Environmental behaviour refers to all the actions of man that are significantly related to the natural environment, such as the consumption of environmental resources and space, the pollution of water, soil and air, the production of noise and waste, and man-made changes of landscapes. A broad range of behaviours falls within this definition of environmental behaviour, such as the production and the consumption of food, the buying of a house, working, transportation, various activities at home and shopping. The commons dilemma underlying many problems of environmental degradation (see Chapter 2) becomes clear if we realise that a lot of these behaviours satisfy our personal needs here and now (at the micro-level). However, the aggregated behaviour of many people together may in the long run affect natural environmental qualities at the macro-level. Also, the aggregated behaviour of many people affects the human environment, which refers to the technical environment people live in, the economy, the cultural environment, institutions and demographic developments. All these macro-level developments may have repercussions on the individual behaviour at some later time. For example, more intensive use of soil may yield larger harvests, which may sustain a more comfortable life-style. However, if all farmers adopt such more intensive agricultural activities, the chance of erosion will rise, which may cause a possible famine in the long run. Often however people are not aware of long-term negative developments, e.g., because they are behaving habitually, i.e. without much deliberation. This implies that they follow a cognitive processing style that does not involve an incorporation of the macro-level developments in their mental map.

The description above indicates that environmental behaviour can be conceived as a cyclical process, in which the micro-level behaviour of many individuals and the macro-level outcomes mutually affect each other. This cyclical pattern is being depicted in Figure 5.1, to be discussed below.

Regarding the degradation of the natural environment, the critical question has been formulated in Chapter 1: “Why do people so frequently over-exploit and damage natural resources, thereby endangering their own (future) living conditions, whereas in other conditions they use such resources with moderation so as to preserve them?”. In Chapter 2 this question was abbreviated as “why people bite the hand that feeds them”. In answering this question it is important to study the process as sketched in Figure 5.1. This implies that attention should be given to the macro-level developments as determinants of behaviour, the processes that determine the micro-level behaviour, and the strategies for behaviour change that are being employed by governments, industries and other interest parties. Consequently, the challenge resides in the formalisation of a behavioural model that captures the dynamics of the micro-macro interactions as depicted in Figure 5.1.
Towards a meta-model of behaviour

The discipline of psychology has a lot to contribute regarding how people behave, what processes guide that behaviour, and which factors affect these processes. Psychology is a relatively young science, taken to be founded in 1879, when Wilhelm Wundt started the first formal psychological laboratory at the University of Leipzig. Modern psychology comprises a large number of theories explaining different but often overlapping aspects of human behaviour. As regards environmental behaviour, relevant theories deal with issues like attitude formation and change, the principles of reasoned action, human needs and motivation, classical and operant conditioning, social learning and social comparison processes, self-awareness theory, social facilitation and inhibition, cognitive dissonance, equity and justice, and the likelihood of elaboration.

In studying the processes underlying people's behaviour, various psychological theories may contribute more or less important insights. However, because these theories are describing aspects, parts, or episodes of the processes underlying consumer behaviour, not all theoretical insights are relevant at the same time. For example, habitual behaviour, which is often triggered by environmental circumstances, can be described using conditioning theory. However, when a habit is being changed, also processes of attitude formation, reasoned action and social comparison may play a role. Moreover, some theories appear to be very general, and therefore important, such as a theory on human needs, whereas other theories are very specific and less important, such as self-awareness theory.

Up to now, no integrative models of human behaviour exist that link the various psychological theories together, thereby indicating when which theory is relevant. Whereas, for example, physics is working on a grand unifying theory that integrates a multitude of theories on various phenomena (see, e.g., Hawkins, 1998), psychology lacks such an integrative framework. According to some scholars there is a need for a meta-
theory of human behaviour (Vallacher and Nowak, 1994). Such a meta-theory should provide an organising framework to integrate simplified versions of relevant specific theories of behaviour. In this chapter a step in the direction of such a meta-theory is being offered. A conceptual meta-model will be discussed that combines basic principles of various relevant theories in an integrative fashion. This proposed conceptual meta-model is a revised version of the conceptual model that has been described in Jager, Van Asselt, Rotmans, Vlek, and Costerman Boodt (1997).

The description of the meta-model starts with the macro-level driving factors of human behaviour, which refers to the block on the left-hand side of Figure 5.1. Here, a perspective will be sketched on developments in the natural environment, technological change, economy, demographic developments, institutions and culture.

Following that, the micro-level driving factors of human behaviour will be discussed. These refer to personal needs, the opportunities to be used, the abilities that consumers may have, and the uncertainty people experience.

A next section is devoted to the conceptualisation of the cognitive process that people employ, which constitutes the heart of the meta-model. We assume that people usually employ only one cognitive processing strategy at the time. For example, they are deliberating about what product to buy or they are buying it habitually. The type of cognitive processing a person engages in depends on various driving factors, which refer to the person's state and the environment (s)he is living in. For example, if a person is very satisfied with driving a car, it is likely that this person uses the car in a habitual manner, instead of deliberating on alternative modes of transportation before every trip. Consequently, the meta-model should specify under what conditions which theory-based rule will guide the agent's cognitive processing strategy. Moreover, the meta-model should incorporate feedbacks in order to deal with dynamical processes of change. The conditions wherein a certain process will prevail can often be deduced from the corresponding behavioural theory. Consequently, behavioural theory is necessary to develop a set of simple rules that describe both the cognitive processes as well as the conditions under which a particular cognitive process is being used. Integrating the various relevant theories in a meta-model thus implies indication of the conditions in which a certain behavioural mechanism will prevail.

The next section is devoted to the opportunity consumption that follows from cognitive processing. This opportunity consumption involves changes in the macro-level, as well as in the micro-level determinants of behaviour:

At this point the dynamical circle of Figure 5.1 is completed, and we are capable of schematising the conceptual meta-model of behaviour. In a subsequent section we will discuss dynamical processes of behaviour that involve several cycles of the model. Especially the behaviour-dynamical principles of herd behaviour and habit formation are being discussed.

Whereas processes of behavioural change may often emerge autonomously, many deliberate actions are being taken to change consumer behaviour. In the final section of this chapter we will present a perspective on behaviour change that involves the changing of (micro- and macro-level) determinants, the connection with cognitive processes and various general strategies that can be used for changing behaviour.
The macro-level driving factors of human behaviour

In determining the driving factors that affect human behaviour, it is practical to distinguish between macro-level factors that are roughly equal for all persons, and micro-level factors that often differ between persons. The macro-level driving factors refer to the natural and human environment a person lives in, and they largely determine the behavioural options he or she has. The macro-level and micro-level of behaviour determinants are interdependent. The macro-level affects, for example, the opportunities people can choose from, whereas the aggregated consumption of many persons affects the environment they live in.

The natural environment people live in refers to living organisms and non-living materials which provide the basic survival conditions for humans. In the context of a commons dilemma (see Chapter 2), this natural environment refers to resources such as clean air, fish stocks, natural forests, pastureland and the like. Environmental problems usually touch on this natural level, e.g., global warming, deforestation, the depletion of fishing grounds, the loss of bio-diversity and pollution.

Many human-induced macro-level processes affect the condition of the natural environment. Because of their human origin, these processes are referred to as the human environment people live in. Different large-scale developments in the human environment affect the behaviour of many individuals. Well known is the IPAT-formula as introduced by Ehrlich and Holdren (1971), who define the environmental impact of a certain society as \( I = P \times A \times T \). Here, environmental Impact equals the product of Population size, the degree of Affluence per person and the environmental damage from the Technology used to produce one unit of affluence. According to this formula, reducing environmental degradation is a battle on three fronts: (1) limiting population growth, (2) limiting affluence and consumption growth, and (3) reducing the environmental impact of production and consumption technology (Goodland, Daly and Kellenberg, 1994). Because of the mutually compensatory character of \( P \), \( A \) and \( T \), fighting this battle on just one front may not be sufficient to reach sustainable development. For example, just increasing the level of ‘clean’ technology (T), while ignoring the growth of population (P) and affluence level (A), may still result in a significant growth of total environmental impact (I).

If we start investigating the socio-behavioural causes of population growth, increasing affluence and the ever growing power of technology, two other driving forces behind environmental overexploitation can be recognised, i.e. **institutions** as vehicles for constituting and governing human societies, and **culture** as the conglomerate of socially shared beliefs, values and attitudes. On this basis, Opschoor (1989), Stern (1992) and Vlek (1995) consider environmental overexploitation as being driven by technological, economic, demographic, institutional and cultural developments (abbreviated as the T.E.D.I.C. complex). Especially in the 20th century the T.E.D.I.C. complex has propelled an acceleration in environmental over-exploitation. From left to right in the T.E.D.I.C. complex, it seems that we are dealing with forces varying from easy-to-change to hard-to-change, or, from modifiable to ‘given’. Therefore the more fundamental the determinants addressed by an environmental policy aimed at reducing environmental overexploitation are, the more politically sensitive and harder to implement this policy becomes. This explains the popularity of technical solutions to environmental problems, which may, however, in fact only scratch the surface of a much deeper-rooted set of problems (Vlek, 1995). The following sections describe the developments in the industrialised countries.
with respect to macro-level factors in terms of technological, economic, demographic, institutional and cultural developments. These sections are adapted from Gatersleben and Vlek (1997).

**Technological developments.** In current industrial society, many goods, services and materials are available now that 50 years ago did not exist. For example, in 1950 the washing machine came on the market. The first machine only made mechanical movements and it had no supply- or drainpipe. Nowadays, the washing machine does everything for us; we merely have to put in the laundry and the soap and push the buttons. The washing machine and other household goods such as the micro-wave oven deliver services that were also delivered before. There are also many goods that deliver new services, such as a TV set, or the personal computer. Apart from a growing availability of goods and services there are also more different goods that deliver the same service. Technological developments also indirectly influence household consumer behaviour because they make goods and services available that people need in order to be able to use other goods, such as roads to drive a car, or pipe-connections to the gas-, water-, or electricity distribution systems.

**Economic developments.** While technological developments have led to many new goods, economic developments led to an increasing amount of money to consume and produce these goods. Of course these two go hand in hand; goods that are developed in technology are sold, and profits are used for further development. Not only is there more money to produce; there is also more money to consume. Since 1950 the purchasing power of individual households has strongly increased. Because of mass production, prices have decreased and more people were able to afford a particular good. Furthermore, for some goods, the prices per service unit have decreased. Household goods such as a washing machine have become more efficient and therefore use less energy, which makes the service they deliver relatively cheaper.

**Demographic developments.** Demographic developments can be seen as a multiplier, because when there are more people more goods and materials are needed and may be consumed. For example, from 1950 to 1990 the Dutch population has grown by a factor of 1.5 (from about 10 to 15 million) and is estimated to grow by another 0.6% towards 2010. The number of households has increased even more, due to a decreasing average household size.

**Institutional developments.** Striving for economic and technological growth can also be found in the way in which society is organised in social structures and institutions. According to Opschoor (1989), today's industrial capitalism originates not only in technological and scientific developments, but also in the development of the free-market system, which is aimed at increasing the material well-being of individuals and society by focusing on efficiency as reflected in market values. Natural resources used for industrial production generally do not have a market value and therefore are traditionally not seen as contributing to the economic value of goods.

**Cultural developments.** Consumption and consumption growth have penetrated into cultural norms and values as well: well-being these days seems to depend largely on how much people earn and possess; and how one is perceived by others is influenced by one's material possessions. The importance of nature tends to be reduced to the extent to which it is able to serve human needs. This stems from a traditional Christian belief in human domination over nature (or anthropocentrism: man as the measure for everything; White,
a belief in material prosperity, the free-market mechanism, and a materialistic culture in which norms and values are expressed in quantifiable units (Opschoor, 1989).

Macro-level developments following the T.E.D.I.C.-complex such as described above are important to understand the behavioural pressures affecting the individual consumer. For example, if the population grows, everything else being equal, the availability of consumption opportunities per capita will decrease because it has to be shared with more people. Moreover, the aggregated behaviour of many individual consumers affects macro-level outcomes such as environmental quality. The developments following the T.E.D.I.C.-complex can thus be considered as emergent properties originating from the behaviour of many individual consumers. Consequently, linking macro-level developments to the driving factors of individual consumer behaviour allows us to incorporate the micro-macro dynamics of consumer behaviour into one integrative model.

The micro-level driving factors of human behaviour

At the micro-level the basic driving forces of behaviour refer to human needs and values, behavioural opportunities, consumer abilities and consumer uncertainty. These four basic driving forces will be discussed in separate sections. Combining needs with opportunity consumption results in a level of need satisfaction, which determines their motivation to consume certain opportunities and to elaborate on opportunities. This level of need satisfaction will be discussed in the section on needs and values. Combining consumer abilities with opportunity demands yields a behavioural control, indicating the feasibility of opportunity consumption, which also affects the consumers motivation to elaborate on alternative opportunities. This behavioural control will be discussed in the section on abilities. The consumers level of need satisfaction, behavioural control and uncertainty are key factors that determine the type of cognitive processing he or she is most likely to engage in.

Human needs and values

The concept of need has many connotations (e.g., Gasper, 1996). First, it can be used both as a verb and a noun. The verb ‘need’ usually refers to wanting a certain item as a prerequisite for a certain behaviour, without referring to the deeper source of that wanting. For example, one may need a car to travel to work. The noun ‘need’ has many meanings, which can be grouped in three generic categories (Gasper, 1996, p. 5). The first refers to needs as related to wants or desires. Theories in this realm posit needs as underlying internal forces that drive our actions, e.g. the theories of McDougall (1928), Maslow (1954) and Max-Neef (1992). For example, the need for safety refers to the desire people have to feel safe. This desire may elicit various behaviours, depending on the circumstances. The second meaning refers to needs as an external (environmental) requirement for achieving an end. Theories in this area analyse satisfaction and try to identify what makes people fulfilled, happy or content (e.g. Scitovsky, 1992; Argyle, 1987). This approach, for example, studies the conditions in which people feel safe. The third meaning refers to needs as justified requirements for performing behaviour. Corresponding theory is concerned with normative and ethical aspects of needs and arguments about which prerequisites have a priority status (e.g., Doyal and Gough, 1991).
We will henceforth adopt the first ‘noun’ meaning of needs, referring to internal forces that drive our actions, as an appropriate perspective for our modelling exercise. The theories of McDougall (1928), Maslow (1954) and Max-Neef (1992) offer starting points to model needs as driving factors of behaviour. McDougall (1928) identified eighteen human needs (innate propensities or instincts). Examples are the need to seek (and perhaps to store) food, the need to explore strange places or things, the need to cry aloud for assistance when our efforts are utterly baffled, and the need to laugh at the defects and failures of our fellow-creatures. McDougall’s listing of what people need represents an early attempt to state universal motivational forces. However, the listing lacks a theoretical perspective on the relationships between the various needs.

Maslow (1954) has presented a well-known hierarchical ordering of needs, assuming that needs low in the hierarchy must be at least partially satisfied before needs higher in the hierarchy may become important sources of motivation. From the bottom to the top of his needs-pyramid, represented in Figure 5.2, Maslow (1954) discerns physiological and safety needs, needs to belong and be loved, and esteem, cognitive, aesthetic and self-actualisation needs.

A more sophisticated description and classification of human needs than those of McDougall (1928) and Maslow (1954), is postulated by Max-Neef (1992). This classification will be used in the conceptual meta-model to be presented. Max-Neef (1992) identifies nine fundamental needs that all people have: subsistence, protection, affection, understanding, participation, leisure, creation, identity and freedom. Whereas the first seven needs have existed since the origins of homo habilis and, undoubtedly, since the appearance of homo sapiens, the latter two are assumed to have been developed later in the evolutionary process. Furthermore, Max-Neef (1992) hypothesises that needs nowadays felt by some people, e.g. the need for Transcendence, may somewhere in the future evolve into a universal need. According to Max-Neef (1992), needs can be fulfilled by satisfiers, which are defined as ‘...everything which, by virtue of representative forms of being, having, doing and interacting, contributes to the actualisation of human needs’. Thus, the above-mentioned needs are related to four types of existential categories: being, having,
Linking the nine types of universal needs to the four types of existential categories yields a matrix as represented by Table 5.1, in which specific satisfiers can be categorised as cell entries.

<table>
<thead>
<tr>
<th>Chapter 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doing and interacting respectively.</td>
</tr>
</tbody>
</table>

<p>| 1/ Physical health, mental health, equilibrium, sense of humour, adaptability | 2/ Food, shelter, work | 3/ Feed, procreate, rest, work | 4/ Living environment, social setting |</p>
<table>
<thead>
<tr>
<th>Subsistence</th>
<th>Protection</th>
<th>Affection</th>
<th>Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/ Care, adaptability, autonomy, equilibrium, solidarity</td>
<td>6/ Insurance systems, savings, social security, health systems, rights, family, work</td>
<td>7/ Co-operate, prevent, plan, take care of, cure, help</td>
<td>8/ Living space, social environment, dwelling</td>
</tr>
<tr>
<td>9/ Self-esteem, solidarity, respect, tolerance, generosity, receptiveness, passion, determination, sensuality, sense of humour</td>
<td>10/ Friendships, family, partnerships, relationships with nature</td>
<td>11/ Make love, caress, express emotions, share, take care of, cultivate, appreciate</td>
<td>12/ Privacy, intimacy, home, spaces of togetherness</td>
</tr>
<tr>
<td>13/ Critical conscience, receptiveness, curiosity, astonishment, discipline, intuition, rationality</td>
<td>14/ Literature, teachers, method, educational policies, communication policies</td>
<td>15/ Investigate, study, experiment, educate, analyse, meditate</td>
<td>16/ Settings of formative interaction, schools, universities, academies, groups, communities, family</td>
</tr>
<tr>
<td>17/ Adaptability, receptiveness, solidarity, willingness, determination, dedication, respect, passion, sense of humour</td>
<td>18/ Rights, responsibilities, duties, privileges, work</td>
<td>19/ Become affiliated, co-operate, propose, share, dissent, obey, interact, agree on, express opinions</td>
<td>20/ Settings of participative interactions, parties, associations, churches, communities, neighbourhoods, family</td>
</tr>
<tr>
<td>21/ Curiosity, receptiveness, imagination, recklessness, sense of humour, tranquility, sensuality</td>
<td>22/ Games, spectacles, clubs, parties, peace of mind</td>
<td>23/ Day-dream, brood, dream, recall old times, give way to fantasies, remember, relax, have fun, play</td>
<td>24/ Privacy, intimacy, spaces of closeness, free-time, surroundings, landscapes</td>
</tr>
</tbody>
</table>
A conceptual meta-model of human behaviour

| Creation | 25/ Passion, determination, intuition, imagination, boldness, rationality, autonomy, inventiveness, curiosity | 26/ Abilities, skills, method, work | 27/ Work, invent, build, design, compose, interpret | 28/ Productive and feedback settings, workshops, cultural groups, audiences, spaces for expression, temporal freedom |
| Identity | 29/ Sense of belonging, consistency, differentiation, self-esteem, assertiveness | 30/ Symbols, language, religions, habits, customs, reference groups, sexuality, values, norms, historical memory, work | 31/ Commit oneself, integrate oneself, confront, decide on, get to know oneself, recognise oneself, actualise oneself, grow | 32/ Social rhythms, everyday settings, settings which one belongs to, maturation stages |
| Freedom | 33/ Autonomy, self-esteem, determination, passion, assertiveness, openness, mindedness, boldness, rebelliousness, tolerance | 34/ Equal rights | 35/ Dissent, choose, be different from, run risks, develop awareness, commit oneself, disobey | 36/ Temporal/spatial plasticity |

Table 5.1: A categorisation of need satisfiers according to Max-Neef (1992). Along the rows, nine basic needs are listed. Along the columns, four existential categories are ordered. The cells indicate a variety of need satisfiers.

The satisfaction or dissatisfaction of human needs results in experiencing feelings or emotions. As the concept of emotion is associated with general arousal of the Sympathetic Nervous System (Schachter, 1964), and the satisfaction of a need may actually decrease one’s level of arousal, we prefer to relate the (dis)satisfaction of needs to the concept of feelings. (Un)pleasant feelings about something can be conceived as one of the constituent parts of emotion (Frijda and Mesquita, 1992). Feelings may be positive or negative (e.g., McDougall, 1928: pleasure and pain, and Siminov, 1970: positive and negative emotions). It is assumed here that the satisfaction of a need yields positive feelings, whereas the dissatisfaction of needs will yield negative feelings. Extending the typology of needs as presented by Max-Neef (1992) with positive and negative feelings yields the following list of feelings as presented in Table 5.2.

If a need is not satisfied, the related negative feeling will arouse a drive to satisfy this need. For example, if the need for subsistence is not satisfied because of a lack of food, the negative feeling will be hunger, arousing the drive to eat. If confronted with an (real or imagined) opportunity that is perceived to be capable of satisfying the need in question, this drive will result in a motivation to use that opportunity. Often there are several opportunities for satisfying one’s needs. For example, if one is hungry, one could eat a tuna sandwich, a banana, and a varied number of other foods. Thus, a consumer may be motivated to use many different opportunities. The satisfaction of a need will evoke...
positive feelings. If a need is fully satisfied, no drive will emerge and the motivation to use a relevant opportunity will be low.

<table>
<thead>
<tr>
<th>Basic need</th>
<th>Satisfaction of needs, positive feelings</th>
<th>Dissatisfaction of needs, negative feelings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subsistence</td>
<td>satiated, repleted</td>
<td>hungry</td>
</tr>
<tr>
<td>Protection</td>
<td>safe</td>
<td>in danger, anxiety</td>
</tr>
<tr>
<td>Affection</td>
<td>love/ being loved</td>
<td>hate/ indifference</td>
</tr>
<tr>
<td>Understanding</td>
<td>intellectual well-being, smart, clever</td>
<td>intellectual frustration, dumb, stupid</td>
</tr>
<tr>
<td>Participation</td>
<td>belonging, related, involved</td>
<td>lonesome, isolated, forsaken</td>
</tr>
<tr>
<td>Leisure</td>
<td>playful, relaxation</td>
<td>boredom/ bored, weary, stressed</td>
</tr>
<tr>
<td>Creation</td>
<td>creative, inspired</td>
<td>uninspired</td>
</tr>
<tr>
<td>Identity</td>
<td>self-assured, confident, positive self-image</td>
<td>uncertain, insecure, negative self-image</td>
</tr>
<tr>
<td>Freedom</td>
<td>free, independent</td>
<td>entangled, chained, bounded, captured, tied</td>
</tr>
</tbody>
</table>

Table 5.2: A categorisation of feelings according to the typology of needs (Max-Neef, 1992).

The satisfaction of needs is bounded to the here and now because needs indicate the ‘state of the system’ at the present time. For example, your current need for subsistence depends on the biophysical state of your body (e.g., hunger, thirst), and your need for leisure may depend on your psychological state (e.g., tension, stress) at this moment. Consequently, we need water now, and not tomorrow, and we feel we need a vacation now, and not next month. Despite the fact that needs are only felt at the current moment, people can (to some extent) manage their needs because they can forecast future situations. For example, if you hike through the mountains, you’ll make sure to take sufficient water and food supplies with you, and perhaps a raincoat. These supplies can be considered as a stock that can be used if a need is becoming apparent. For example, with respect to food, a self-supporting farmer may store this year’s harvest in his barn, and households may have a refrigerator for storing food. For all types of needs such a ‘stock’ is imaginable. Some of these stocks may deplete and replenish at a relatively quick rate, for example, a food stock in a refrigerator may deplete in a relatively short period of time (days), but can be replenished very quickly (by shopping). Other stocks deplete more slowly, for example, upon returning from a vacation in the mountains you may feel ‘ready, willing and able’ to start working again, but after a couple of months’ working you might feel the ‘need for a vacation’ again. Some stocks may be conceived as not depleting at all, such as having a

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8 One step further is that we can go from storing natural supplies that directly satisfy needs, such as food, to storing an unnatural supply such as money. Money can be spent on various goods that satisfy several needs. Thus, money should be considered as a capacity that people have, and it will therefore be discussed under the topic of consumer abilities.
good partner relation, which serves to satisfy one's need for affection, or having a raincoat, which may (partly) satisfy one's need for protection (against rain) for a lifetime.

In the conceptual model we consider these various need-satisfying stocks as reservoirs that have an outflux (depletion). Consumption (influx) is necessary to refill the reservoirs, so as to keep need satisfaction at an acceptable level. The depletion time of a need-satisfying stock can be conceived as the speed at which its reservoir level drops if no refill occurs. This depletion time may differ significantly for different types of need-satisfying stocks.

In principle, need-satisfying stock levels are not bounded by a maximum value. For example, one could accumulate a food stock that lasts a lifetime. However, people tend to store that amount of food that guarantees the satisfaction of their subsistence need for a certain period of time. For a self-supporting farmer this period may take a year to the next harvest, and for households it may take a week to their next supermarket visit. Storing more food will be less useful (unless you are trading food), because the satisfaction of the underlying need is already guaranteed. Because of this satisfaction, the actor's motivation to further increase the relevant stock level will be low. Stated differently, if the stock level is already high, the utility (in terms of need satisfaction) of another unit of that stock is low. As such, the need-satisfying capacity of an opportunity (e.g., consumption good, activity) follows a diminishing marginal utility function along with increasing stock level. This well-known principle of micro-economics explains that the more of a good one has, the less utility one gets from obtaining yet another unit of that good. In Figure 5.3 this principle is graphically displayed.

Figure 5.3: The need-satisfying capacity of food as a function of the stock level

Figure 5.3 illustrates that the contribution of an opportunity to one's level of need satisfaction gets smaller the higher the stock of a certain need satisfier (opportunity) is. An obvious example is that a hungry man (with a low nutrient stock) will experience a higher need satisfaction per sandwich than the man who already ate five of them (providing a high nutrient stock), whilst the need-satisfying capacity (nutrient value) of sandwiches is constant. Of course, the exact function depends on the need-satisfying capacity (NSC) of the relevant opportunity. This NSC is defined as the increase in the level of need
satisfaction after the consumption of one unit (e.g., kilogram, litre and minute) of an opportunity given that the initial stock level is zero.

If a stock level is low, the actor will be strongly motivated to consume opportunities that satisfy the associated need, because the utility per unit of opportunity is maximal. In case a stock level is very high, and the associated need is highly satisfied, there are usually other needs that are more depleted, and the actor will be more inclined towards the consumption of opportunities that satisfy these other needs.

**Human values** are often referred to as relatively stable beliefs about the personal or social desirability of certain behaviours and modes of existence (Rokeach, 1973). For example, whereas some people attach great value to comfortable living, adhering to a materialistic life-style, other people are more concerned with the environment and adhere to a more non-material life-style. In this section we will relate values and related concepts as basic orientors and cultural perspectives to the level of need satisfaction people experience.

When the environment people live in is relatively stable, they are most likely to experience a relatively stable need satisfaction. For example, having a good relation with spouse, family and friends, being secure of a job, living in a city with a lot of street-crime and owning a house, will provoke a relatively stable level of need satisfaction. In this example the need for protection is not satisfied because one is living in a city with a lot of crime. We suggest that the values that govern human behaviour can be related to the profile of need satisfaction.

The person in the example has relatively high levels of need satisfaction for subsistence and affection, but the level of need satisfaction for protection is relatively low. In evaluating opportunities, protection will thus be an important aspect determining the person’s choices to a large extent. For example, it will not be the taste of the bread that will be the criterion to choose between two bakers, but rather the relative safety of the street they are located in. When one (or more) needs dominate the evaluation of a various range of behavioural opportunities, an enduring preference for certain opportunities may become visible. Such a preference can be conceived as a general value that affects most behaviour in a systematic way. Various values can be distinguished, depending on which (combinations of) need(s) or need satisfaction profile dominates the preferences for certain types of opportunities.

When the overall profile of need satisfaction changes, also a person’s cherished values will change. Many people live in relatively stable environments and thus their values will be quite stable. However, serious changes in one’s natural or human environment may cause a persevering change in one’s prevalent need satisfaction profile. This may cause one’s values to change in a direction that is more strongly focussed at the dissatisfied needs. Examples of such (natural and human) environmental changes that may cause one’s values to change are war, famine, economic crisis (e.g., unemployment), the manifestation of a physical handicap, or the loss of a loved one. The concept of value orientations provides a general perspective on which values (orientations) are associated with the deprivation of which needs.

In determining if certain environmental states would also stimulate the emergence of related values or basic orientors, Krebs and Bossel (1997) performed a series of simulation experiments. These involved the creation of different simple environments and the observation of the type of behaviour a learning agent (‘animat’) would adopt. Krebs and Bossel defined six environmental states on the basis of six basic properties of normal
environments (Bossel, 1977, 1994). These six environmental states are: (1) normal state (stable and sufficient food availability), (2) sparse resources, (3) variety, (4) fluctuation, (5) change, and (6) other systems (i.e. animats). To survive in such environments, an agent must be able to, respectively: (1) physically exist in this environment, (2) effectively harvest necessary resources, (3) freely respond to environmental variety, (4) protect itself from unpredictable threats, (5) adapt to changes in the environment, and (6) interact productively with other agents. Simulations with learning agents showed that the agents developed strategies that balanced the six theoretically postulated basic orientors: (1) existence, (2) effectiveness, (3) freedom of action, (4) security, (5) adaptability, and (6) coexistence. The weights that the agents attached to these orientors depended on the type of world the agents were placed in. For example, security was very important in an unpredictable dangerous world, resulting in cautious behaving agents.

These results shed light on the relation between the environment one lives in and the conceptualisation of values as described before, because the basic orientors can be linked very easily to the needs as discerned by Max-Neef (1992), as will be demonstrated in Table 5.3 below.

Besides a link between human needs and basic orientors, Bossel (1996) also postulates a link between his basic orienters and the worldviews people may have according to the Cultural Theory of Thompson, Ellis and Wildavsky (1990). Cultural Theory postulates five different cultural perspectives, viz. the Individualist, the Hierarchist, the Egalitarian, the Fatalist and the Hermit. The Hermit, supposed to be 'withdrawn' from society, will be left out of consideration.

Two common social dimensions are supposed to underlie the different cultural perspectives (Thompson et al., 1990): (1) one which reflects social restrictions placed on individual autonomy ('grid') and: (2) one which contrasts solidarity with egocentrism ('group'). Contrasting high and low values on the 'grid' and 'group' dimensions results in four cultural perspectives, namely: the Hierarchist (high 'grid' and high 'group'), the Egalitarian (low 'grid' and high 'group'), the Individualist (low 'grid' and low 'group') and the Fatalist (high 'grid' and low 'group'). These perspectives partly determine the way in which people perceive the world and behave in it. However, the four perspectives are considered to be extreme archetypes, because most consumers exhibit biases and preferences that belong to more than one perspective. In line with this, we can identify a survival strategy for each cultural type fitting the four elementary dilemmas (benefit-risk, temporal, spatial and social) described in Chapter 2 on the environmental commons dilemma.

The Individualist tends to estimate achievable benefits in financial and material terms. Freedom of action is an important value of the Individualist, suggesting the dominance of the need for freedom in the need satisfaction profile. In line with the Individualist’s risk-seeking strategy, his/her perception of financial and material gains will result in a positive attitude towards a given behaviour pattern, even if appreciable risks are involved. With regard to the social survival dilemma, the Individualist evaluates outcomes in terms of benefits and risks for him/herself. Also, the Individualist emphasises present outcomes over future gains and losses, while in the spatial survival dilemma, the Individualist assigns a higher value to local benefits whilst ignoring outcomes elsewhere.

Egalitarians, however, who are characterised here as being risk-aversive, tend to stress the risk side of behaviour, instead of the benefits. Benefits are also expressed in terms of quality of life, in which material gains are subordinate. Coexistence is the important value of Egalitarians, suggesting that the need for participation is dominating
the need satisfaction profile. Egalitarians tend to feel responsible for humanity everywhere at any time. Therefore, with regard to the temporal and spatial survival dilemmas they take serious account of future and global consequences. In line with the Egalitarian definition of solidarity with others, which ascribes a higher value to the collective as a whole than to separate individuals, Egalitarians emphasise collective outcomes in the evaluation of behaviour.

The Hierarchist, for whom social stability is the primary driving force, aims to maintain a balance between benefits and risks, present and future outcomes, local and global impacts, and collective and individual gains and losses. Security is the important value of Hierarchists, suggesting that the need for protection dominates their need satisfaction profile.

The Fatalist has no predefined position with respect to three of the four dilemmas. The Fatalist will not evaluate behaviour in the terms described above, but is merely trying to cope with the circumstances, which are regarded as beyond human control. This implies that he/she focuses on individual rather than collective outcomes of behaviour. The important value of Fatalists refers to existence and subsistence, suggesting that the fulfilment of basic living conditions is dominating their need satisfaction profile.

Besides the four commonly recognised perspectives, Bossel (1996) also identifies the perspectives of the Organiser and the Innovator, which are usually the important movers and shakers of societal development, but which fall outside the explanatory group-grid dimensions. The Organiser’s most important value refers to effectiveness, suggesting that the needs for understanding and leisure are dominating their need satisfaction profile. The Innovator has adaptability as his/her dominant value, suggesting that the need for creation dominates his/her need satisfaction profile. Including the perspectives of the Organiser and the Innovator, we end up with six cultural perspectives.

In Table 5.3, based on Bossel (1996), a classification is presented that indicates which needs are at the focus of which perspectives. Whereas a particular value and the associated needs may be most important for a person adhering to a certain perspective, the other needs will also play an important role in determining behaviour, especially when these are not satisfied.

<table>
<thead>
<tr>
<th>Cultural perspective (Thompson et al., 1990, extended by Bossel, 1996)</th>
<th>Basic orientors/ values (Bossel, 1977)</th>
<th>Personal + social needs (Max-Neef, 1992)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalist</td>
<td>Existence</td>
<td>Subsistence</td>
</tr>
<tr>
<td>Organiser</td>
<td>Effectiveness</td>
<td>Understanding</td>
</tr>
<tr>
<td>Individualist</td>
<td>Freedom of action</td>
<td>Freedom</td>
</tr>
<tr>
<td>Hierarchist</td>
<td>Security</td>
<td>Protection</td>
</tr>
<tr>
<td>Innovator</td>
<td>Adaptability</td>
<td>Creation</td>
</tr>
<tr>
<td>Egalitarian</td>
<td>Coexistence</td>
<td>Participation</td>
</tr>
<tr>
<td>All perspectives</td>
<td>Psychological needs</td>
<td>Affection</td>
</tr>
</tbody>
</table>

Table 5.3: Cultural perspectives, basic orientors/values and focal needs. Based on Bossel (1996).
The personal needs ‘affection’ and ‘identity’, which Bossel (1996) notifies as ‘psychological needs’, are not dominating the behaviour of any of the cultural perspectives in particular. These needs can thus be regarded as equally important for all perspectives. The dissatisfaction of affection and identity needs may focus the behaviour of people in very different directions. For example, one person may want to acquire a group identity, whereas another person satisfies his or her need for identity by feeling unique. This variety may imply that an enduring dissatisfaction of affection and identity needs is not being reflected in a clear behavioural value.

Within a certain population it is possible to observe a certain distribution of the different perspectives. For example, empirical studies show that egalitarianism is dominant in the Nordic countries and the Netherlands, whereas fatalism is dominant in Great Britain, Ireland and southern Europe (e.g., Grendstad, 1999). Various cultures from different parts of the world may differ regarding the distribution of cultural perspectives and the predominant values and needs.

**Opportunities**

Opportunities are the products and services (commodities) that one can use and that have a certain capacity to satisfy one’s needs. Thus, in line with Max-Neef (1992), an opportunity can be conceived as a potential need-satisfying stock. The need-satisfying capacity is conceptualised as a person’s increase of the stock of a need satisfier following the consumption of one unit of an opportunity (e.g., kilogram, litre or minute), provided that one starts with an empty stock. The concept of need satisfying capacity is abbreviated as NSC.

A single opportunity may satisfy several needs simultaneously. For example, eating caviar may fulfil the need to eat (Subsistence), to relax (Leisure) and to demonstrate one’s prosperity (Identity). However, the less fulfilled a particular need is, the more it will dominate the evaluation of available opportunities. For example, a hungry consumer will tend to evaluate food primarily on its nutrient potential.

Also, a single need may be satisfied by means of various different opportunities. For example, the need for Leisure may be fulfilled by playing, watching television, taking a holiday, practising sports, and so forth. Thus, the relation between opportunities and needs is a complex one, as some opportunities may, in fulfilling a specific need, simultaneously either fulfil or impair other needs. In exploring the relation between needs and opportunities, Max-Neef (1992) discerns five types of satisfiers:

1. **Violators and destructors**; these supposedly satisfy a given need (usually protection) but in fact often annihilate the possibility of satisfying this need and impair the satisfaction of other needs. For example, a strong governmental bureaucracy aims to offer protection for unfair treatment, but frequently people are treated unfairly by lengthy bureaucratic procedures. Other needs are annihilated by strong bureaucratic procedures. For example, strong bureaucratic procedures may impair people’s understanding of the decision making process, may incite the feeling of being treated as a number, and may impair people’s freedom by capturing them in procedures and rules (cf. Table 5.1).

2. **Pseudo-satisfiers**; stimulate a false sensation of satisfying a certain need, but they may in fact impair the fulfilment of that need. For example, status symbols may be used to fulfil the need for identity, but a preoccupation with the acquisition of status symbols (e.g., expensive brands of clothing) may actually impair the satisfaction of one’s identity needs.
3: **Inhibiting satisfiers** may satisfy one need, but inhibit other needs in the process. For example, obsessive economic competitiveness may satisfy the need for (economic) freedom, thereby yielding a larger material prosperity. However, this may be attained at the cost of, e.g., the time spent with family and friends (affection), the quality of the environment (subsistence), and time to relax and enjoy oneself (leisure).

4: **Singular satisfiers** satisfy one need without interfering with other needs. For example, insurance systems satisfy the need for protection against the financial consequences of, e.g., illness, accidents and burglary without inhibiting the satisfaction of other needs.

5: **Synergic satisfiers** satisfy a certain need, and they simultaneously stimulate and contribute to the satisfaction of other needs. For example, popular education spreads knowledge that satisfies people's need for understanding, but it also helps people to strive towards better living conditions (protection), to enhance their influence on social decision processes (participation) and their self-confidence (identity).

The more an individual perceives an opportunity as potentially need-satisfying, the more he or she will be motivated to use this opportunity. This motivation is an internal behavioural tendency of the consumer. However, the consumers' perception is susceptible to external information about the supposed need-satisfying capacities of opportunities, as, for example, provided by advertisements and the consumptive behaviour of other persons.

Besides perceived need-satisfying attributes of opportunities, which may trigger someone's internal motivation, also external factors constitute an opportunity. These external factors deal with the feasibility of the opportunity use rather than with their need-satisfying capacity. Examples of external factors are the availability of consumer goods, the publicity (advertisement) for them, the prices that have to be paid, the places where they can be bought, and the like. The use of opportunities may demand various abilities from the consumer, such as monetary investments, permits, personal knowledge and skills. These abilities can be conceived as the personal resources that the consumer has available. The more constraints the use of an opportunity imposes on a consumer, the higher the opportunity's resource demands. General strategies aimed at a behaviour change (e.g., Sheth and Frazier, 1982; Cook and Berrenberg, 1981; Stern, 1992) often involve a change of the resources demanded by opportunity use. Four general types of personal resources are distinguished: (1) physical resources, (2) juridical and regulatory resources, (3) financial-economic resources, and (4) social and cognitive resources. The demands for these four types of personal resources associated with opportunity use can be captured under the headings of **physical characteristics**, **laws and rules**, **prices and costs**, and **social and cognitive demands**, respectively.

**Physical characteristics** refer, in the first place, to the availability of certain products and services. This availability largely depends on the developmental stage a given society is in. For example, in Western society, the availability of coal and wood as a heating fuel is very low because the availability of natural gas and electricity allows for a much more convenient way of home heating. Due to the low demands for coal, the market mechanism has reduced this opportunity to almost zero. However, in regions where the availability of natural gas and electricity is low, people are more dependent on coal and wood (e.g., Gatersleben and Vlek, 1997). If available, coal and wood form the major home-
heating opportunities in those regions. Secondly, physical availability refers to the places where certain products can be obtained. As such, both the infrastructure (e.g. for the distribution of gas, water and electricity) and the location of shops and service centres determine the physical availability of products. Other physical characteristics refer to, for example, the distance travelled and the amount of energy (e.g. physical strength) needed for consumption, and the quantity that can be consumed at one time.

Laws and rules refer to the legal regulations associated to the use of certain products. Some products are not allowed to be sold in a given region (country) because they do not conform to given product standards (e.g. ingredients, energy use, or environmental effects) or trade-agreements (origins of the product). Some may only be used with a permit or allowance (e.g. driver’s licence, residential permits).

Prices and costs refer to the amount of money that products and services cost. Developments in mass production have resulted in decreasing prices of consumer goods, especially in the Northern regions (Gatersleben and Vlek, 1997). This in itself has led to an increased consumption. Furthermore, the availability of consumer credits (loans) also allows for the consumption of products, even if people lack a sufficient amount of cash.

Social and cognitive demands refer to the skills, knowledge, cognitive capacity and social support and/or restrictions required for using a particular opportunity. Some opportunities require training (education) before one can use them, e.g., for using a computer and driving a car. Moreover, some opportunities are not widely used and therefore relatively unknown. Cognitive effort is then necessary to find these opportunities and learn about their characteristics. Furthermore, the amount of publicity (advertisement and information) that is associated with the marketing of a given product plays a significant role. Advertising usually tries to persuade consumers to buy the product. Along with the development of the media (newspapers, radio, television, the Internet), advertising has grown into a huge industry, stimulating people to consume whatever is being produced. Consumer information is commonly more neutral in presenting both the pros and the cons of a given product. Besides the formally defined rules, such as documented in official laws, also informal cultural rules determine the opportunity to consume a certain product. For example, the consumption of pork and alcohol is restricted in Islamic countries (often also according to the law), and the smoking of cigarettes is socially restricted in the USA and Europe (also laws have been issued, banning smoking from public buildings).

The more opportunities are alike with respect to their need-satisfying attributes, the more they are interchangeable. This interchangeability functions in processes of substitution. For example, for medium-distance travelling, the train offers a better substitute for the car than the bike. If an opportunity is not attainable (any more), a consumer may look for alternatives that satisfy his/her needs as much as possible in the same way. Sometimes substitution processes cross the borders of different activity domains. For example, a consumer may decide to travel longer in order to achieve better living conditions (e.g. housing). In this situation the satisfaction of needs in one domain (good housing, serving Protection, Identity and Freedom) is increased at the cost of the satisfaction of needs in other domains (less spare time: Leisure and Freedom).

Abilities
The concept of ability refers to the set of capacities and/or skills an actor (individual, or household) has for actually using or acquiring an opportunity. In line with the resources
demanded, as discussed in the previous section, abilities can be conceived as the personal resources that a consumer has available. Important aspects of ability refer to physical means and skills, permits and licences, financial means, and social and cognitive abilities to buy and use consumer goods.

**Physical resources** refer firstly to one's personal health, fitness and strength. These physical capacities allow for the use of certain opportunities, such as cycling, working on the land, carrying water, and the like. Secondly, also the physical tools and circumstances one has available are conceived as physical abilities. As such, owning a car, a house, and having good (storage) space are regarded as physical abilities. For example, owning a car increases one's radius of action, thereby bringing more opportunities in reach, and a larger house provides more room for useful appliances (e.g., a washing machine, cooling equipment.). The physical resources a consumer has available are variable by nature, that is, they can increase and decrease as a function of aspects like age, satisfaction level of certain needs (e.g., hunger decreases one's physical strength) and consumption of certain opportunities (e.g. owning a car).

**Permitted and licensed resources** refer to the permits and licences one has for using certain opportunities. Examples of such abilities are having a driver's licence, a necessary educational grade and a permit to install a solar energy device on top of the roof. Besides permitted and licensed abilities such as provided by governments, the socio-cultural environment also provides abilities. For example, the (officially) abandoned caste system in Indian society allowed the use of certain opportunities only to members of a particular caste. Also, various cultures more or less accept the consumption of alcoholic beverages, pork and cigarettes. Rules and norms such as imposed by governments may be reflected in the cultural norms and beliefs of a given society. Permitted and licensed resources are variable, that is, they may be granted or denied on the basis of age, gender, identity, culture and the like.

**Financial resources** refer to the income a consumer has. The higher the income of a consumer is, the higher his/her ability to buy more and expensive consumer goods. Money deserves some special attention here, because it is a resource that can be earned by means of working, and it allows one to buy a variety of commodities that are capable of satisfying needs. Money, however, is not capable of satisfying all needs, which inspired the Beatles in writing their song ‘Can’t buy me love’ (1964). Especially in the industrialised societies the combination of increasing mean annual income and decreasing prices of consumer goods has led towards a strong increase in consumption (Gatersleben and Vlek, 1997). The financial resources a consumer has are variable, depending on income and spending patterns.

**Social and cognitive resources** refer, firstly, to one's knowledge, cognitive capacities/skills, attitudes, values and norms. These factors determine one's ability to understand the outcomes associated with opportunity use. This may lead to the perception of a low behavioural control, viz. the physical or social feasibility of a particular opportunity use. Secondly, the time that people have available determines their ability to elaborate cognitively on outcomes. Finally, one's social status (a social resource) may also allow the use of certain opportunities. People having a high social status generally have easier access to information, a larger social network providing one with information, and more social support than people having a low status. Social status can be seen as a function of one's physical, permitted and financial resources, as well as the level of one's needs satisfaction. Cognitive resources may be conceived as a function of educational level
and heredity. Knowledge is a personal resource that hardly decreases, but which may become outdated. For example, new opportunities often demand more or new cognitive resources, as the introduction of the personal computer illustrates.

The abilities that people may have strongly depend on the developmental stage of the society they are living in. For example, in a 'hunter-gatherer' society, people have other abilities than in an industrial society. The same goes for the availability of opportunities.

**Behavioural control** is defined as a balance between the resources an actor has available and the resources that are demanded by a certain opportunity. Behavioural control indicates if he/she can easily consume a certain opportunity, or that its consumption is difficult or impossible. Theoretically there exists a certain degree of behavioural control for each actor over every single opportunity. Because consumers have limited knowledge, no consumer precisely knows his/her behavioural control over all possible opportunities. We assume that people estimate their behavioural control over opportunities during cognitive processing. Behavioural control will be further discussed in the later section on cognitive processing.

**Uncertainty**
The stability of (parts of) the environment people live in and of the (natural) resources they use may vary considerably. For example, fishermen may be confronted with sudden drops in their catch after periods of relatively stable catches, commuters may be confronted with unexpected traffic-jams, bad harvests may result in unexpected food shortages et cetera. As a result of such unexpected outcomes, people often become uncertain about which behaviour to perform. Should a fisherman increase his time fishing after an unexpected drop in catch, should the jammed commuter choose for a new route to his work, and what is the best action to avoid hunger when food is scarce? Uncertainty also pertains to the question if the own abilities are sufficient to engage in certain consumptive behaviour.

In such situations it is often a smart strategy to look at how successful the actions of other people are. Especially the behaviour of people having about the same abilities is of interest, because their actions are most likely to be also feasible for oneself. Social processing is therefore stimulated by uncertainty about opportunities and abilities and thus about outcomes.

**Uncertainty tolerance** indicates how sensitive people are to uncertainty of outcomes. Whereas a person with a low uncertainty tolerance may be looking at others after the slightest difference between his/her expected and actual outcomes, persons with a higher uncertainty tolerance may be less sensitive to such differences.

In the next section a perspective will be presented on the different cognitive processing strategies people may employ in their consumption behaviour.
Cognitive processing

Whereas the previous section was focused on the micro-level driving factors of human behavior, this section is devoted to the cognitive processes people may employ and how these may be affected by the various driving factors. Cognitive processing refers to the strategies a person may employ in determining which behavior to perform.

People may engage in different cognitive processes such as deliberation, social comparison, imitation and habit formation in deciding how to behave. Several general theories describe these processes, and explain under what conditions people are most likely to engage in them. These theories have been developed from a particular paradigmatic perspective. For example, in the behaviouristic tradition much research is focused on how rewards and punishments shape routine behavior, whilst the cognitivist tradition is concerned with mental processes such as information acquisition and attitude change. Thus, theories in different traditions are focused on different cognitive processes and associated factors.

Because environmental behavior involves various kinds of behavior processes and determinants, it is important to represent the different types of processing adequately in the conceptual meta-model of consumer behavior. The model should integrate the several main cognitive processing types. This requires the specification of the conditions under which a certain cognitive processing style is most likely to be employed by a person. The different theories specify more or less explicitly under what conditions people are most likely to engage in the relevant processes. On the basis of these conditions two dimensions have been identified along which cognitive-processing theories can be organized. These two dimensions are, respectively, reasoned versus automated processing, and individually versus socially determined processing.

**Reasoned versus automated processing**

Reasoned processing implies that one is elaborating about need fulfillment, the characteristics of opportunities and/or strategies to improve one’s abilities, thereby taking possible future outcomes into account. Reasoned processing is directed at the optimization of possible outcomes. However, because people have limited cognitive resources, many of their daily routines are automated. Here, optimizing is not focused exclusively on behavioral outcomes, but also on managing cognitive resources. Automated processing implies that one is using relatively simple heuristics in choosing what behavior to perform, thereby focusing at the here and now. This automating of behavior prevents people from e.g., spending hours in supermarkets deliberating over the various brands of products they can buy. Instead, people often habitually repeat their originally deliberate choices for as long as the outcomes are satisfying. However, a current habit may yield far from optimal outcomes because, for example, new better behavioral opportunities may have been introduced in the meantime.

The central factors that determine if an actor is more likely to engage in either reasoned or automated processing are: (1) the level of need satisfaction (LNS) of the actor and (2) the actor’s behavioral control (BC). Frequently, actual behavior is not satisfying anymore. This implies that one or more need-satisfying stocks are getting depleted. If a stock is so low that need satisfaction is seriously impaired (LNS gets below a critical value), one will be highly motivated to elaborate on alternative opportunities for consumption. This also holds for situations where the resource demands of an opportunity increase,
and/or the consumption abilities of an actor decrease. In such situations the actor may experience that an opportunity that formerly could be consumed without problems, has become unattainable. This causes the behavioural control (BC) over the previously consumed opportunity to become low, forcing the consumer to elaborate on alternative opportunities for consumption. For example, a person having plenty of financial resources and a driver's license may be very satisfied driving a car. However, if this person is increasingly being confronted with traffic jams, his or her satisfaction with car driving may get seriously impaired. Or suppose that the finances of this person drop significantly. This would result in a decrease in his/her behavioural control, possibly causing this person to be unable to afford a car anymore. In such cases the person will elaborate on alternative feasible opportunities to satisfy his/her needs. Returning to the example, our person could end up using the public transportation system, this being the only affordable opportunity that could satisfy his or her needs.

In situations where needs satisfaction is low and/or behavioural control is low (low LNS and/or low BC) it is a good strategy to elaborate on opportunities that are satisfying and feasible. In the process of elaboration, the person memorises information. In our conceptual model we have incorporated a 'mental-map' which functions as memory. Reasoned processing implies that the mental-map is being updated with actual information before a behavioural choice is made. Especially when one's abilities are low it is very hard (if not impossible) to find opportunities that both satisfy one's needs and are affordable in terms of behavioural control (BC). Often, one first has to increase one's abilities before one can afford a satisfying opportunity. Working to earn money is one of the main strategies to increase one's financial abilities, but also criminal activities may constitute an efficient (though risky) strategy. Sometimes, people cannot increase their abilities nor satisfy their needs sufficiently, which forcing them to live in poverty, crime, and/or sickness. If, however, people regularly find effective means to satisfy their needs, the urge to elaborate extensively on one's behavioural options diminishes and one can afford to behave in a more automated level.

If actors are satisfied with the opportunities they use, it appears that their needs-satisfying stocks are filled sufficiently, guaranteeing a sufficient level of needs satisfaction (LNS). As long as their LNS is high, their motivation to further increase the stock levels is relatively low (increases are subject to diminishing marginal utility). Because of this, the actor will not be motivated to spend a lot of cognitive effort in scanning all the possible opportunities and updating his/her mental map. On the contrary, because the actor is satisfied it appears that his/her mental map functions adequately in guiding behaviour. As long as the actor is satisfied, he/she will not be motivated to update the mental map with new, actualised knowledge. However, because the environment may change, the mental map may become outdated. As a consequence, new, even more satisfying opportunities may be neglected, just as the negative or sub-optimal long-term outcomes of the current behaviour.

The consumption of an opportunity may demand more resources than the actor has available. In that case the actor's Behavioural Control (BC) is low (negative) and he/she has to find another opportunity that satisfies the particular need, or to increase his abilities (e.g., by earning money). This implies that the actor will shift towards a reasoning process. Updating the mental map may then reveal new satisfying opportunities or confront the actor with long-term negative outcomes.
Individual versus social processing

If an actor is gathering and processing information without considering the behaviour of others as a main source of information on behavioural opportunities, we speak of individual processing. A person may, however, incorporate expectations of how others are going to behave while processing individually, e.g., as in chess. If an actor is observing the behaviour of other actors as a means to get information on which opportunities are attractive to perform for oneself, we speak of social processing. Several factors determine the likelihood that an actor engages in individual or social processing. Individual processing is stimulated by:

- Relative certainty about the availability and the need-satisfying capacity of opportunities: The more stable the outcomes, the more certain the actor will be. Moreover, the fewer needs a certain category of opportunities satisfies (e.g., a refrigerator), the easier it gets to gather information on these need-satisfying capacities, and consequently, the more certain the actor will be. Finally, the higher is the cognitive ability of an actor, the more certain he/she will generally be.

- Visibility of opportunity use: The more private a given opportunity use is, the less information on other people’s behaviour is available, and the less apparent the norms on proper opportunity use will be. Consequently, the comparison of possible opportunities for private use will be done in an individual manner.

- The cultural perspective of a consumer: For example, an individualist, experiencing few rules (low ‘grid’) and with hardly any group identity (low on ‘group’) will be more inclined towards individual information processing.

- The type of needs prevailing in a certain situation: More individually relevant needs, e.g. the need for subsistence, will entail a more individual style of cognitive processing.

Factors that stimulate social processing are:

- Relative uncertainty about availability and the need-satisfying capacity of opportunities: Especially when outcomes bear an unstable character, these outcomes may differ significantly from the expectations one had (in the mental map). In such a situation the change in actual need satisfaction and/or consumption ability as a result of behaviour is quite different than the consumer may have expected. As a consequence one may become uncertain. Moreover, the more needs are involved with a certain category of opportunities (e.g., dwelling, which is associated with the satisfaction of various needs), the harder it is to gather information on all stock-increasing capacities, and thus uncertainty will be larger. Finally, the lower the cognitive ability of an actor, the less certain he/she will generally be.

- Visibility of opportunity use: The more public an opportunity use is, the more information on other people’s behaviour is available, and the more prevalent the norms on proper opportunity use will be.

- The cultural perspective of a consumer: For example, a hierarchist, experiencing many rules (high ‘grid’) and with a strong sense of belonging to a group (high on ‘group’) will be more inclined towards social information processing.

- The types of needs prevailing in a certain situation: More socially relevant needs, e.g. the need for identity, will entail more social processing styles.

Four cognitive processing styles

In the previous section the two dimensions of cognitive processing were discussed separately, first reasoned versus automated processing, followed by individual versus social
processing. These distinct dimensions yield a fourfold categorisation of existing behavioural theories. Several theories that are relevant for understanding the cognitive processes guiding consumer behaviour, can be organised in this fourfold perspective. For matters of clarity, the four processing types are labelled as deliberation, social comparison, repetition and imitation, respectively. These labels appear to grasp the essence of the cognitive processes described by the theories in the four quadrants of Table 5.4.

<table>
<thead>
<tr>
<th>Individually determined (certainty, private, individualist CP, personal needs)</th>
<th>Repetition</th>
<th>(1) Deliberation</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automated (high LNS, high BC)</td>
<td>- Classical conditioning theory - Operant conditioning theory</td>
<td>- Decision and choice theory - Theory of reasoned/planned behaviour (attitude and perceived control)</td>
<td></td>
</tr>
<tr>
<td>Social determined (uncertainty, public visibility, egalitarian CP, social needs)</td>
<td>Imitation</td>
<td>(3) Social comparison</td>
<td>(4)</td>
</tr>
<tr>
<td></td>
<td>- Social learning theory - Theory of normative conduct</td>
<td>- Social comparison theory - Relative deprivation theory - Theory of reasoned/planned behaviour (social norm)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.4: A classification of eight major theories on human behaviour. LNS = level of need satisfaction, BC = Behavioural Control and CP = Cultural Perspective (based on Jager et al., 1997)

The theories presented in Table 5.4 provide a comprehensive framework explaining under what conditions which type of cognitive processing is most likely to occur. In the following sections the different theories on behaviour are briefly discussed under the heading of the cognitive processing styles they apply to.

**Repetition: theories of individually automated behaviour (quadrant 1 of Table 5.4)**

Theories of individual automated behaviour apply mainly to situations where consumers have a relatively high level of need satisfaction and behavioural control. Therefore, elaboration on finding alternative opportunities and/or on increasing their own abilities is not necessary. Moreover, these theories apply to situations where outcome-uncertainty is relatively low, opportunity use is less publicly visible, the needs in question are more individually relevant, and consumers have a more individualistic cultural perspective.

Cognitivistic theories on reasoned behaviour emphasise the cognitive processes of deliberation and choice before performing a given behaviour, whilst they are more or less presuming that the consumer is a rational actor. In contrast, behaviouristic theories rely more on the reduction of drives as pressures towards behaviour, and as such they emphasise the outcomes of a performed behaviour. The dissatisfaction of a given need is assumed to lead towards a drive to satisfy that need. If the need is fulfilled, the drive is reduced. For example, ingesting food is a need, whereas hunger is the drive to fulfill that need. People are conceived as being biologically motivated to reduce drives with respect to basic physiological and safety needs (Maslow, 1954; Max-Neef, 1992; see above in this chapter). Behaviours that are successful in reducing those drives are experienced as rewarding.

The Classical Conditioning Theory as studied by Pavlov (1927), describes the process of how the performance of behaviours can be linked to stimuli that are indirectly related to the reduction of a drive. Pavlov’s most famous experiment showed that, after a light was
repeatedly turned on before a dog was fed, the dog salivated already in response to the light itself. Instead of showing the unconditional or natural response: salivating when confronted with food, the dog had learned that the turning on of the light preceded the presentation of food. As a result, the salivation at the light developed as a conditioned response. This is called response acquisition. As long as the conditional stimulus is followed by an unconditioned reward, a conditioned response will occur. When the reward is omitted, the conditioned response will continue to occur for some time, but it will eventually diminish, thus revealing extinction of the relevant behaviour. Conditioned stimulus-response relationships in fact are simple, primitive ‘if-then’ rules by which behaviour is automated and cognitive processing is strongly reduced. For example, a popular conditioned stimulus-response mechanism is: if you have to travel for more than two kilometres, then you take your car; because you ‘automatically’ expect positive travel experiences when doing so.

Where classical conditioning is based on linking existing natural responses to new, ‘unnatural’ stimuli, Operant Conditioning Theory (Skinner, 1938; 1953) describes the process of learning new, previously nonexistent responses. If, in a given stimulus situation, an immediate reinforcement or a punishment is experienced after performing a (coincidental) behaviour, the principles of operant conditioning apply. Positive reinforcements or rewards stimulate the repetition of the relevant behaviour. After experiencing a reward, people are motivated to repeat the preceding behaviour. Eventually, even an occasional rewarding of the behaviour (e.g. only 1 out of 10 times) will suffice to let the behaviour continue to occur. Furthermore, people may try to find out if similar rewards appear when the behaviour is slightly altered or performed in somewhat different situations. Following this principle of contingent reinforcement, the behaviour can evolve and be performed in comparable situations. Negative reinforcements are concerned with the experience of physically or socially negative outcomes after performing a given behaviour. Thus such behaviour will be unlearned or extinguished. Negative outcomes may be avoided by performing another behaviour to which they are not associated. The performance of new behaviour may thus be motivated either by the expectation of still higher rewards, or by the desire to avoid negative outcomes associated with current behaviour.

Because classical and operant conditioning theories only apply to situations with a small time interval between behaviour and ‘contingent’ reinforcement, long-term outcomes can only affect behaviour through explicit cognitive processing (reasoning). Furthermore, one has to experience outcomes that can be clearly attributed to one’s individual behaviour. Therefore, classical and operant learning theories imply that time-dispersed and collective outcomes largely occur beyond the scope of (individual) conditioning processes because of: (1) the large time interval between performing behaviour and experiencing the corresponding outcomes, and (2) the impossibility of precisely identifying one’s own contribution to collective outcomes. In some cases, where performing a specific behaviour leads to rewards in the short term, but to negative outcomes in the long run, conditioned and cognitive response processes may conflict. If one is well aware of the negative long-term outcomes resulting from a given behaviour but unable, at the same time, to give up the short-term positive outcomes, we can speak of addictive behaviour.

**Deliberation: theories of individually reasoned behaviour**

Theories of individually reasoned behaviour apply mainly to situations where consumers have a relatively low level of need satisfaction and/or behavioural control. Thus,
consumers are forced to elaborate on alternative opportunities and/or on increasing their abilities. Moreover, these theories apply to situations where outcome-uncertainty is relatively low, opportunity use less publicly visible, the needs in question more individually relevant, and where consumers have a more individualistic cultural perspective.

Decision and Choice Theory addresses the process of cognitive elaboration that precedes the making of deliberate choices. Decision theory deals with the question of how people actually decide (descriptive research) and how they should optimally decide (prescriptive research). Because the prescriptive branch of decision theory is more relevant in the context of strategies for behaviour change, this will be discussed in the section on policy instruments and behavioural change. Within the descriptive branch of decision theory, Janis and Mann (1977) discriminate between an optimising and a satisficing strategy. Optimising refers to a decision strategy leading to maximal expected utility. This strategy requires the elaboration of all available information. To apply an optimising strategy, an actor must be highly motivated, have strong cognitive abilities and sufficient decision-making time. Three stages can be identified in the optimising strategy: (1) information acquisition, (2) structuring the decision-making problem and (3) evaluating alternative options (opportunities) and making a choice (Vlek, Timmermans and Otten, 1993). Economic theories on consumer behaviour typically regard consumers as rational individuals (see also Chapter 3 on optimisation of behaviour). In this view, consumers try to optimise their utility (welfare), given their available budget (Green, Tunstall, N’Jai, and Rogers, 1990; Opschoor, 1993).

Often people lack the motivation, the cognitive ability and/or the time to employ an optimising strategy. Furthermore, people have a limited capacity to store and elaborate upon information (Newell and Simon, 1972; Shiffrin, 1975). Consequently, people often use a satisficing strategy, which involves choosing an option that is ‘good enough’ for them (Simon, 1976; Janis and Mann, 1977). For instance, one can select the option with the highest score on the most important attribute. If two or more options score equally well, the procedure can be repeated for the second important attribute (this is the lexicographical decision heuristic). A comprehensive listing of decision heuristics is given by Timmermans (1991). These heuristics allow for quick and effective decision-making, albeit through reduced information processing, so that more preferable options may be overlooked. In general, the type of decision process one follows depends on one’s information processing motivation (driven by the importance of the related needs), the complexity of the opportunities one has to choose from and one’s cognitive and temporal abilities.

The Theories of Reasoned Action and of Planned Behaviour (Fishbein and Ajzen, 1975; Ajzen, 1985, 1991) are based on the assumption that individuals are rational human beings who make systematic use of the information available to them when choosing between alternative opportunities. The concepts employed in the theory of reasoned action are fundamentally cognitive in nature, i.e., the behaviour is supposed to depend on the intention to perform a given behaviour. The stronger a person’s intention, the more he/she is willing to try to act in the corresponding way, and the greater the likelihood that such behaviour is actually being performed. The Theory of Reasoned Action (Fishbein and Ajzen, 1975) specifies two conceptually independent determinants of intention. The first is a personal factor termed the attitude towards the behaviour and refers to the individual’s positive or negative evaluation of using an opportunity. This attitude consists of one’s belief that using an opportunity will lead to certain outcomes, weighted by the evaluation of those
The second determinant of behavioural intention is a social factor, called the **subjective norm** or one’s perception of what other people consider to be appropriate (the ‘injunctive norm’, see below), which will be discussed in the section on socially reasoned behaviour.

The **Theory of Planned Behaviour** (Ajzen, 1985, 1988, 1991) is an extension of the **Theory of Reasoned Action** (Fishbein and Ajzen, 1975). The extension consists of including the concept of **perceived behavioral control**, i.e., the person’s belief as to how feasible the use of an opportunity is likely to be. Both one’s abilities and opportunities can interfere with control over the intended behaviour. The more personal resources individuals think they possess and the fewer resource demands they anticipate, the greater their perceived behavioural control. Perception of control has an important impact on a person’s behavioural intention (Ajzen and Madden, 1985). Generally, the greater the perceived behavioural control, the stronger is a person’s intention to try to perform the relevant behaviour. A low level of behavioural control can lead to a negative adjustment of formerly positive attitudes (Golob, Horowitz and Wachs, 1979). However, the perceived behavioural control also affects behaviour in a more direct manner, e.g., by making it impossible to perform a certain behaviour despite one’s positive intentions towards it.

Figure 5.4 schematically represents the **Theory of Planned Behaviour**.

![Figure 5.4: The Theory of Planned Behaviour (Ajzen, 1985, 1988, 1991; Ajzen and Madden, 1985)](image)

**Imitation: theories of socially automated behaviour (quadrant 3 of Table 5.4)**

Theories of socially automated behaviour apply mainly to situations where consumers have a relatively high level of need satisfaction and behavioural control. Therefore, elaboration on alternative opportunities and/or on increasing abilities is not necessary. Moreover, these theories apply to situations where personal outcome-uncertainty is relatively high, opportunity use is publicly visible, the needs in question are more socially relevant and consumers have a more egalitarian cultural perspective.

Besides directly experiencing personal reinforcement, seeing someone else being reinforced following his/her behaviour may also affect one’s behaviour. Such processes are expressed in **Social Learning Theory** (Bandura, 1977; 1986). Social learning may occur directly while seeing someone being reinforced. However, also the media (such as radio and television, e.g., Liebert, Neale, and Davidson, 1973) and verbal representations (e.g., stories) may evoke social learning. Teaching new behaviour using exemplary behaviour is called **modeling** (Bandura, 1977). Because one has to be aware of someone else’s experiences, social learning theory asserts the occurrence of reasoned processes in addition
to plainly automated processes. From being aware of someone else’s (rewarding) behaviour towards performing that behaviour yourself, five steps have to be taken. These are, respectively, being attentive to the behaviour of someone else, understanding and remembering that behaviour, being able to reproduce that behaviour, and experiencing reinforcement after performing the behaviour yourself (Bandura, 1977). As such, social learning involves the abilities one has (for attention, understanding, recollection), the opportunities and skills to reproduce the behaviour, and the motivation as driven by expected reinforcement.

Socially automated behaviour may also occur in the form of simple compliance to social norms. According to the Theory of Normative Conduct (Cialdini, Kallgren and Reno, 1991), three distinct types of norms affect human actions. First, social norms of the descriptive kind guide one’s behaviour via the perception of how most other people (would) actually behave. Second, social norms of the injunctive kind guide one’s behaviour via the perception of how most other people would approve or disapprove of one’s behaviour. Third, personal norms guide one’s behaviour via the perception of how one would approve or disapprove of one’s own behaviour oneself. The behaviour of people is likely to conform to the norm that is currently in focus, even when the other types of norm dictate contrary behaviour.

Social comparison: theories of socially reasoned behaviour (quadrant 4 of Table 5.4)

Theories of socially reasoned behaviour apply mainly to situations where consumers have a relatively low level of need satisfaction and/or behavioural control. Therefore, people are forced to elaborate on alternative opportunities and/or on increasing their abilities. Moreover, these theories apply to situations where personal outcome-uncertainty is relatively high, the opportunity use is publicly visible, the needs in question are more socially relevant and the consumers have a more egalitarian cultural perspective.

As shown in the previous section, the Theory of Planned Behaviour (Ajzen, 1985, 1988, 1991) also includes a social factor, the subjective norm, which refers to a person’s perception of the opinion of others about him/her performing the relevant behaviour. The subjective norm is proposed as a function of one’s beliefs that referents think whether the person should or should not perform the behaviour (called the injunctive norm), weighted by the motivation to comply with those referents (see Figure 5.4). Becoming aware of a subjective (social) norm would involve an assessment of relevant others and an appreciation of their behavioural intentions. Specific theories on social norms describe both reasoned and automated behaviour. In this respect, the Theory of Planned Behaviour overlaps with the Theory of Normative Conduct (Cialdini et al., 1991; see the previous section on imitation).

Social Comparison Theory (Festinger, 1954) states that people are motivated to consciously compare their opinions and abilities with those of other people. These comparisons follow dimensions such as the possession of material goods, financial means, status, principles, attitudes and skills. With respect to opinions, people have a drive to roughly conform to others. With respect to abilities, people have a drive to be (somewhat) superior to others. Especially in new (unfamiliar) situations, these comparisons provide information about what is/are proper behaviour and opinions. Social comparison processes not only occur at the individual level, but also at the group level (Faucheux and Moscovici, 1972). Two important factors determine the degree of comparison between persons in a group (Festinger, 1954): the more similar group members are, and the more cohesive a group is, the more strongly members are motivated to compare themselves with
others in the group. More recently, social comparison processes with respect to personal status and achievements have been the focus of research (Buunk and De Vries, 1991). Theories on relative deprivation describe social comparison processes in terms of social justification and indicate that one's achievements relative to others are often valued more than one's absolute achievements (e.g. Masters and Smith, 1987). For example, someone driving a new Volkswagen in an average small town may experience more status than someone driving the same Volkswagen in Beverly Hills may. Because people generally prefer a positive outcome of a social comparisons, this process appears to stimulate a continuous upward social mobility, a permanent striving towards the improvement of one's own position compared to the position of relevant others.

**Opportunity consumption**

The cognitive process a consumer follows eventuates in a behavioural choice. This involves the consumption of one or more (or a part of) opportunities. People usually perform different behaviours in time, and in doing so they combine the use of various opportunities. For example, during the day people may work, travel, eat, watch television and play. Considering each type of activity as a separate opportunity, it is appropriate to describe the behaviour of a consumer in terms of distribution of opportunity consumption. Such a distribution shows how frequently certain types of opportunities are being used. Within this context, work is also being considered as an opportunity, because it usually increases the (financial) abilities of a consumer, and thus indirectly contributes to the satisfaction of needs. However, work may also involve intrinsic need-satisfying characteristics, such as identity, participation and creation.

The dynamical structure of the conceptual meta-model (Figure 5.1) implies the idea that the consumption of opportunities involves feedbacks towards the driving forces of behaviour. At the micro-level, opportunity consumption yields changes of personal stock-levels related to need satisfaction, changes in experienced uncertainty and changes in ability. At the macro-level, the aggregated opportunity consumption of many consumers yields changes in the natural and the human environment, which in turn affects the opportunities available at the micro-level. These different outcomes are being discussed into detail in the following sections.

**The satisfaction of needs**

The utilisation of opportunities may satisfy (or frustrate) several consumer needs. If a need is satisfied, a person's immediate motivation to use the relevant need-satisfying opportunity again will decrease, for as long as the need remains satisfied. In the situation where the consumption of a particular opportunity does not satisfy a certain need, the consumer's motivation to use this opportunity again will decrease. These feedbacks from opportunity consumption to the satisfaction of needs regulate the frequency and intensity of opportunity use, and they guide the cognitive process.

With respect to the need-satisfying outcomes of opportunity use, it can be stated that the more his or her needs are satisfied, the better off the consumer will be. The need satisfaction resulting from a (combined) opportunity use can be conceived as a contribution to one's **quality of life**. The concept of **quality of life** (QoL) is defined here as the
extent of multivariate need satisfaction, in terms of a taxonomy such as presented in Tables 5.1 and 5.2.

Changes in abilities

Behaviour will also affect the abilities a consumer has. Some behaviours like working are mainly performed to increase one's (financial) abilities. However, as stated before, such behaviours may also satisfy needs, e.g., working may satisfy one's needs for participation and creation. Opportunity consumption often costs abilities (e.g., money) or requires a certain level of an ability (e.g., knowledge). For example, the purchasing of a car will have consequences for the consumer's physical abilities (e.g., a higher mobility), financial means and social life. Regarding changing abilities, we distinguish between four basic types of outcomes: (1) physical outcomes, e.g. one's ability to move around, (2) regulatory and enforcement outcomes, e.g. the withdrawal or granting of a license, (3) financial-economic outcomes, e.g. one's available budget and (4) social and cognitive outcomes, e.g. changes in knowledge and social support. These changes of consumer abilities may be positive (e.g. increasing knowledge) and negative (e.g. financial budget reductions). Also, performing a certain behaviour may affect the attainability of other behaviour. For example, the purchasing of a car may reduce one's financial abilities to afford a proper house. That car, however, may provide the means to develop the skills for running a freight transport business. Thus, the use of a certain opportunity will affect one's abilities, and thus one's behavioural control over other opportunities. These feedbacks and interactions reflect the process of substitution between different opportunities, and they refer to the autonomous or self-regulating processes that guide consumption and behaviour change.

If the actor's abilities are insufficient to consume a certain opportunity, yet the actor is very motivated to consume it, he/she may try to increase his/her abilities. Work is a main strategy to increase financial abilities. Education and training are strategies to increase knowledge and skills.

Changes in uncertainty

Consumers always have certain expectations regarding the outcomes of their behaviour. However, if the actual outcomes of behaviour are different from these expectations, the consumer may experience uncertainty. For example, the fisherman may be confronted with an unexpected drop in the fish-catch and the commuter may suddenly be confronted with traffic jams. Especially when the expectations follow from an outdated mental-map (no reasoned processing having taken place for a long time), the chances rise that a large difference emerges between expectations and actual outcomes. The uncertainty tolerance of people reflects their sensitivity to such differences.

Changes in the natural and human environment

The behaviour of many consumers yields aggregated outcomes that affect the natural and human environment. The consumption of various opportunities involves the use of natural resources such as forests, live-stock, plants, energy (renewable and non-renewable), water, materials, space, environment and the like, as well as the production of waste. To assess the environmental outcomes of a particular opportunity distribution, the resulting amount of resource use will have to be translated into environmental impacts. At this stage, information on the natural (environmental) outcomes of the behaviour is needed. For example, the energy use of an actor will depend on the type of work (s)he has, the
mode of travelling, the use of household appliances and the like. Here, the outcomes of human consumption are indicated in terms of litres of water, miles of transportation, kWh electricity, m$^3$ natural gas, but also in terms of natural resources that are being consumed or wasted (e.g., fish, clean air, woods). Here, the link can be made with scientific knowledge about the dynamics of ecosystems, which are often formalised in models of environmental processes. If a behavioural model is formalised to assess consumption volumes, these volumes could be used as inputs for environmental models. On the other hand, environmental models may provide the necessary input to assess changes in the natural environment as a macro-level determinant of consumer behaviour. Depending on the level of consumption and the type of opportunity (e.g. exhaustible, renewable, recyclable), a scarcity or even a depletion of natural resources may occur. Especially in the case of renewable resources, over-consumption may be understood as the overshothing of the carrying capacity of a certain provision system. Such developments at the macro-level have direct repercussions for the availability of opportunities for individual consumers. Sources of opportunities thus may change as result of their use.

The human environment involves developments in technology, economy, demography, institutions and culture (the T.E.D.I.C.-complex as described earlier in this chapter). The aggregated outcomes of consumer behaviour also have impacts on these developments. For example, new opportunities may be developed, the prices of opportunities may change, more people may have to share the same common resources, institutions may impose restrictions on certain types of opportunity use, and the cultural perspective of large groups of people may change as result of sustained changes in need satisfaction. Because these developments interact with developments in natural ecological systems, researchers often integrate them in so-called ecological-economic models (e.g., ISLAND; Engelen et al. 1995; Lakeland; De Greef and De Vries, 1991, see also Chapter 1 on integrated modelling).

The human environment also involves the characteristics of consumers who are using certain opportunities. The need-satisfying characteristics of an opportunity can be affected by information on which type of consumer uses a certain opportunity. For example, if only high-status consumers use a particular opportunity (e.g., playing tennis), other consumers may subsequently perceive this opportunity as more socially rewarding (e.g. satisfying the need for identity), and they thereby may become more motivated to use this opportunity as well. The more people use that particular opportunity, the less it will satisfy the need for identity of the people that originally consumed that product. This will increase the motivation of these people to find new opportunities that will satisfy their need for identity (e.g., playing golf). This process, in which people ‘chase’ one another in consumptive behaviour in order to demonstrate their social status is often referred to as ‘keeping up with the Jones’, where the Jones’ stand for the average middle-class family. In the short run, this process seems to work within relatively homogeneous groups, where neighbours and friends are comparing themselves with one another. In the long run, these effects lead to behaviour of ‘higher classes’ being adopted by ‘lower classes’, while ‘higher classes’ have to develop new standards to keep up their high-status identity. Elias (1984) extensively discusses these processes in his work on the civilisation process. Processes of feedback, involving information on which kind of people use which opportunities, seem to be essential in understanding this societal drive.
Strategies for behavioural change

Various interest parties, e.g., individuals, governments, producers, churches and consumer organisations, use various strategies to influence people's behaviour. Many of these interest parties operate on the micro-level of society. For example, my little daughter has an arsenal of strategies that she applies in attempting to change my behaviour from reading a newspaper to playing with her. These strategies range from acting pitiful in order to draw attention, to making it physically impossible for me to read the paper. In a similar manner, many people in our daily lives act upon our driving forces. In general, family, friends, colleagues and strangers are interest parties at the micro-level that frequently attempt to change our behaviour.

Whereas the forces applied to us by micro-level actors are often short-term oriented, bear no systematic character and are usually being directed at a single person, actors at the macro-level usually try to affect the behaviour of larger groups of people in a systematic way. Two main interest parties at the macro-level that spend a lot of effort in changing (or consolidating) consumptive behaviours are the government and the suppliers/producers. However, also various consumer organisations, environmental organisations, interest groups, churches and the like may spend efforts in trying to change consumer behaviour. Many strategies aimed at changing behaviour are being employed, such as taxes, advertisement, laws and product development and innovation. Within the context of stimulating a sustainable development of consumer behaviour, these systematic efforts are the most interesting in making an inventory of strategies for behavioural change.

Changing the driving forces of behaviour

In order to make a systematic inventory on the strategies and tactics that can be used in changing behaviour, it is necessary to draw a perspective of how policy measures may affect the driving factors of behaviour. In terms of the conceptual meta-model, policy measures are aimed at changing the driving factors of behaviour. These changes thereby may affect the cognitive process consumers engage in, and they are ultimately aimed at changing the resulting behaviours. Strategies to change consumer behaviour are generally focussed at four types of driving factors: (1) the need-satisfying capacity of opportunities, (2) the resource demands of opportunities, (3) the abilities of consumers and (4) the perspective on people's preferred mode of need satisfaction.

Changing the need-satisfying capacities of opportunities indirectly affects the consumer's motivation to use an opportunity. This motivational change will only occur if one actually perceives the opportunity change. The consumer's perception of opportunity changes may be the result of personal reflection, external information and/or persuasion, own experiences with the need-satisfying characteristics of consumer goods and services, or via the observation of other consumers' behaviour and outcomes. If a consumer is not aware of a change before using an opportunity, there will be a difference in expected and actual need-satisfying outcomes. Outcomes that differ from the expectations one had may give rise to uncertainty and stimulate processes of social comparison.

Increasing need-satisfying aspects often is relatively easy to do, and many suppliers of opportunities (e.g. producers) make large efforts to increase the need-satisfying aspects of their products by improving existing products and developing new ones. Decreasing the need-satisfying capacity of an opportunity is often hard because people may find it hard to
accept such a loss of need satisfaction. For example, very few consumers would like measures that make cars less comfortable or long-distance holidays less appealing.

**Changing the resource demands of opportunities** can be achieved by using laws, prices, information, and the like. As such, opportunities that are not preferred by the government may be taxed or prohibited, and preferred opportunities may be subsidised or propagated. Policy measures that address the sheer availability of opportunities may also be conceived as affecting the resource demands. Changing the resource demands of an opportunity obviously influences the **behavioural control** a consumer has. Increasing the ability demands of an opportunity results in a decrease in consumers' behavioural control. Decreasing ability demands results in an increase in behavioural control. Furthermore, if a consumer is unaware of a change in the resource demands of an opportunity, he or she may experience a difference between expected and actual outcomes, resulting in insecurity and thus stimulating processes of social comparison.

**Changing the abilities of consumers** (consumer resources) involves instruments that increase or decrease consumer abilities. For example, income taxes decrease the financial abilities a consumer has, and education increases the knowledge of consumers. Changing consumer abilities also changes the **behavioural control** of consumers. Increasing abilities will result in an increasing behavioural control, whilst decreasing abilities result in a decreasing behavioural control. Thus, as discussed before, consumer abilities (resources) and opportunity resource demands are two sides of the same coin.

**Changing the perspective people have on the preferred mode of need satisfaction** is based on the notion that the level of need-satisfaction is partly determined by the cultural perspective a consumer adheres to. Consumers with an equal type of consumption may experience different levels of need-satisfaction (quality-of-life) due to their differing cultural perspectives. For example, a consumer with an individualistic perspective will be more focussed at personal needs satisfaction, whereas a person adhering to a more egalitarian perspective will be more likely to include the outcomes for other people and the environment in his/her consumption decisions. Consequently, a change in cultural perspective may change one's experienced level of need satisfaction, thereby changing one's motivation to consume certain opportunities. Moreover, such a change in cultural perspective may also change one's perception of the need-satisfying capacities of opportunities in general, thereby (indirectly) also changing one's motivation to consume certain types of opportunities. Such a change in motivation may pertain to general categories of consumer activities such as eating, transport and holiday-making. Consequently, strategies aimed at a change of cultural perspective might be effective in changing coherent patterns of consumer behaviour, thus changing people's life-style. The cultural perspective a consumer adheres to may be changed via modifications in people's values, norms and morality underlying people's satisfaction with their current and/or expected future quality-of-life. This may be accomplished through 'value debates', confrontations with others adhering to different cultural perspectives and concomitant life-styles, resulting in a different (not lesser) quality of life.

**The dynamics of behavioural change**

The efficacy of policy instruments directed at behavioural change depends on how well a behavioural process is approached. For example, if a consumer is highly motivated to use an opportunity, but is lacking an adequate behavioural control, he or she will be motivated to elaborate on alternative opportunities and/or on strategies to increase behavioural
control, and it is likely that new information will be taken into consideration. In contrast, a consumer with a low motivation to elaborate will not consider new information; inducing a behaviour change then requires other (combinations of) instruments. As said before, policy measures affect the driving forces of behaviour and thus may cause a shift in the cognitive process people engage in. A clear example may be derived from attempts at changing habits. As previously stated, habitual behaviour involves minor cognitive processing. Only direct positive outcomes will maintain the perseverance of a habit. Policy measures aimed at changing a given habitual behaviour may be focused on the elimination of direct positive outcomes, the administration of direct negative outcomes, or the increase of resource demands. Because this means that the habit is not satisfactory and/or feasible anymore, people will engage in reasoned processing (deliberation or social comparison) in order to find new need-satisfying opportunities. During reasoned processing the consumer may include information on long-term outcomes in his/her evaluation of behavioural opportunities. Consequently, information may play an important role in the change of habitual behaviour, but only if people are ‘being forced’ to engage in reasoned processing. If a more need-satisfying opportunity is found, and the consumer has a high behavioural control over that opportunity, a new habit may emerge, which involves a shifting back to (a new) automated behaviour.

The four types of cognitive processes (Table 5.4) thus differ regarding their sensitivity to changes in the various driving forces. Because behavioural change is a process in which people frequently switch between the cognitive processes that guide their behaviour, it is necessary to use a combination of instruments to guide the total process of behavioural change. These instruments must be targeted at the relevant cognitive processes at the right time in order to tackle the relevant behavioural dynamics. Therefore, it is necessary to make an inventory of what the different theories of behaviour, that apply to the four cognitive processing types, have to say on changing behaviour. But first it is necessary to make an inventory of the general strategies that can be used in changing these cognitive processes and the resulting behaviour.

Five general strategies for behavioural change
There are five scientific disciplines that deal explicitly with behaviour change, namely technical science, law, economics, psychology/sociology and moral philosophy/cultural anthropology. This categorisation by and large reflects the categorisation of strategies by, e.g., Sheth and Frazier, 1982; Cook and Berrenberg, 1981; De Young, 1993; and Vlek and Michon, 1992. In line with these disciplines, five corresponding types of general strategies for behavioural change are recognised: (1) providing physical alternatives and arrangements, (2) regulation and enforcement, (3) financial-economic stimulation, (4) social and cognitive stimulation, and (5) changing values and morality.

1. Provision of physical alternatives and (re)arrangements may change the consumer’s set of opportunities. New behavioural opportunities are shaped or existing opportunities are deleted through changing technology and infrastructure. The basic assumption is that changing the physical environment in which behaviour takes place can shape this behaviour. Firstly, this strategy may change the need-satisfying capacity of opportunities. This would subsequently change the consumer’s motivation to use opportunities. For

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10 In the policy development process the focus is usually at technical science, law, economics and psychology/sociology, at the neglect of moral philosophy/cultural anthropology.
example, making public transportation more comfortable may result in an increasing motivation to actually use it. Secondly, this strategy may change the physical resource demands of an opportunity. This involves a change of the behavioural control a consumer has. For example, closing a street for car-traffic (e.g. during certain hours) will substantially decrease consumers’ behavioural control over driving there. If this decrease of behavioural control is significant, consumers cannot drive there by car (as much as they used to) and may become motivated to elaborate on alternative travelling opportunities and strategies to increase ability (substitutions). Some exemplary types of physical alternatives and (re)arrangements are:

- **Optimisation of existing technology** (e.g., improving efficiency). For example, cars can be made to run more kilometres on a litre of gasoline, and more energy-efficient wood-fired cooking stoves can be produced.
- **Innovation and development** leads to new technologies refers to the development of new opportunities. For example, new small-scale types of windmills have been developed for the generation of electricity and the pumping of water. Cars with electric engines have been developed, to reduce harmful emissions.
- **Infrastructural change** refers to the change of a system of opportunities or the development of a new system. For example, a new railway offers new opportunities to travel, and the development of computer networks (Internet) provides new opportunities for communication.

2. **Regulation-and-enforcement** serves to restrict or extend the set of behavioural opportunities one has. This strategy is based on the issuing and enforcement of laws, rules, regulations and standards adopted by the government. Their violations - if detected - are met with some kind of punishment, fine or disapproval. This requires an adequate organisation for supervision, monitoring and enforcement. Regulations typically change opportunity demands and/or consumer abilities, thereby altering the behavioural control consumers have. It is assumed that regulations eventually will be internalised, thereby leading to a motivational change, i.e., a change in the perceived need-satisfying capacities of an opportunity. Some exemplary types of regulation-and-enforcement are:

- **Civil law** determines the rules that apply to interactions between citizens. For example, civil law provides rules for business transactions between citizens and rules concerning private property.
- **Constitutional law** determines the rules that the government imposes on its citizens. For example, constitutional law determines product characteristics (e.g. rules for additives in food) and speed limits.
- **International law** determines the rules that apply to the interaction between states. For example, governments may take measures like boycotting a country to force it to conform to international civil rights and may regulate the freedom of trade (e.g. the NAFTA agreement) and travelling (e.g. the Schengen agreement).

3. **Financial-economic stimulation** is aimed at changing the pay-off structure of a set of opportunities. Preferred behaviours may be financially rewarded using subsidies and discounts, while unpreferred behaviours may be financially punished using taxes and fines. The basic assumption is that the behaviour of people is susceptible to the price mechanism, and that the demand-price elasticities involved are reasonably high. Financial-economic stimulation can be directed at specific (types of) opportunities, thereby altering
the behavioural control consumers have. Moreover, the financial ability consumers have may be changed, e.g., by changing the tax system. Some exemplary types of financial-economic stimulation are:
- Micro-economic measures are exploiting the price mechanism. They are directed at changing the financial abilities that the use of an opportunity requires. Examples are the taxing of luxury goods and the subsidising of public transportation.
- Macro-economic measures mainly address the financial abilities of consumers in a country. Examples are measures to change interest rates, budgetary deficits and national debts.

4. **Social and cognitive stimulation** may be aimed at increasing public problem awareness and altering problem perception, thereby motivating people towards preferred behaviours. This strategy involves giving information, education, arguments, social rewards, behavioural examples (role models), prompts and advice. Changes in attitudes and values, seeing role models being rewarded and changes in people's perceptions of their quality-of-life are assumed to change the perception of the need-satisfying capacities that opportunities have, thereby changing consumers' motivation. Also, offering knowledge and advice can increase consumers' ability to change their behaviour. The basic assumption is that specific behaviours are determined by cognitions and by social factors, such as social norms and customs. Some exemplary types of social and cognitive stimulation are:
- Informing consumers about the (dis)advantages of certain opportunities, which may change their motivation and subsequently their behaviour.
- Social modelling and support, which may change consumers' motivation. For example, if high-status persons propagate and demonstrate the use of a certain opportunity, consumers may perceive that opportunity as status-increasing (need for identity). Also, exemplary behaviour may facilitate the reproduction of that behaviour, because copying behaviour often requires fewer consumer abilities than extensive elaboration on the outcomes of that behaviour.

5. **Changing values and morality** involves appeals to the conscience of consumers. This may involve attempts to enhance their 'altruism' or 'cooperativeness' towards other actors and future generations, e.g., by means of increasing their trust in other consumers' behaviour. However, also individualism, nationalism and religious extremism may be the targets of this general strategy. Changing values and morality may also entail a change in people's conceptions of quality-of-life, particularly in the relative importance they attach to collective and environmental qualities as components of their notion of human welfare and sustainable development. It is assumed that a change in morality is reflected in a changing cultural perspective, e.g., a consumer may move from a more individualistic perspective towards a more egalitarian perspective. Such a change of values or morality implies that one's perception and motivation to consume opportunities in general may change. Consequently, this strategy might be effective in changing life-styles.

The strategy of changing or preserving values and morality is by nature the domain of religious and other ideological and cultural groups and organisations. Also the government has means to influence existing values and morality, e.g. by means of the educational system, general campaigns and the media. For example, stressing the fact that some behaviours have negative outcomes for other people (or the collective), and
appealing to the principle of reciprocity, may both motivate people to change their behaviour for reasons of fairness.

Levels of strategies for behavioural change
The above mentioned general strategies may be directed at individual consumers (the micro-level of society), but also at organisations such as industries, special interest groups, public services and so forth, and at the level of countries and international organisations such as the World Bank and the OECD (the macro-level). Especially when the behaviour of individuals is embedded in or determined by organisational structures of a higher level, applying the strategies at the macro-level may indirectly affect the behavioural opportunities one may employ at the micro-level. For example, setting energy-use standards for the appliances produced by an industry (regulation-and-enforcement at the macro-level) may indirectly affect the opportunities a consumer at the micro-level can use, via the (derived) strategy of providing other physical alternatives and (re)arrangements. Strategies employed at the macro-level may strongly affect the behavioural processes at the macro and micro-levels of society. For example, a free-trade agreement may have effects on both the producers and consumers of goods and services.

Dimensions of strategies for behavioural change
The five strategies just discussed can, alone or in combination, be incorporated in specific policy instruments. A policy instrument may include elements of different strategies. Policy instruments are defined as ‘all means an actor has decided to use to achieve one or more policy goals’ (Klok, 1991). Van der Doelen (1989) discerns three dimensions to categorise the great variety of possible policy instruments. The first differentiates between directing and constituting instruments. Directing instruments are aimed at influencing the behavioural process directly, e.g., by means of information, prices and prohibitions. Constituting policy instruments are aimed at creating preconditions for a behavioural change, e.g., by means of education, developing infrastructure and issuing constitutional law.

The second dimension differentiates between collective and individual policy instruments. Collective instruments are aimed at influencing simultaneously many consumers in different situations, e.g., by means of mass-media campaigns, regulating prices and general laws. Individual instruments are aimed at influencing specific groups of individuals in specific situations, e.g., by means of advice, levies and licences.

The third dimension discerned by Van der Doelen (1989) refers to instruments that either restrict or extend people’s freedom of choice. Restrictive instruments are aimed at decreasing the behavioural control consumers have over an opportunity, e.g., by means of propaganda, raising prices and prohibitions. As such, restrictive instruments are usually directed at restricting the use of opportunities not favoured by policy. Extending instruments are aimed at increasing the behavioural control consumers have over a desired opportunity, e.g., by means of information, subsidies and privileges. As such, these instruments are usually directed at stimulating the use of opportunities favoured by policy.

In the previous sections we have drawn a perspective on the general strategies that can be used in changing behaviour, and how they can be used in policy measures. In the following section we will describe how these strategies affect the cognitive processes and what the relevant theories have to say about changing behaviour.
Cognitive processing and behavioural change

When one makes an inventory of psychological knowledge on behavioural change, one will observe that most of the body of knowledge originates from theories that have been organised here under ‘cognitive processing’ instead of under ‘driving forces of behaviour’. That does not imply that those theories have nothing to say about the driving forces of behaviour. However, because they are focussed on particular cognitive processes they do not take account for the various driving forces simultaneously. Moreover, they do not provide a perspective on processes of behavioural change that involve switching between different cognitive processes. Yet, it is useful to have knowledge on how the different cognitive processes can be tackled in order to stimulate a behavioural change. Therefore, we have organised the theoretical perspectives on behavioural change along the two dimensions that have been used for cognitive processing (see Table 5.4), thus discussing strategies for behavioural change under the heading of deliberation, social comparison, repetition and imitation, respectively.

1. Repetition: changing individually automated behaviour. As discussed in the above section on social processing, classical and operant conditioning theories on behavioural change address changes in opportunities. This implies changing the reinforcement schedules associated with the use of opportunities. Two methods can be distinguished, namely rewarding the preferred behaviour and punishing the unwanted behaviour. Both rewards and punishments can be developed using all five strategies: providing physical alternatives (1), regulation-and-enforcement (2), financial-economic stimulation (3), social/cognitive stimulation (4) and changing values and morality (5). The experiencing of a reward or punishment after employing an opportunity directly affects one’s motivation to use that opportunity (again). Indirectly, certain types of rewards and punishments may also imply changes in people’s ability to actually use an opportunity.

Rewarding the preferred behaviour can be accomplished in two ways. Firstly, new positive outcomes may be connected to the use of an opportunity. Secondly, existing negative outcomes associated with the opportunity may be removed. Punishment may also be administered in two ways, viz. by connecting new negative outcomes to an opportunity or by removing existing positive outcomes. Some guidelines for effective punishment are (Azrin and Holz, 1966):

- The punishment must be unavoidable;
- The punishment stimulus must be immediate at a profound level instead of increasing gradually;
- The punishment should follow immediately after performing the unwanted behaviour;
- The frequency of punishment should be as high as possible;
- Prolonged periods of punishment should be avoided, as one could get accustomed to the punishment, especially when the punishment is moderate;
- Positive reinforcements should be eliminated as far as possible;
- Feasible alternative opportunities must be available;
- If direct punishment is not feasible, a punishment-related stimulus should be used.

When using effective punishment, the unwanted behaviour will be extinguished and, consequently, further punishment will be unnecessary. When using rewards, a minimum level of rewarding should always be guaranteed. A combination of punishing the unwanted behaviour and rewarding the wanted behaviour will be most effective.
2. Deliberation: changing individually reasoned behaviour. The theoretical frameworks to consider individually reasoned behaviour are decision theory and the theory of planned behaviour (see the above section on social processing). Decision theory offers two main perspectives on behavioural change. First, one may change a person’s decision situation. This implies a change of opportunities to choose from, e.g. offering new opportunities, eliminating existing opportunities and changing the value attributes of opportunities. Such changes may lead to preference shifts, whereby new opportunities come to be chosen over old ones. This perspective utilises the strategies of providing physical alternatives (1), regulation-and-enforcement (2) and financial-economic stimulation (3).

The second perspective, emerging from the prescriptive branch of decision theory, involves methodical decision support. This applies to situations where consumers lack sufficient abilities to apply an optimising strategy and therefore use a satisficing strategy. Procedures, sometimes computer-programmed, are available to assist decision-makers in structuring a problem and selecting the most preferred opportunity. See, e.g. the Multi-Attribute Utility-model (MAU model, Keeny and Raiffa, 1976; Edwards and Newman, 1982). Such decision support may be helpful in evaluating a set of opportunities on several need-satisfying characteristics. Consequently, the greater use of information in the decision-making process may result in shifting preferences. Decision support is a typical social and cognitive stimulation technique (4).

The first perspective on behavioural change offered by the Theory of Planned Behaviour (Ajzen, 1985) entails changing attitudes. Attitudes may change as a consequence of providing information on (changed) need-satisfying characteristics of (new) opportunities and/or the resources required for their consumption. If consumers are made aware of an opportunity change, they may subsequently change their beliefs that certain outcomes (satisfaction of needs, required resources) result from using that opportunity. Moreover, if a consumer becomes aware of an increase in required resources for a specific opportunity use, this would decrease his or her perceived behavioural control. Information, communication and education (strategy 4) can be employed to inform consumers about changing opportunities. This strategy mainly addresses consumer abilities in comprehending apparent opportunity changes.

Besides changing opportunities, the evaluations of outcomes also can be changed. Stated in terms of decision theory this means the changing of the subjective weighting of attributes. As this subjective weighting partially depends on the predominant values and morality (associated with a cultural perspective), a change in values and/or morality may change a consumer’s motivation to use an opportunity, thus resulting in a behavioural change. Especially changing values and morality (strategy 5) may be aimed at the changing of values and/or morality.

The second perspective on behavioural change offered by the Theory of Planned Behaviour (Ajzen, 1985) entails changing subjective norms, which involves socially reasoned behaviour. This perspective will be discussed below in the corresponding section on socially reasoned behaviour.

The above mentioned perspectives also address the process of attitude change. The Elaboration Likelihood Model (ELM; Petty and Cacioppo, 1986) discerns a central and a peripheral route to attitude change. The central route pertains to the elaboration of pure arguments in a persuasive message and/or new information. The peripheral route is concerned with the elaboration of form aspects or cues of a message such as the number of arguments, the credibility and the attractiveness of the source. The extent to which
people follow these two routes depends on their motivation to elaborate (MtE) and/or their ability to process information. If MtE and/or cognitive processing ability is low, people will only elaborate the cues in a message, using simple cognitive schemata (heuristic process model of persuasion). If MtE and/or cognitive processing ability is moderate, people will assess the motives of the source to deliver the message (attribution process model of persuasion). This combined use of central and peripheral routes requires more cognitive elaboration than the use of heuristics. If MtE and/or cognitive processing ability is high, people will explicitly elaborate the information in the message, relating it to existing knowledge structures (cognitive response model of persuasion). Generally spoken, attitude changes resulting from central processing are enduring, while peripheral processing results in only temporarily attitude shifts. This implies that if people have a high MtE and/or cognitive processing ability, a persuasive message is most likely to be effective if it entails relevant arguments and new information. If people have a low MtE and/or cognitive processing ability, it is advisable to identify strategies to increase MtE and/or cognitive processing ability, and subsequently provide arguments and new information.

3. Imitation: changing socially automated behaviour. The perspective of Social Learning Theory (Bandura, 1977; Liebert et al., 1973, see the above section on social processing) on behavioural change addresses the use of representative behaviour as performed by role models. This technique, often referred to as modelling, comprises the confrontation with role models that are rewarded or punished as discussed in the foregoing section on classical and operant conditioning. Role-models may be present in one’s direct social surroundings, but they may also be provided via media such as television, newspapers, magazines etc. As such, modelling falls under strategy 4 (social and cognitive stimulation).

According to the Theory of Normative Conduct (Cialdini et al., 1991, see the above section on social processing), the activation of norms to change behaviour may best be directed at injunctive norms: one’s ideas about what other people regard as proper behaviour. The activation of descriptive norms will only be effective if most people already behave in a desirable way, and thus offers fewer possibilities for the development of policy instruments. Finally, the activation of personal norms will only be effective if these norms are already congruent with the preferred behaviour. This changing of personal norms is similar to the changing of socially reasoned behaviour as discussed before. The activation of norms falls under strategy 4 (social and cognitive stimulation).

4. Social comparison: changing socially reasoned behaviour. The Theory of Planned Behaviour (see the above section on social processing) also offers a perspective on changing behaviour by changing one of its three components, viz. the subjective norm. Changing the beliefs that a consumer has regarding the social appropriateness of a given behaviour involves providing information, communication and education (strategy 4) and changing values and norms (strategy 5). Especially the belief that similar people approve or disapprove certain behaviour will be effective. As a result, a consumer may change his or her (social) evaluation of an opportunity.

According to Social Comparison Theory (Festinger, 1954) and the Theory of Relative Deprivation (Masters and Smith, 1987, see the above section on social processing), a change in the salient dimensions of comparison would result in a change of behaviour. For example, if status and achievements were defined in a more sustainable way, with lesser emphasis on material consumption as a main focus of comparison, upward social mobility
would come to be directed at being more sustainable than others. Such a drastic change of
morality, although hard to realise in one generation (e.g., Elias, 1984), would mainly fall
under strategy 5 (changing values and norms).

The preceding two perspectives on behavioural change originate from cognitive
behaviour theories, and they are directed at changing both the situation (in terms of
opportunity characteristics) and the consumer (in terms of motivation and ability) in a
direct way. The following two behaviouristic perspectives, however, address only
situational changes, implying that indirect changes in consumer motivation and ability.

In the previous sections we discussed which driving factors of behaviour can be
targeted with policy measures, and what behaviour-theoretical principles apply to the
targeting of different cognitive processes. In the next sections we will discuss the level at
which policy measures can be applied and the dimensions that can be discerned.

The conceptual meta-model of behaviour

In the previous sections a perspective has been drawn regarding the driving factors of
behaviour at the micro- and macro-level, the cognitive processes that people engage in, the
outcomes of behaviour and strategies for behavioural change. Moreover, the various
factors and processes have been related to each other. In Figure 5.5 these relations are
schematically presented in a meta-model of consumer behaviour. This model is an
elaborated version of the model presented in the introduction of this chapter (see Figure
5.1).

Cognitive processing is forming the heart of this meta-model. Dependent on the
uncertainty and level of need satisfaction of a consumer, he/ she will engage in one of the
four cognitive processes. Cognitive processing involves the greater or lesser use of a
mental map, which functions as a memory, in which one's abilities, the characteristics of
the opportunities, and the behaviour of similar other consumers are being stored. The
mental map is used to determine if a particular opportunity consumption would be
satisfying and attainable (when behavioural control is positive). Only when the consumer is
reasoning (deliberation or social comparison), he or she will update the mental map.
Following cognitive processing, the consumer will decide on what opportunities to
consume. This opportunity consumption will yield outcomes that feed back to the micro-
level (level of need satisfaction, uncertainty and abilities), and to the macro-level (natural
and human environment), which in its turn may change the opportunities that the
consumer has available.
The dynamical structure of the conceptual meta-model involves that it can be used to describe and interpret behavioural dynamics that may evolve over time. This will be demonstrated in the next section on the dynamics of consumer behaviour.

The dynamics of consumer behaviour

Following the conceptual meta-model of behaviour in Figure 5.5, consumptive behaviour is considered as a process that evolves over time. Feedbacks, both within and between consumers may give rise to regularities in behaviour that can be observed in many situations. Two behavioural dynamics that deserve special attention are herd behaviour and habit formation.

Herd behaviour

Herd behaviour implies that people are imitating one another, and thus it typically involves interactions between people. When many people are satisfied but uncertain, they tend towards imitating the behaviour of others. The more people start behaving in the same way, the larger may be the change at the macro-level. This in turn may increase uncertainty
in other people, stimulating them to engage in imitation, too. In this way a 'snow-ball effect' may occur, causing many people to behave similarly. This process also refers to the 'lock-in' effect of consumptive behaviour, which implies that the more people consume a certain opportunity, the more attractive it becomes for other people to consume that opportunity as well.

This herd-like behaviour may have negative consequences, as for example rumours causing uncertainty in stock-market brokers may cause a crash or an unfounded growth ('hype') in the stock market. Or, when rumours about a forthcoming scarcity of food are being spread, and some people have already started to create a private food-stock, this may cause other people to imitate that behaviour. This may result in massive hoarding behaviour, which may actually result in unnecessary depletion of food stores. As a consequence, scarcity may emerge, which may endanger the level of need satisfaction of those people who did not succeed in acquiring their own private stock. Herd-behaviour may thus incite a self-fulfilling prophecy.

Habit formation
A second important dynamical process is the formation of habits. When certain behaviour is satisfactory, and one is feeling certain about the behavioural outcomes, the experienced reinforcement will make it likely that this behaviour is being performed repeatedly. Here, the cognitive process is being automated to a certain degree, resulting in a habit. Habits and cognitive automations are related concepts (Huizing, Zaal and Miedema, 1995). Fiske and Taylor (1991) distinguish a continuum of automations. The strongest automation is a preconscious one (Fiske and Taylor, 1991), i.e., behaviour which can hardly be influenced at all (as in reflexes). Habits are considered to be weak automations that are more susceptible to change. Much consumptive behaviour is embedded in relatively stable consumption patterns, which can be conceived as forms of habitual behaviour. Consequently, behaviours like the buying of food, the use of appliances (cars, showers, domestic appliances) and the disposal of rubbish are mostly performed in a habitual manner.

The origins of a habit may lie in earlier reasoned or imitative behaviour of a person. An important condition for habits to develop is that individuals are able and motivated to repeat that earlier behaviour (Verhallen and Pieters, 1984). Regardless of the nature of the cognitive processes that originally led to the behaviour, frequent repetition leads towards automation of the behaviour, thereby saving (limited) cognitive capacity (abilities) for other tasks. When opportunity consumption satisfies current needs and entails a high behavioural control, the likelihood increases that this behaviour will be repeated, thus constituting a habit. By habitually performing the behaviour, the evaluations of the relevant aspects of the alternative behaviour patterns are saved and stored in one's memory as a script (Fiske and Taylor, 1991). The minute a given behaviour may be conducted, a person appeals to such a script instead of comparing and elaborating the opportunities over and over again. Thus, individuals do not have to explicitly evaluate all aspects of the available opportunities any more, which enables them to use their limited abilities in other domains. However, a current habit may yield far from optimal outcomes because new, better behavioural opportunities may have been introduced in the meantime. Consequently, whereas habits are frequently very efficient and necessary strategies that help us to perform routine behaviour, this automating of behaviour may also cause people to behave in an inefficient or even detrimental manner.
Because the use of a behaviour script implies the absence of extensive cognitive elaboration, the principles of classical and operant conditioning are most applicable to the cognitive process. Thus it is assumed that mainly short-term, individual and local (detectable) need-satisfying outcomes will determine a habit. Outcomes that emerge only on the long term, and that are collective and more dispersed, will hardly affect the habit, irrespective of the fact that they are positive or negative. As long as the short-term outcomes are positive, the habit is likely to persist, often despite one's cognitive awareness of the risk of long-term negative outcomes (consider e.g., smoking and over-eating). As soon as negative outcomes are experienced directly following the behaviour, i.e., when using that opportunity no longer satisfies the consumer's needs, one is likely to abandon the script and shift towards the cognitive (reasoning) mode of information processing. A cognitive re-evaluation of the habitual behaviour may include the elaboration of long-term, collective and dispersed outcomes. This cognitive elaboration may evoke a behavioural change. Eventually, the new behaviour, if sufficiently repeated and positively reinforced, develops into a new habit of opportunity use.

The relation between reasoned and habitual behaviour has been explored and characterised by Triandis (1977), Bentler and Speckart (1979), Ronis, Yates and Kirscht (1989), Aarts, Knippenberg and Verplanken (1992), Verplanken and Aarts (1994) and Eagly and Chaiken (1993). They suggest that with regard to the prediction of behaviour, there is a trade-off between deliberate intention and habit: when habit is strong the intention-behaviour relation is weak and vice versa. Or as Triandis (1977, p. 205) expresses it: "....when a behaviour is new, untried and unlearned, the behavioural-intention component will be solely responsible for the behaviour, while, when the behaviour is old, well-learned, or overlearned and has occurred many times before (..), it is very likely to be under control of the habit component".

**The effectiveness of policy measures**

The dynamical process of consumer behaviour implies that many driving factors of behaviour are constantly changing. First, these changes may be autonomous, following from the consumption process itself. Second, producers of products and services bring about many changes in the opportunities they offer. Third, many other interest parties are often trying to change the behaviour of people. The resulting complexity is further increased because the interactions between the various actors touch upon different time-scales. For example, the life-cycle of many food products spans a period of days, whereas the life-cycle of e.g., an industrial process involves years, and the life cycle of, e.g., railway infrastructure may exceed a century. Because of this complexity, developments often take unexpected courses, and policy measures may yield disappointing or even opposite effects. From this perspective it is understandable that many deliberate actions of authorities to change behaviour in a certain direction actually fail.

Policy makers usually have a certain representation of the dynamics that determine the system they are managing, and develop measures on the basis of this representation. However, policy domains in which consumer behaviour plays an important role are usually very complex. This makes it hard to acquire a complete and correct representation of the system. An incomplete or incorrect representation may lead to unpredicted and often unwanted outcomes of policy measures, fostering beliefs such as “nothing can be done to manage consumer behaviour” or “the price-mechanism is the only effective measure to change consumer behaviour”. Effects like this have been found in experiments where
decision-makers had to manage an artificial system of which the underlying dynamics were only known to the researchers (e.g., Strohschneider, 1991, 1994a, 1994b; Brehmer and Dörner, 1993).

A better understanding of the dynamics that underlie such complex systems is needed to improve their management. This would facilitate an early diagnosis of potentially unwanted developments, thereby increasing the chances that relatively small measures are capable of redirecting unwanted developments. Such dynamical policy-making requires knowledge about the most relevant behavioural dynamics of consumer behaviour. In recent years theories and tools have been developed to investigate and simulate the dynamics of complex systems. Chapter 3 provided an inventory of techniques that can be used for the simulation of such systems. In the next chapter the consumat approach we have developed will be presented, translating the conceptual meta-model of behaviour into a provisional set of simple but coherent rules for an ‘artificial consumer’. The consumat approach developed so far allows for simulating the behavioural dynamics of a group of consumers in various ways.