every extra car given in descending order of annual driving distance.
Make ______________  Model ______________  Manufacture year ______________
Purchase person ______________  Purpose ______________
Main car: ______________
Extra car: ______________

I 20. What type of car did your household have before you bought your current car?

I 21. What type of car do you think your household will buy in the future? (Tick the alternative that says spontaneously, if you are not sure choose “other” and note what s says).

- Large car
- Small car
- Swedish
- European
- American
- Japanese
- Electric
- Estate
- Jeep/Van
- Same as today
- Other: ________________________________

I 22. What is your price limit for the new car?

______________________________ SEK

ASPIRATION LEVEL

*Read out loud and slow: I will now ask some questions about what demands you have on cars of the same type and with the same fields of application as the one you own.*

*Read the questions A1-A4 slowly.*

A 1. Suppose 0 represents the worst car on the market you could possibly imagine, despite the fact that it has passed its M.O.T inspection within the last 12 months. 100 represents the best car on the market you could imagine. Now I would like to know the absolute lowest quality, graded between 0 and 100, that would be acceptable for any car you own? ________________________________

A 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of car on the market you can imagine. Which is the absolute lowest quality acceptable for any car you own? ________________________________

A 3. Suppose 0 represents the worst conceivable standard of functioning car on the market and 100 represents the best conceivable standard of functioning car on the market you can imagine. Which is the absolute lowest standard acceptable for any car you own? ________________________________

A 4. I will now ask more detailed questions about different car characteristics. We are still on a scale between 0 and 100 where 0 means the worst conceivable and 100 the best conceivable. If a car you own is to be acceptable, which is the minimum grade you would expect from a car at the time of purchase regarding:

- Mechanical reliability ________________________________
- Safety in traffic ________________________________
- Fuel consumption ________________________________
A P P E N D I X 1

Road holding
Driver comfort
Passenger comfort
Loading capacity
Running costs
Insurance, repair and service costs
Horsepower/top speed
Second hand price
Level of noise from engine, exhaust, gears and external factors
Heating and ventilation
Acceleration capacity
Design
The driving experience
Environmental friendliness

Technological Innovation

A 5. Have you been alerted to recent technological developments within the car industry?
   ___ Yes, what
   ___ No

If the answer to question A 5 is yes, ask:

A 6. Do you remember where you heard or saw it?
   ___ Through family member
   ___ Through neighbour or acquaintance
   ___ Through salesmen
   ___ In a daily paper
   ___ In weekly paper
   ___ Direct mail
   ___ Other

Environmental Awareness

A 7. To what extent do you consider yourself to be environmentally aware? Answer on a scale between 0 and 100 where 0 means not at all and 100 means very much.

A 8. To what extent do you consider your own environmental initiatives to be of importance to the environment? State on a scale between 0 and 100, where 0 means that your initiatives are of no importance at all and 100 means that your initiatives are vital for the improvement of the environment.

A 9. How conceivable is it that enough people take an active interest in the environment for it to be of importance to and have an impact on the environment? State on a scale between 0 and 100, where 0 means not at all conceivable and 100 very conceivable
Purchase intentions

I will now ask some questions about your plans for replacing the car. Remember that the questions concern the car with registration number _____________.

To the interviewer: If s states strong intention, go to question U 2.

U 1a. Does your household intend to replace the current car within 4 months? State on a scale between 1 and 7, where 1 means no intention and 7 strong intention.
No intention 1 2 3 4 5 6 7 Strong intention

U 1b. Does your household intend to replace the current car within 8 months? State on a scale between 1 and 7, where 1 means no intention and 7 strong intention.
No intention 1 2 3 4 5 6 7 Strong intention

U 1c. Does your household intend to replace the current car within 12 months? State on a scale between 1 and 7, where 1 means no intention and 7 strong intention.
No intention 1 2 3 4 5 6 7 Strong intention

U 1d. Does your household intend to replace the current car within 2 years? State on a scale between 1 and 7, where 1 means no intention and 7 strong intention.
No intention 1 2 3 4 5 6 7 Strong intention

Essential to the following questions: If s states: we will definitely change car, go to question U 3.

The changing of cars is of particular interest to us in this survey, so I would like to ask some more questions about this. You have just stated what intentions you have concerning changing the current car.

U 2a. How probable is it that your household will replace the car during the next 4 months? State on a scale between 1 and 7, where 1 means not at all probable and 7 means very probable.
Not at all probable 1 2 3 4 5 6 7 Very probable

U 2b. How probable is it that your household will replace the car during the next 8 months? State on a scale between 1 and 7, where 1 means not at all probable and 7 means very probable.
Not at all probable 1 2 3 4 5 6 7 Very probable

U 2c. How probable is it that your household will replace the car during the next 12 months? State on a scale between 1 and 7, where 1 means not at all probable and 7 means very probable.
Not at all probable 1 2 3 4 5 6 7 Very probable

U 2d. How probable is it that your household will replace the car during the next 2 years? State on a scale between 1 and 7, where 1 means not at all probable and 7 means very probable.
Not at all probable 1 2 3 4 5 6 7 Very probable
U 3. Right now do you think that you notice more, as many, or less car advertisements than usual? To the interviewer: If s states more or less, then ask if it is a few more or considerably more or a few less or considerably less, respectively.

____ you notice considerably more than usual
____ you notice more than usual
____ you notice as many as usual
____ you notice less than usual
____ you notice considerably less than usual

U 4. When your household replaces the current car with a new car, how probable do you think it is that you will buy a brand new car, i.e. not a used car? State on a scale between 1 and 5, where 1 means not at all probable and 5 means very probable.

________________________________________

Other purchase plans

U 5. Has your household made any larger purchase or larger investment of at least 10 000 SEK in the last four months?

____ No
____ Yes, what

U 6. Are there any investments to be made or more expensive capital goods to be bought for at least 10 000 SEK, which your household is fairly sure about, before you change car? Remember that we mean the chosen car.

____ No
____ Yes, what

CURRENT LEVEL

I will now ask some overall questions that directly concern the chosen car with registration number __________________

Read N 1-N 4 out loud and slowly.

Suppose 0 represents the worst car on the market you could possibly imagine, despite the fact that it has passed its M.O.T inspection within the last 12 months. 100 represents the best car on the market you could imagine. Now I would like to know which grade, between 0 and 100, is your current car?

N 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of functioning car on the market. Which quality do you consider your current car to be?

___________________________

N 3. Suppose 0 represents the worst conceivable standard of functioning car on the market and 100 represent the best conceivable standard of functioning car on the market. Which quality do you consider your current car to be?

___________________________

N 4. I will now ask more detailed questions about different characteristics of your car. We are still on a scale between 0 and 100 where 0 means the worst car you can
imagine and 100 the best conceivable. How is your current car concerning the following characteristics:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Rating</th>
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<tbody>
<tr>
<td>Mechanical reliability</td>
<td></td>
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<tr>
<td>Safety in traffic</td>
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<td>Fuel consumption</td>
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<td>Road holding</td>
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<td>Driver comfort</td>
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<td>Loading capacity</td>
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<td>Running costs</td>
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<td>Insurance, repair and service costs</td>
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<td>Horsepower/top speed</td>
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<td>Second hand price</td>
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<td>Level of noise from engine, exhaust, gears and external factors</td>
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<td>Heating and ventilation</td>
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<td>Acceleration capacity</td>
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<td>Design</td>
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<td>The driving experience</td>
<td></td>
</tr>
<tr>
<td>Environmental friendliness</td>
<td></td>
</tr>
</tbody>
</table>

I will now ask some questions about your opinion of the economic situation.

Consumer confidence/sentiments

*General economy*

C 1. How do you think the economic climate in Sweden has changed during the last 12 months? Do you think that it has got better, worse or that it is unchanged? *To the interviewer: If s states worse or better, then ask how much better or worse respectively.*

- ___ got much worse
- ___ got a little worse
- ___ no change
- ___ got a little better
- ___ got much better

C 2. How do you think the economic climate in Sweden will change during the next 12 months? Do you think that it will be better, worse or that it is unchanged? *To the interviewer: If s states worse or better, then ask how much better or worse respectively*

- ___ get much worse
- ___ get a little worse
- ___ no change
- ___ get a little better
- ___ get much better
Private economy
C 3. How do you think your household’s economic situation is now compared with 12 months ago? Do you think that it has got better, worse or that it is unchanged? To the interviewer: If s states worse or better, then ask how much better or worse respectively.

- got much worse
- got a little worse
- no change
- got little better
- got much better

C 4. How do you think your household’s economic situation will be in 12 months? Do you think that it will be better, worse or that it is unchanged? To the interviewer: If s states worse or better, then ask how much better or worse respectively.

- get much worse
- get a little worse
- no change
- get a little better
- get much better

Unemployment
C 5. How do you think unemployment will change during the next 12 months? Do you think it will increase, decrease or remain unchanged? To the interviewer: If s states increase or decrease, then ask how much of an increase/decrease.

- increase substantially
- increase a little
- remain unchanged
- decrease a little
- decrease substantially

Inflation
C 6. Compared to today, what do you think will happen to prices within the next 12 months? To the interviewer: Read the alternatives out loud.

- prices will increase more rapidly than today
- prices will increase at the same pace as today
- prices will increase less rapidly than today
- prices will remain unchanged
- prices will decrease

Saving
C 7. Do you think you will be able to save any money during the next 12 months? To the interviewer: read the alternatives out loud.

- Absolutely
- Probably
- Probably not
- Absolutely not
C 8. Do you think that today is a good, bad, or neither good or bad time to buy capital goods? To the interviewer: If s states good, ask if it is very good or quite good.

____ Very good
____ Quite good
____ Neither good or bad
____ Quite bad
____ Very bad

Sociodemographic factors

Now I finally want to ask some questions about the composition, education level, profession and income of the household.

B 1. What is your present occupational situation?
   ____ gainful employment full-time
   ____ gainful employment part-time
   ____ homemaker
   ____ student
   ____ retired
   ____ none, unemployed

What is your job?

B 2. Which of the following types of education have you gone through after primary school? ‘Gone through’ means that you have passed your examination. To the interviewer; more than one alternative is possible at the same time.

   ____ None
   ____ Vocational school
   ____ Secondary school (senior high school)
   ____ Further, non-university education
   ____ University

*Do not ask the following two questions if s is single.*

B 3. What is the present occupational situation of your wife/husband/partner?
   ____ gainful employment full-time
   ____ gainful employment part-time
   ____ homemaker
   ____ student
   ____ retired
   ____ none, unemployed

What is your wife’s/husband’s/partner’s job?
B 4. Which of the following types of education has your wife/husband/partner gone through after primary school? ‘Gone through’ means that he/she has passed his/her examination. To the interviewer; more than one alternative is possible at the same time.

___ None
___ Vocational school
___ Secondary school (senior high school)
___ Further, non-university education
___ University

B 5. How many people live in your household?__________________________

B 6. How old are you?___________________________________________

B 7. How old is your wife/husband/partner?________________________

B 8. How many children do you have and how old are they?______________

B 9. How big is the annual income of the household? Here we mean the total income from gainful employment after taxes plus contributions. Indicate therefore the total disposable income, that is to say salary, parental contribution, housing and sickness benefits, financial aid for studies etc. We are not interested in your exact income and only want to know within which interval we should place your household.

___ 0-50.000
___ 50.000 - 100.000
___ 100.000 - 150.000
___ 150.000 - 200.000
___ 200.000 - 250.000
___ 250.000 - 300.000
___ 300.000 or more

To the interviewer if s is single
THANK THE SUBJECTS FOR GIVING OF THEIR TIME, FINISH THE INTERVIEW AND TELL THEM YOU WILL CALL THEM AGAIN IN FOUR MONTHS TO MAKE A NEW, BUT SHORTER INTERVIEW.
If \( s \) is not single and you have not changed \( s \) after question 1. (Who in the household decides...) say:

As I mentioned in the beginning we are specially interested in the reasons for changing car in your household and how that decision is made within the household. In many households, such an important financial decision is made jointly. We suppose your wife/husband/partner also is implicated. It is therefore very important that we get the opportunity to ask your wife/husband/partner a couple of questions about the intentions of the household to change car. It only takes a couple of minutes. Is that okay? If no, ask why, note and thank them for giving of their time.

____ Yes
____ No, why

Say the following to wife/husband/partner:

At the moment we are carrying out a survey about when and why households change car. The survey is being carried out by the Transportation Research Unit at the University of Umeå. I have just interviewed your wife/husband/partner about your current car ____________________ registration number ____________________.

It is important to us that we could also ask you some questions since such an important decision often is made jointly in the household. It will only take a couple of minutes. Is that okay?

Remember that this concerns the car with registration number ____________________.

S 1. First I would like to know who in the household decides when the household should change car? To the interviewer: Read the alternatives out loud.

____ you decide all by yourself
____ you have most influence
____ you and your wife/husband/partner have equal influence
____ you have little influence. Your wife/husband/partner has more influence
____ you have no influence. Your wife/husband/partner decides by him-/herself

To the interviewer: If \( s \) indicates strong intention, go to question S 3.

S 2a. Does your household intend to replace the current car within 4 months? Indicate on a scale between 1 and 7, where 1 means no intention and 7 strong intention.

No intention 1 2 3 4 5 6 7 Strong intention

S 2b. Does your household intend to replace the current car within 8 months? Indicate on a scale between 1 and 7, where 1 means no intention and 7 strong intention.

No intention 1 2 3 4 5 6 7 Strong intention

S 2c. Does your household intend to replace the current car within 12 months? Indicate on a scale between 1 and 7, where 1 means no intention and 7 strong intention.

No intention 1 2 3 4 5 6 7 Strong intention

S 2c. Does your household intend to replace the current car within 2 years? Indicate on a scale between 1 and 7, where 1 means no intention and 7 strong intention.

No intention 1 2 3 4 5 6 7 Strong intention
S 3. What type of car do you think your household will buy in the future? (Mark the alternative that says spontaneously, if you are not sure choose “other” and note what s says).

- Large car
- Small car
- Swedish
- European
- American
- Japanese
- Electric
- Estate
- Jeep/Van
- Same as today
- Other: __________________________

S 4. How much can the new car cost?

_______________________________ SEK

S 5. When your household replaces the current car for a new car, how probable do you think it is that you buy a brand new car, i.e not a used car? State on a scale between 1 and 5, where 1 means not at all probable and 5 means very probable.

THANK THE SUBJECT FOR GIVING OF THEIR TIME, END THE INTERVIEW AND SAY THAT YOU WILL CALL THEM AGAIN IN FOUR MONTHS TO MAKE A NEW BUT SHORTER INTERVIEW.

Did you get to carry out the interview with the wife/husband/partner directly in connection with the first interview or did you have to call them again at another time?

- Directly
- At another time

If s has any questions or thinks that something is unclear ask them to contact me or tell them that I could call them when it is convenient. Do not try to explain the questions or their purposes on your own. S may call Agneta Marell, project organiser daytime at Tel 090 166114 and evenings/weekends at 090 124151.
HELLO

My name is .... and I am calling on behalf of the Transportation Research Unit at the University of Umeå. Could you spare a few minutes? If no, ask if and when you could call back. As You maybe remember, you were interviewed a couple of months ago, in ............... (have a check in the logbook when the interview with s was conducted). The interview was conducted as a part of a survey to find out when households replace their cars and what factors are important when purchasing a car.

As you might know the objective is to investigate when and why people replace their cars. We are going to interview each household a maximum of 7 times over the two years. That means once every four months. If the household is changing it’s car during the series of interviews a closing interview is being conducted.

El. As a start I like to ask if the household still have the car with _____________ (note registration number and car make) □ Yes □ No.

If the household don’t have the car in their possession, note and change to the interview with questions designed for people who have changed their cars

We hope that you are available to be interviewed and I would like to. For the survey to be reliable it is very important that the persons that are asked to participate do so. The interview does not contain any questions of a sensitive nature and your anonymity is naturally guaranteed. The results are presented in such a way that no single individual can be identified.

I would be happy to carry out the .......(2-7) interview now but we could also arrange another time that might suit you better. Is that okay? If s does not want to participate in the survey, note why and thank him/her for giving of his/her time
If s says yes, conduct the interview.
If s says yes, but for another time, note when you may call them back. Make sure you call them again at the agreed time. Notes (For example, time of telephone calls and when you may call them again)

Make a note of some of the answers you got on the reply form for this particular household.

APPENDIX 2
TELEPHONE INTERVIEW NR 2
For interview occasions 2-7

Time for the interview to start: ________________

To the interviewer: Skip the introduction if you conduct the interview directly in connection with the first question, i.e. whether they still have the car in question or not.

(Introduction) Hello, this is ........ calling from the Transportation Research Unit at the University of Umeå. We spoke a while ago and decided that I should call you back today for an interview that takes approx. 20 minutes. Is this still a good time to conduct the interview? (If no, arrange a new time).

To the interviewer: Begin here if you conduct the interview directly.
I would like to start by asking if there have been any changes within the household since we last spoke?

________________________________________________________________________

________________________________________________________________________
If s is single ask:
E2. Do you still have _____ car/cars and is the car that we refer to still your main/extra car?
☐ Yes
☐ No. What changes have there been and has any other car been added or removed? Read and note on the form. Check also if the new car after the change is an extra car or a main car.

If the extra car has become the main car, ask: Would you please explain with your own words why this change has been made?

__________________________________________________________________________

If the main car has become the extra car, ask: Would you please explain with your own words why this change has been made?

__________________________________________________________________________

Have there been any changes regarding work, habitation or family composition during the four past months?
E3. Have you changed job since we last interviewed you?
☐ Yes, to what; ________________________________
☐ No

E4. Do you still live at __________________________________________ (address)
☐ Yes
☐ No, new address; __________________________________________

E5. I also wonder if you are still single and if the household still consists of ____ persons?
☐ Yes
☐ No, May I ask what changes there have been? Note any change in the composition of the household:

__________________________________________________________________________

If s is still cohabiting or married ask:
E6. Do you still have _____ car/cars and is the car that we refer to still your main/extra car?
☐ Yes
☐ No. What changes have there been and has any other car been added or removed? Read and note on the form. Check also if the new car after the change is an extra car or a main car.
If the extra car has become the main car, ask: Would you please explain with your own words why this change has been made?

________________________________________________________________________

If the main car has become the extra car, ask: Would you please explain with your own words why this change has been made?

________________________________________________________________________

Have there been any changes regarding work, residence or family composition in the past four months?

E7. I wonder if you still are cohabiting/married and if the household consists of ___ persons?

☐ Yes  ☐ No. May I ask what changes there have been?

Note any change in the composition of the household:

________________________________________________________________________

If s is no longer married or cohabiting, ask question E 3-E 4, according to page 3, questions designed for single persons.

E8. Have you or your wife/husband/partner changed job?

☐ Yes, who and to what __________________________

☐ No

E9. Do you still live at ___________________________ (address)

☐ Yes  ☐ No, new address and phone no.; __________________________

If s is still cohabiting or married ask question F 2.

F2. Who in the household decided when the household should replace the old car, registration number ______________? To the interviewer: Read the alternatives out loud.

(+2) ___ You decided all by yourself

(+1) ___ You had the most influence

(0) ___ You and your wife/husband/partner influenced the decision equally

(-1) ___ You had little influence. Your wife/husband/partner had most influence

(-2) ___ You had no influence. Your wife/husband/partner decided entirely
Procedure: Once the questions have been asked, study the points allocated for the question. If the score is 0, +1 or +2, proceed with the person you are talking to. If not, change to the wife/husband/partner.

To the interviewer: you might have been talking to wrong person, in other words, a person that doesn't normally make a decision about the time for car purchase. In that case, you have to ask if you may speak to the person in the household who decides most about the car and repeat everything you said earlier to the new subject. You also have to ask the new S the question about decision-making and make sure that this answer matches the earlier one.

I will now ask some questions about the new car.

When did you buy the new car? __________________________ (month and day if possible)

What make, model (GTI, cadet etc) and year is the new car?
make_________ model_________ year_________

How much did the new car cost? __________________________ SEK

Is the new car used regularly by the household?
☐ Yes
☐ No

F7. What is the new car used for? To the interviewer: read the alternatives out loud.
☐ Regular trips to/for work and in free time.
☐ Other.
What:_________________________________________________

Has the newly acquired car replaced the function of the old car?
☐ Yes
☐ No

I 4. Does the household receive subsidies from employer/company for the new car?
☐ Yes, to what extent?____________________(state in % of annual driving distance)
☐ No

I 7. Approximately how many kilometres has the car done? ________________ km

Did you trade in your old car at the time of purchase or did you sell it? Read the alternatives out loud:
☐ You traded in your old car at the time of purchase
☐ You got rid of the old car on another occasion

What happened to the old car? Read the alternatives out loud
☐ It was scrapped
☐ It was sold to a private person
☐ It was sold to a car salesman
☐ Other ____________________________________________

How much did you get for the old car? __________________________ SEK
I 14. Have travel patterns, travel needs and field of use changed in the last four months, and/or do you think it will change in the next four months? *Note as accurately as possible what s says.*

___ No
___ Yes, recently: ___________________________ in the future: ___________________________

I 15. How many times has the car been repaired during the last four months? By ‘repaired’ we mean that the car has been taken to a garage for the rectification of a specific defect or for the identification of a suspected defect; or any D.I.Y measure to the same effect. We do not refer to occasions when service or regular maintenance is carried out.

___ None (proceed to question I 17)
___ One
___ Two
___ Three
___ Four
___ Five or more

I 16. How much have you paid for the repairs and/or spare parts in the last four months? ____________________________ SEK

BB1. Had you thought about replacing the old car for a long time?
- Yes, about how long? ____________________________ month/s
- No, about how long? ____________________________ month/s

BB2. I’d now like to know what made your household decide to change car, i.e. to get another car? *More than one alternative may be given.*
Was it something directly to do the car (do not read out the alternatives)
- major, extensive repairs
- many minor repairs
- unreliability
- you expected it to break down anytime, i.e. expected repairs
- boring to drive
- poor fuel consumption
- Other: ____________________________________________

Was it something that had to do with family or work (do not read out the alternatives)
- changes within the family
- new work
- new residential circumstances i.e. the household has moved to the city or to the countryside
- Other: ____________________________________________

or maybe
- new technical refinements, i.e. e airbags or ABS-brakes in new cars
- new information about the car in ownership
- the new car is more reliable or safe in traffic
- the old car was not very environmentally friendly
BB3. Could you explain in your own words what made your household decide to replace the old car? I would like to know how you came to the conclusion that it was time to replace the old car. Be careful to clearly note what is says.

BB4. What factors were most important to your household when deciding to replace the old car? Try to elicit at least three.

BB5. If you consider the factors you previously mentioned as the most important, could you please indicate how important they were to your household when you decided to replace the old car? Could you evaluate each factor by assigning each one a number from 1 to 9, where 1 means 'not at all important' and 9 'very important'.

BB6. Which factors did you attach the greatest importance to when you bought the car? Try to elicit at least three.

BB7. If you consider the factors you previously mentioned as the most important, could you please indicate how important they were to you when you bought the new car? Could you evaluate each factor by assigning each one a number from 1 to 9, where 1 means 'not at all important' and 9 'very important'.

ASPIRATION LEVEL

Read out loud and slowly. I will now ask some questions about what demands you had on cars of the same type and with the same fields of use as the one you recently bought.

Read the questions A1-A4 slowly.

A1. Suppose 0 represents the worst car on the market you could possibly imagine, despite the fact that it has passed its M.O.T inspection within the last 12 months. 100 represents the best car on the market you could imagine. Now I would like to know the absolute lowest quality, graded between 0 and 100, that would be acceptable for any car you buy?

A2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of car on the market you can imagine. Which is the absolute lowest quality acceptable for any car you buy?

A3. Suppose 0 represents the worst conceivable standard of functioning car on the market and 100 represents the best conceivable standard of functioning car on the market you can imagine. Which is the absolute lowest standard acceptable for any car you buy?
A 4. I will now ask more detailed questions about different car characteristics. We are still on a scale between 0 and 100 where 0 means the worst conceivable and 100 the best conceivable. If a car you own is to be acceptable, which is the minimum grade you would expect from a car at the time of purchase regarding:

- Mechanical reliability
- Safety in traffic
- Fuel consumption
- Road holding
- Driver comfort
- Passenger comfort
- Loading capacity
- Running costs
- Insurance, repair and service costs
- Horsepower/top speed
- Second hand price
- Level of noise from engine, exhaust, gears and external factors
- Heating and ventilation
- Acceleration capacity
- Design
- The driving experience
- Environmental friendliness

BB 8. Where did you look for information in connection with your purchase?

BB 9. Was there any particular information you think had special bearing on the purchase decision?

BB 10. Did you look for a lot of information about makes and models of car other than the one you bought? Read the alternatives out loud

☐ Yes, I looked at a lot of information about other models and makes
☐ Yes, but not very much
☐ No, hardly anything

BB 11. Did you think things over carefully or was the decision to replace the car made quickly? Read the alternatives out loud

☐ The decision to replace the car was made quickly.
☐ The decision was made quite quickly
☐ The decision was made neither quickly nor slowly
☐ The decision was made quite slowly
☐ The decision was made very slowly

A 5. Have you been alerted to recent technological developments within the car industry?

☐ Yes, what ☐ No
If the answer to question A 5 is yes, ask:

A 6. Do you remember where you heard or saw it?
  ___ Through family member
  ___ Through neighbour or acquaintance
  ___ Through salesmen
  ___ In a daily paper
  ___ In weekly paper
  ___ Direct mail
  ___ Other __________________________

Other purchase plans

U 5. Has your household made any larger purchases or larger investments of at least 10 000 SEK in the past four months?
No ___ Yes, what________________________

GRADE OF THE OLD CAR

I will now ask some general questions directly to do with the old car, i.e. the car you got rid of.

Read N 1-N 4 out loud and slowly.

N 1. Suppose that 0 represents the worst car on the market that you can imagine, despite the fact that it passed its M.O.T inspection within the last 12 months. 100 represents the best conceivable car on the market you can imagine. Now I would like to know how you would grade your old car. __________________________

N 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of functioning car on the market. How would you grade your old car? __________________________

N 3. Suppose 0 represents the worst conceivable standard of car on the market and 100 represents the best conceivable standard of car on the market. How would you grade your old car? __________________________

N 4. I will now ask more detailed questions about different characteristics of your car. We are still on a scale between 0 and 100 where 0 means the worst car you can imagine and 100 the best conceivable. How would you grade your old car for the following characteristics?

  Mechanical reliability __________________________
  Safety in traffic __________________________
  Fuel consumption __________________________
  Road holding __________________________
  Driver comfort __________________________
  Passenger comfort __________________________
  Loading capacity __________________________
  Running costs __________________________
  Insurance, repair and service costs __________________________
  Horsepower/top speed __________________________
  Second hand price __________________________
  Level of noise from engine, exhaust, gears and external factors __________________________
Heating and ventilation
Acceleration capacity
Design
The driving experience
Environmental friendliness

CURRENT GRADE

I will now ask some general questions directly concerning the recently bought car.

Read N 1-N 4 out loud and slowly.

N 1. Suppose that 0 represents the worst car on the market you can imagine, despite the fact that it passed its M.O.T inspection within the last 12 months. 100 represents the best conceivable car on the market you can imagine. Now I would like to know how you would grade your new car.

N 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of functioning car on the market. How would you grade your new car?

N 3. Suppose 0 represents the worst conceivable standard of car on the market and 100 represents the best conceivable standard of car on the market. How would you grade your new car?

N 4. I will now ask more detailed questions about different characteristics of your car. We are still on a scale between 0 and 100 where 0 means the worst car you can imagine and 100 the best conceivable. How would you grade your old car for the following characteristics?

Mechanical reliability
Safety in traffic
Fuel consumption
Road holding
Driver comfort
Passenger comfort
Loading capacity
Running costs
Insurance, repair and service costs
Horsepower/top speed
Second hand price
Level of noise from engine, exhaust, gears and external factors
Heating and ventilation
Acceleration capacity
Design
The driving experience
Environmental friendliness

When you were about to change car, which information about the new car did you think was most important?
When choosing the new car, which car makes did you choose primarily and why? What was the decisive factor? *(Note the makes that mentions, why the make was of interest and what decided the matter in favour of the chosen car)*

Do you think it was a sensible decision to change car?

___ Yes ___ No ___ Don’t know ___ Time will tell

Was it sensible to buy the make of car that you bought?

___ Yes ___ No ___ Don’t know ___ Time will tell

Are you very interested or not very interested in cars? Answer on a scale between 1 and 100 where 1 means ‘not at all interested’ and 100 means ‘very interested’.

Do you know a little or a great deal about cars? Answer on a scale between 1 and 100 where 1 means ‘not much’ and 100 means ‘a great deal’.

Do you consider yourself as knowing more, just as much or less than the average Swede when it comes to cars? *To the interviewer: If s answers’ more’, asks whether more or much more.*

___ much more
___ more
___ just as much
___ less
___ much less

When do you think you will replace the newly obtained car? *(Give as exact answer as possible). In*

Socio-demographic factors

Now I finally want to ask some questions about the composition, level of education, profession and income of the household.

B 1. What is your present occupational situation?

___ gainful work full-time
___ gainful work part-time
___ home maker
___ student
___ retired
___ none, unemployed

*Do not ask the following if s is single.*

B 3. What is your husband/wife/partner’s present occupational situation?

___ gainful work full-time
___ gainful work part-time
___ home maker
___ student
___ retired
___ none, unemployed
B 9. How big is the household’s annual disposable income? Here we mean the total income from gainful work after taxes plus contributions. Indicate therefore the total disposable income, i.e. salary, child allowance, housing benefit, sick pay, student grants or loans etc. We are not interested in your exact income and only want to know which interval we could place your household in.

- 0-50,000
- 50,000 - 100,000
- 100,000 - 150,000
- 150,000 - 200,000
- 200,000 - 250,000
- 250,000 - 300,000
- 300,000 or more

THANK THE SUBJECTS FOR GIVING OF THEIR TIME AND FINISH THE INTERVIEW
TELEPHONE INTERVIEW WITH PEOPLE WHO HAVE CHANGED THEIR CARS
For interview occasions 2-7

To the interviewer: Skip the introduction if you conduct the interview directly in connection with the first question, i.e. whether they still have the car in question or not.

(Introduction) Hello, this is ....... calling from the Transportation Research Unit at the University of Umeå. We spoke a while ago and decided that I should call you back today for an interview that takes approx. 20 minutes. Is this still a good time to conduct the interview? (If no, arrange a new time).

To the interviewer: Begin here if you conduct the interview directly.
I would like to start by asking if there have been any changes within the household since we last spoke?

When did you sell the car, what date?______________________

If S is married or co-habiting:
E6. Do you still have ____ cars?
☐ Yes
☐ No, what has changed, has a car been added or removed from the previous total?
Read and make a note on the reply form. Also check if, after the change, the new car is a main car or an extra car.

Have there been any changes regarding work, residence or family composition in the past four months?

E7. I wonder if you still are cohabiting/married and if the household consists of ____ persons?
☐ Yes
☐ No. May I ask what changes there have been?

Note any change in the composition of the household:

If s is no longer married or cohabiting, ask question E 3-E 4, according to page 3, questions designed for single persons.
E8. Have you or your wife/husband/partner changed job?
☐ Yes, who and to what.____________________________
☐ No

E9. Do you still live at ________________________________ (address)
☐ Yes
☐ No, new address and phone no.: ________________________________

If s is single ask:
E2. Do you still have ____ cars?
☐ Yes
☐ No.
APPENDIX 3

What changes have there been and has any other car been added or removed? *Read and note on the form. Check also if the new car after the change is an extra car or a main car.*

Have there been any changes regarding work, habitation or family composition during the four past months?

E3. Have you changed job since we last interviewed you?
- Yes, to what: __________________________________________________________
- No

E4. Do you still live at ________________________________________________ (address)
- Yes
- No, new address: ____________________________________________________

E5. I also wonder if you are still single and if the household still consists of ___ persons?
- Yes
- No, May I ask what changes there have been?
  *Note any change in the composition of the household:*
  ________________________________________________________________
  If s is still cohabiting or married ask question F2.

F2. Who in the household decided when the household should replace the old car, registration number ___________________? To the interviewer: Read the alternatives out loud.

(+2) ___ You decided all by yourself
(+1) ___ You had the most influence
(0) ___ You and your wife/husband/partner influenced the decision equally
(-1) ___ You had little influence. Your wife/husband/partner had most influence
(-2) ___ You had no influence. Your wife/husband/partner decided entirely

*Procedure: Once the questions have been asked, study the points allocated for the question. If the score is 0, +1 or +2, proceed with the person you are talking to. If not, change to the wife/husband/partner.*

I will now ask some questions about the new car.

When did you buy the new car? ______________________ (month and day if possible)

What make, model (GTI, cadet etc) and year is the new car?
make________________ model________________ year____________

How much did the new car cost? ___________________________ SEK

Is the new car used regularly by the household?
- Yes
- No
F7. What is the new car used for? *To the interviewer: read the alternatives out loud.*
- Regular trips to/for work and in free time.
- Other.

What: __________________________________________

Has the newly acquired car replaced the function of the old car?
- Yes
- No

I 4. Does the household receive subsidies from employer/company for the new car?
- Yes, to what extent? ______________________ (state in % of annual driving distance)
- No

I 7. Approximately how many kilometres has the car done? ________________ km

Did you trade in your old car at the time of purchase or did you sell it? *Read the alternatives out loud:*
- You traded in your old car at the time of purchase
- You got rid of the old car on another occasion

What happened to the old car? *Read the alternatives out loud*
- It was scrapped
- It was sold to a private person
- It was sold to a car salesman
- Other ________________

How much did you get for the old car? ________________ SEK

I 14. Have travel patterns, travel needs and field of use changed in the last four months, and/or do you think it will change in the next four months? *Note as accurately as possible what s says.*
- No
- Yes, recently:________________________ in the future:________________________

I 15. How many times has the car been repaired during the last four months? By ‘repaired’ we mean that the car has been taken to a garage for the rectification of a specific defect or for the identification of a suspected defect; or any D.I.Y measure to the same effect. We do not refer to occasions when service or regular maintenance is carried out.
- None (proceed to question I 17)
- One
- Two
- Three
- Four
- Five or more

I 16. How much have you paid for the repairs and/or spare parts in the last four months? ______________________ SEK

BB1. Had you thought about replacing the old car for a long time?
- Yes, about how long? ______________________ month/s
- No, about how long? ______________________ month/s
BB2. I'd now like to know what made your household decide to change car, i.e. to get another car? More than one alternative may be given.

Was it something directly to do the car (do not read out the alternatives)

☐ major, extensive repairs
☐ many minor repairs
☐ unreliability
☐ you expected it to break down anytime, i.e. expected repairs
☐ boring to drive
☐ poor fuel consumption
☐ Other: ________________________________

Was it something that had to do with family or work (do not read out the alternatives)

☐ changes within the family
☐ new work
☐ new residential circumstances i.e. the household has moved to the city or to the countryside
☐ Other; ________________________________

or maybe

☐ new technical refinements, i.e. e airbags or ABS-brakes in new cars
☐ new information about the car in ownership
☐ the new car is more reliable or safe in traffic
☐ the old car was not very environmentally friendly

BB3. Could you explain in your own words what made your household decide to replace the old car? I would like to know how you came to the conclusion that it was time to replace the old car. Be careful to clearly note what s says.

________________________________________

BB4. What factors were most important to your household when deciding to replace the old car? Try to elicit at least three. ____________________________________________

BB5. If you consider the factors you previously mentioned as the most important, could you please indicate how important they were to your household when you decided to replace the old car? Could you evaluate each factor by assigning each one a number from 1 to 9, where 1 means 'not at all important' and 9 'very important'.

________________________________________

BB6. Which factors did you attach the greatest importance to when you bought the car? Try to elicit at least three. ____________________________________________

BB7. If you consider the factors you previously mentioned as the most important, could you please indicate how important they were to you when you bought the new car? Could you evaluate each factor by assigning each one a number from 1 to 9, where 1 means 'not at all important' and 9 'very important'.

________________________________________
ASPIRATION LEVEL

Read out loud and slowly. I will now ask some questions about what demands you had on cars of the same type and with the same fields of use as the one you recently bought.

Read the questions A1-A4 slowly.
A 1. Suppose 0 represents the worst car on the market you could possibly imagine, despite the fact that it has passed its M.O.T inspection within the last 12 months. 100 represents the best car on the market you could imagine. Now I would like to know the absolute lowest quality, graded between 0 and 100, that would be acceptable for any car you buy?___________________________

A 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of car on the market you can imagine. Which is the absolute lowest quality acceptable for any car you buy?___________________________

A 3. Suppose 0 represents the worst conceivable standard of functioning car on the market and 100 represents the best conceivable standard of functioning car on the market you can imagine. Which is the absolute lowest standard acceptable for any car you buy?___________________________

A 4. I will now ask more detailed questions about different car characteristics. We are still on a scale between 0 and 100 where 0 means the worst conceivable and 100 the best conceivable. If a car you own is to be acceptable, which is the minimum grade you would expect from a car at the time of purchase regarding:

Mechanical reliability
Safety in traffic
Fuel consumption
Road holding
Driver comfort
Passenger comfort
Loading capacity
Running cost
Insurance, repair and service costs
Horsepower/top speed
Second hand price
Level of noise from engine, exhaust, gears and external factors
Heating and ventilation
Acceleration capacity
Design
The driving experience
Environmental friendliness

BB 8. Where did you look for information in connection with your purchase?
APPENDIX 3

BB 9. Was there any particular information you think had special bearing on the purchase decision?

BB 10. Did you look for a lot of information about makes and models of car other than the one you bought? Read the alternatives out loud
- Yes, I looked at a lot of information about other models and makes
- Yes, but not very much
- No, hardly anything

BB 11. Did you think things over carefully or was the decision to replace the car made quickly? Read the alternatives out loud
- The decision to replace the car was made quickly.
- The decision was made quite quickly
- The decision was made neither quickly nor slowly
- The decision was made quite slowly
- The decision was made very slowly

A 5. Have you been alerted to recent technological developments within the car industry?
- Yes, what______________________________
- No______________________________

If the answer to question A 5 is yes, ask:
A 6. Do you remember where you heard or saw it?
- Through family member
- Through neighbour or acquaintance
- Through salesmen
- In a daily paper
- In weekly paper
- Direct mail
- Other ____________________________

Other purchase plans

U 5. Has your household made any larger purchases or larger investments of at least 10 000 SEK in the past four months?
- No______________________________
- Yes, what______________________________

GRADE OF THE OLD CAR

I will now ask some general questions directly to do with the old car, i.e. the car you got rid of.

Read N 1-N 4 out loud and slowly.

N 1. Suppose that 0 represents the worst car on the market that you can imagine, despite the fact that it passed its M.O.T inspection within the last 12 months. 100 represents the best conceivable car on the market you can imagine. Now I would like to know how you would grade your old car. ____________________________

N 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of functioning car on the market. How would you grade your old car? ____________________________
N 3. Suppose 0 represents the worst conceivable standard of car on the market and 100 represents the best conceivable standard of car on the market. How would you grade your old car? __________________________

N 4. I will now ask more detailed questions about different characteristics of your car. We are still on a scale between 0 and 100 where 0 means the worst car you can imagine and 100 the best conceivable. How would you grade your old car for the following characteristics?

- Mechanical reliability
- Safety in traffic
- Fuel consumption
- Road holding
- Driver comfort
- Passenger comfort
- Loading capacity
- Running cost
- Insurance, repair and service costs
- Horsepower/top speed
- Second hand price
- Level of noise from engine, exhaust, gears and external factors
- Heating and ventilation
- Acceleration capacity
- Design
- The driving experience
- Environmental friendliness

CURRENT GRADE

I will now ask some general questions directly concerning the recently bought car.

Read N 1-N 4 out loud and slowly.

N 1. Suppose that 0 represents the worst car on the market you can imagine, despite the fact that it passed its M.O.T inspection within the last 12 months. 100 represents the best conceivable car on the market you can imagine. Now I would like to know how you would grade your new car. __________________________

N 2. Suppose 0 represents the worst conceivable quality of functioning car on the market and 100 represents the best conceivable quality of functioning car on the market. How would you grade your new car? __________________________

N 3. Suppose 0 represents the worst conceivable standard of car on the market and 100 represents the best conceivable standard of car on the market. How would you grade your new car? __________________________
N 4. I will now ask more detailed questions about different characteristics of your car. We are still on a scale between 0 and 100 where 0 means the worst car you can imagine and 100 the best conceivable. How would you grade your old car for the following characteristics?

Mechanical reliability
Safety in traffic
Fuel consumption
Road holding
Driver comfort
Passenger comfort
Loading capacity
Running cost
Insurance, repair and service costs
Horsepower/top speed
Second hand price
Level of noise from engine, exhaust, gears and external factors
Heating and ventilation
Acceleration capacity
Design
The driving experience
Environmental friendliness

When you were about to change car, which information about the new car did you think was most important?

When choosing the new car, which car makes did you choose from primarily and why? What was the decisive factor? (Note the makes that s mentions, why the make was of interest and what decided the matter in favour of the chosen car)

Do you think it was a sensible decision to change car?
__Yes  __No  __Don’t know  __Time will tell

Was it sensible to buy the make of car that you bought?
__Yes  __No  __Don’t know  __Time will tell

Are you very interested or not very interested in cars? Answer on a scale between 1 and 100 where 1 means ‘not at all interested’ and 100 means ‘very interested’.

Do you know a little or a great deal about cars? Answer on a scale between 1 and 100 where 1 means ‘not much’ and 100 means ‘a great deal’.
Do you consider yourself as knowing more, just as much or less than the average Swede when it comes to cars? To the interviewer: If 's answers' more', asks whether more or much more.
   ___ much more
   ___ more
   ___ just as much
   ___ less
   ___ much less

When do you think you will replace the newly obtained car? (Give as exact answer as possible). In ________________________________

Socio-demographic factors
Now I finally want to ask some questions about the composition, level of education, profession and income of the household.

B 1. What is your present occupational situation?
   ___ gainful work full-time
   ___ gainful work part-time
   ___ home maker
   ___ student
   ___ retired
   ___ none, unemployed

Do not ask the following if s is single.
B 3. What is your husband/wife/partner’s present occupational situation?
   ___ gainful work full-time
   ___ gainful work part-time
   ___ home maker
   ___ student
   ___ retired
   ___ none, unemployed

B 9. How big is the household’s annual disposable income? Here we mean the total income from gainful work after taxes plus contributions. Indicate therefore the total disposable income, i.e. salary, child allowance, housing benefit, sick pay, student grants or loans etc. We are not interested in your exact income and only want to know which interval we could place your household in.
   ___ 0-50.000
   ___ 50.000 - 100.000
   ___ 100.000 - 150.000
   ___ 150.000 - 200.000
     THANK THE SUBJECTS FOR GIVING
   ___ 200.000 - 250.000
     OF THEIR TIME AND FINISH THE INTERVIEW
   ___ 250.000 - 300.000
   ___ 300.000 or more
### Table 1 Regression Coefficients for the Determinants of Aspiration Level for Each Different Measure.

<table>
<thead>
<tr>
<th>Aspiration level</th>
<th>Level</th>
<th>Quality</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>0.29***</td>
<td>0.37***</td>
<td>0.20***</td>
</tr>
<tr>
<td>Traffic Safety</td>
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<td>-0.10***</td>
<td>0.03</td>
</tr>
<tr>
<td>Fuel consumption</td>
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<tr>
<td>Driving characteristics</td>
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<td>0.08**</td>
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<td>0.10***</td>
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<td>Maintenance cost</td>
<td>0.03</td>
<td>0.08***</td>
<td>0.02</td>
</tr>
<tr>
<td>Insurance and repair costs</td>
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<td>-0.024</td>
<td>-0.04++</td>
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<td>Engine power and top-speed</td>
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<td>0.09***</td>
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<td>Second hand value</td>
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<td>0.13***</td>
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*p< 0.001 = ***  p< 0.01 = **  p<0.05 = *

### Table 2 Regression Coefficients for the Determinants of Current Level for Each Different Measure.

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<th>Level</th>
<th>Quality</th>
<th>Standard</th>
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*p< 0.001 = ***  p< 0.01 = **  p<0.05 = *
Table 1 Regression Coefficients for the Determinants of Aspiration Level for the Cross-sectional Data and Panel Data.

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<th>Panel recruit only main effects</th>
<th>Panel All panel main effects</th>
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*p<0.001 = *** p<0.01 = ** p<0.05 = *
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<td>-0.02</td>
<td>0.02</td>
<td>0.07</td>
</tr>
<tr>
<td>Insurance and repair costs</td>
<td>-</td>
<td>-0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>Engine power</td>
<td>0.09</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Top speed</td>
<td>0.04</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Engine power and top speed</td>
<td>-</td>
<td>0.11**</td>
<td>0.33***</td>
</tr>
<tr>
<td>Second-hand value</td>
<td>0.13***</td>
<td>0.11***</td>
<td>0.43***</td>
</tr>
<tr>
<td>Noise level from engine and</td>
<td>0.06</td>
<td>0.06</td>
<td>0.38***</td>
</tr>
<tr>
<td>exhaustion system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heating and ventilation system</td>
<td>0.01</td>
<td>0.06</td>
<td>-0.07</td>
</tr>
<tr>
<td>Acceleration capacity</td>
<td>0.07</td>
<td>-0.03</td>
<td>-0.03</td>
</tr>
<tr>
<td>Appearance</td>
<td>0.03</td>
<td>0.12***</td>
<td>0.34***</td>
</tr>
<tr>
<td>Joy of driving</td>
<td>0.09</td>
<td>0.01</td>
<td>0.09</td>
</tr>
<tr>
<td>Environmental friendliness</td>
<td>-</td>
<td>0.08**</td>
<td>0.23***</td>
</tr>
<tr>
<td>Adjusted R2</td>
<td>.61</td>
<td>.64</td>
<td>.72</td>
</tr>
</tbody>
</table>

p< 0.001 = ***  p< 0.01 = **  p<0.05 = *

1Current level is an additive index of three measures (level, quality and standard).
### Table 1 Sample Coverage for New Recruited Households at Wave 1.

<table>
<thead>
<tr>
<th>Wave 1</th>
<th>Manufacture year Mean (SD)</th>
<th>Year of purchase Mean (SD)</th>
<th>Age of owner Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampled households (automobiles)</td>
<td>1989 (1.8)</td>
<td>1991 (1.6)</td>
<td>50 years (14.2)</td>
</tr>
<tr>
<td>Households with secret number and hänsvisningston</td>
<td>1989 (1.8)</td>
<td>1991 (1.6)</td>
<td>47 years (13.0)</td>
</tr>
<tr>
<td>Households who can not concentrate or have a hearing problem</td>
<td>1989 (1.2)</td>
<td>1989 (1.0)</td>
<td>77 years (7.2)</td>
</tr>
<tr>
<td>Already replaced the automobile</td>
<td>1989 (2.2)</td>
<td>1991 (2.2)</td>
<td>49 years (18.9)</td>
</tr>
<tr>
<td>Households who do not answer</td>
<td>1988 (1.4)</td>
<td>1991 (1.8)</td>
<td>54 years (1659)</td>
</tr>
<tr>
<td>after at least three trials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can not understand questions do not speak Swedish</td>
<td>1988 (2.9)</td>
<td>1992 (1.4)</td>
<td>55 years (21.9)</td>
</tr>
<tr>
<td>Refused to participate</td>
<td>1989 (1.9)</td>
<td>1991 (1.6)</td>
<td>53 years (13.5)</td>
</tr>
<tr>
<td>Can not participate due to sickness</td>
<td>1988 (1.7)</td>
<td>1991 (1.6)</td>
<td>51 years (15.2)</td>
</tr>
<tr>
<td>Participants</td>
<td>1989 (1.8)</td>
<td>1991 (1.6)</td>
<td>50 years (14.2)</td>
</tr>
</tbody>
</table>

### Table 2 Sample Coverage for New Recruited Households at Wave 2

<table>
<thead>
<tr>
<th>Wave 2</th>
<th>Manufacture year Mean (SD)</th>
<th>Year of purchase Mean (SD)</th>
<th>Age of owner Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampled households (automobiles)</td>
<td>1988 (1.7)</td>
<td>1991 (1.6)</td>
<td>47 years (13.7)</td>
</tr>
<tr>
<td>Households with secret number and hänsvisningston</td>
<td>1989 (2.0)</td>
<td>1991 (2.0)</td>
<td>47 years (14.3)</td>
</tr>
<tr>
<td>Households who can not concentrate or have a hearing problem</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Already replaced the automobile</td>
<td>1989 -</td>
<td>1989 -</td>
<td>57 years -</td>
</tr>
<tr>
<td>Households who do not answer</td>
<td>1989 (1.8)</td>
<td>1991 (1.5)</td>
<td>52 years (12.5)</td>
</tr>
<tr>
<td>after at least three trials</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can not understand questions do not speak Swedish</td>
<td>1991 -</td>
<td>1991 -</td>
<td>37 years -</td>
</tr>
<tr>
<td>Household who refused to participate</td>
<td>1988 -</td>
<td>1990 (1.4)</td>
<td>48 years (14.7)</td>
</tr>
<tr>
<td>Can not participate due to sickness</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Participants</td>
<td>1988 (1.6)</td>
<td>1991 (1.6)</td>
<td>45 years (13.5)</td>
</tr>
</tbody>
</table>
## Table 3 Sample Coverage for New Recruited Households at Wave 3

<table>
<thead>
<tr>
<th>Wave</th>
<th>Manufacture year Mean (SD)</th>
<th>Year of purchase Mean (SD)</th>
<th>Age of owner Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampled households (automobiles)</td>
<td>1989 (2.4)</td>
<td>1991 (1.6)</td>
<td>46 years (14.3)</td>
</tr>
<tr>
<td>Households with secret number and hävinsningston</td>
<td>1988 (2.6)</td>
<td>1991 (1.8)</td>
<td>39 years (11.8)</td>
</tr>
<tr>
<td>Households who can not concentrate or have a hearing problem</td>
<td>1988 -</td>
<td>1991 -</td>
<td>60 years -</td>
</tr>
<tr>
<td>Already replaced the automobile</td>
<td>1989 (2.9)</td>
<td>1991 (2.0)</td>
<td>53 years (21.9)</td>
</tr>
<tr>
<td>Households who do not answer after at least three trials</td>
<td>1988 (2.3)</td>
<td>1992 (1.0)</td>
<td>35 years (12.3)</td>
</tr>
<tr>
<td>Can not understand questions do not speak Swedish</td>
<td>- - - -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Household who refused to participate</td>
<td>1990 (2.5)</td>
<td>1991 (1.7)</td>
<td>51 years (15.2)</td>
</tr>
<tr>
<td>Can not participate due to sickness</td>
<td>1986 -</td>
<td>1993 -</td>
<td>56 years -</td>
</tr>
<tr>
<td>Participants</td>
<td>1989 (2.3)</td>
<td>1991 (1.6)</td>
<td>45 years (13.4)</td>
</tr>
</tbody>
</table>

## Table 4 Sample Coverage for New Recruited Households at Wave 4

<table>
<thead>
<tr>
<th>Wave</th>
<th>Manufacture year Mean (SD)</th>
<th>Year of purchase Mean (SD)</th>
<th>Age of owner Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampled households (automobiles)</td>
<td>1990 (1.9)</td>
<td>1992 (1.6)</td>
<td>48 years (14.8)</td>
</tr>
<tr>
<td>Households with secret number and hävinsningston</td>
<td>1990 (2.1)</td>
<td>1992 (0.7)</td>
<td>38 years (11.0)</td>
</tr>
<tr>
<td>Households who can not concentrate or have a hearing problem</td>
<td>1987 -</td>
<td>1992 -</td>
<td>83 years -</td>
</tr>
<tr>
<td>Already replaced the automobile</td>
<td>1990 (1.9)</td>
<td>1992 (1.9)</td>
<td>53 years (9.6)</td>
</tr>
<tr>
<td>Households who do not answer after at least three trials</td>
<td>1989 (2.1)</td>
<td>1993 (1.6)</td>
<td>35 years (12.4)</td>
</tr>
<tr>
<td>Can not understand questions do not speak Swedish</td>
<td>- - - -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Household who refused to participate</td>
<td>1990 (2.0)</td>
<td>1992 (1.7)</td>
<td>49 years (15.3)</td>
</tr>
<tr>
<td>Can not participate due to sickness</td>
<td>- - - -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Participants</td>
<td>1989 (1.8)</td>
<td>1992 (1.7)</td>
<td>48 years (14.1)</td>
</tr>
</tbody>
</table>
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