

Stellingen

behorende bij het proefschrift

Subjectivity in the consumer's judgement of products

1. Emotionaliteit en het gebruik van abstracte attributen zijn voldoende maar geen noodzakelijke voorwaarden voor subjectiviteit in het oordeel van consumenten over produkten.

Dit proefschrift

2. Subjectief ervaren emotionaliteit en rationaliteit zijn niet elkaars tegengestelden; het zijn twee complementaire grootheden. Een oordeel over een produkt kan daarom tegelijkertijd als emotioneel en als rationeel ervaren worden.

Mede dit proefschrift

3. Een emotioneel oordeel over een produkt is gebaseerd op een momentele ervaring. Het oordeel is dan niet afhankelijk van aspecten die bij mogelijke andere ervaringen een rol spelen. Zonder zulke aspecten bestaat er geen dimensie waarop men een ervaring kan variëren. De consequentie daarvan is dat er geen experimentele of correlatieve methode bestaat om de fysische parameters te identificeren die tot het emotionele oordeel hebben geleid.

Dit proefschrift

4. Een abstract attribuut beschrijft een aspect van het produkt dat interacteert met bepaalde gebruikssituaties. Een oordeel dat gebaseerd is op abstracte attributen is dan zodanig complex dat vooralsnog geen fysische parameters aan het oordeel gekoppeld kunnen worden. De vertaling van het subjectieve oordeel in een produktontwerp kan wel worden geholpen door duidelijk te maken in welke gebruikssituatie de consument tot het oordeel is gekomen.

Dit proefschrift

5. In het ontwerp van een nieuw produkt uit zich de (on)geldigheid van het programma van eisen dat tot het ontwerp heeft geleid. Ontwerpers hoeven daarom niet per se vast te houden aan het initiële programma van eisen, ook niet als daarin de uitdrukkelijke wensen van opdrachtgever en gebruiker zijn verwerkt.

6. De werkelijkheid is een intentioneel systeem. De wetenschap, die slechts formele systemen postuleert, moet daarom worden gezien als een spel, waarbij het doel is zo overtuigend mogelijk de ware aard van de werkelijkheid te verhullen of, zo men wil, te bezweren.

Naar: Feynman, R. P. (1985). *'Surely you're joking, Mr. Feynman!'* London: Unwin Paperbacks.

7. Het referendum is bij uitstek een democratisch instrument. Het legt de verantwoordelijkheid voor belangrijke beslissingen bij de mensen zelf en niet bij hun gedelegeerden, die vaak dermate specialist zijn dat zij niet verder dan hun eigen lobbies kijken. Het behoudende karakter van de meeste resultaten van referenda hoeft men daarbij niet voor lief te nemen. Het is aan de specialisten om zo duidelijk mogelijk uit te leggen waarom een minder behoudende oplossing beter zou zijn.

In antwoord op Hekkert, P. (1995). *Stellingen, behorende bij het proefschrift: Artful judgements: A psychological enquiry into aesthetic preference for visual patterns* (Stelling 8). Delft: Technische Universiteit Delft, Fac. I.O.

8. Het is niet de rationaliteit, maar de moraliteit die een formeel begrip is en geen empirische inhoud heeft.

In antwoord op Lea, S. E. G., Webley, P., & Young, B.M. (1992). *Economic psychology: A new sense of direction*. In: *New directions in economic psychology*. Aldershot, UK: Edward Elgar.

9. De premisse dat dieren een bewustzijn hebben is geen voldoende voorwaarde voor vegetarisme. Namelijk, niet alle dieren die een bewustzijn zouden hebben zijn zelf vegetarisch, waarom zouden we dan voor onze eigen soort een uitzondering maken?
10. Het is de verantwoordelijkheid van kinderen dat zij niet teveel naar hun ouders luisteren maar dat zij hun eigen leven leiden. Minder rekening houdend met bezorgde ouders kunnen zij meer open staan voor hun omgeving en een leven leiden waarvan het verhaal meer lijkt op dat van 'Star Trek' dan 'Zeg eens Aa'.

Dirk Snelders, oktober 1995

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SUBJECTIVITY IN THE CONSUMER'S JUDGEMENT OF PRODUCTS

PROEFSCHRIFT

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*In memory of my father,
Jan Snelders, a great naturalist*

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SUBJECTIVITY IN THE CONSUMER'S
JUDGEMENT OF PRODUCTS

SUBJECTIVITY IN CONSUMER JUDGEMENTS: A PROBLEM IN DESIGN ENGINEERING

INTRODUCTION

No enquiry into the nature of things is conducted solely on the basis of theoretical considerations, nor should it be. The choice of our research, and our theories, is heavily dependent on what we value, be it in private or in public. In itself, there is nothing wrong, or unscientific about this. There is so much to investigate that we need to make a distinction between what is trivial and what is important. What is important, of course, depends on the values of the researcher in question. In this chapter, we will consider the value of the research described in this thesis.

The object under investigation is 'subjectivity in the consumer's judgement of products'. When consumers are asked to give their judgement on a new product, they are sometimes very clear about what they like in the product, but this is not always the case. Here we consider those instances, where consumers remain vague about what they like and do not like in a product. For example, consumers can like cars because they have four wheel drive, or have central locking. Such reasons for liking a car are clear to everyone, from the engineers who constructed the car, to the local car dealer who sells the car. However, consumers can also judge a car on its appearance, and can favour a modern, slick design over a more outdated one. While such reasons for liking a car may be clear and meaningful for the consumer who expresses them, for others, they are open to interpretation. That is, these reasons do not describe an objective aspect of the product, but the understanding that the consumer has of the product. Here, the reason does not have a direct and clear reference to the product, and its meaning will also depend on the consumer who makes the judgement. This means that not everyone will agree that a specific car is modern or slick nor what it is that makes a car modern or slick. As a consequence, judgements based on such reasons are subjective. Here a consumer judgement is called subjective, if it is based on reasons whose meaning not only depends on the object that is being judged, but also on the subject who judges the object. Given this definition of subjectivity, we can see how subjectivity only exists in the communication between two or more people. Namely, the person him- or herself will not be able to make a distinction between an objective and subjective understanding. For him or her, the two would be the same. So it is only in the communication of the reason that another person can make the distinction between a clear objective reason and a vague subjective one.

In this thesis we will look at subjectivity in the judgements that consumers give in consumer research. All reasons for liking or disliking a product that the consumer can

think of are of value in the practice of consumer research. More subjective reasons are also relevant, although we can see that traditionally, these subjective reasons have been used more for the purpose of selling than for the purpose of production. A reason for this is that we do not need to know what the subjective reason really stands for when selling the product, but we do need to know this when we want to make a product that incorporates these reasons. For example, a car salesman can still sell cars as modern or slick, even if the car salesman does not have the faintest idea what it is that makes the car modern or slick. But a design engineer would have a much greater problem: how can he or she actually incorporate 'modernness' and 'slickness' in a car?

So we can see that a problem in the communication between consumer and company arises mainly if these subjective reasons are used for the purpose of the development of new products. Here, the consumer's reasons for liking a product have to be translated into criteria for the design of a new product. Here, subjectivity in consumer judgements poses a problem to design engineers of new products: how should subjective reasons be interpreted and used as the guidelines in the design of a new product?

CONSUMER RESEARCH FOR NEW PRODUCT DEVELOPMENT

There are many ways for a company to succeed, and one of these is to design its product in such a way that there are consumers who want to buy it at a profitable price and keep on buying it. Such a company will have to develop a product that is of value for the consumer, and if it offers its product in a dynamic and competitive market, it will be forced to keep on developing products with incremental value for the consumers who buy it.

A company that has chosen to develop a new product needs to know what consumers want with respect to the actual product. Indeed, as Cooper (1979), and Cooper and Kleinschmidt (1987) have shown, companies consider the success (or failure) of their products to be mainly dependent on the product's capacity to offer a unique advantage to the consumer. Although these studies are heavily criticised for asking companies to provide factors of success and failure in hindsight, which leads to a self-serving bias in the answers (Curren, Folkes & Steckel, 1992), most textbooks on new product development maintain that a consumer orientation is of major importance for product developers (Crawford, 1987; Urban, Hauser & Dholakia, 1987). However, not all of the existing literature is convinced that paying attention to the consumer's wishes is the prime directive.

There are a few notable exceptions that can be found in the literature on product development, where the prime importance of a consumer orientation is discarded. First, Shanklin and Ryans (1987) have argued that for some products, especially those that are 'high-tech', consumer needs are of secondary importance. This is because consumers do not necessarily have an explicit need for a product until it is invented and placed on the market. In such a case, the process of conceiving and developing a new product "boils down to what one executive in a high-tech company called sophis-

ticated wild guesses" (Shanklin & Ryans, 1987, p. 178). Of course, the case of high tech companies can be extended to all cases of very dynamic markets. For example, fashion designers can make little use of the consumer's explicit wishes when designing the clothes that the fashionable consumer will wear a year later. Other cases can be thought of, where sudden changes in an otherwise stable market can make the results of consumer research invalid. Such a dynamism occurred a few years ago in the disposable nappy market, where no consumer researcher could have predicted the consumer's explicit need for trainer nappies for older children.

The above suggests that two factors in the development of a new product can render consumer research invalid. First, the development of a new product may take longer than the time that consumers can look ahead. In such a case, the development of the new product will be 'technology pushed', rather than 'market pulled'. This, however, should not lead a company to focus on anything other than the consumer's needs. Even if product development is technology pushed, companies should be aware of the purpose for which they are developing the product. Here, consumer research methods may well lack the sophistication to be informative about the consumers' needs, but that does not make these needs less important. Instead of disregarding consumer needs, companies would do better to find new ways of ascertaining them. For example, Von Hippel (1986) has shown that in industrial markets, some customers of high tech products can be considered as 'lead users', who have the needs that other users will only have (or be aware of) later. Such early users can be very informative about the purpose of a radically new product, since they are the ones that benefit most directly from the innovation. A similar approach has been developed for consumer markets by Ortt, Hermkens and Schoormans (1993). Here, it is shown that consumers can give good estimates of how they will like radically new products if they have some expertise in existing related products.

Secondly, the many changes that characterise dynamic markets, brought on by external conditions (e.g. competition, government, the weather), can arouse specific consumer needs that did not exist before those changes took place. It is hard to believe that consumers have absolute needs for certain products, and that they can state exactly what they want, regardless of what the market will look like. Needs are triggered by what the market has on offer. However, we have to argue that this problem does not dismiss a consumer orientation as a prime motive in the development of new products. Again, one should not underrate the importance of consumer needs, just because they are hard to track down. Consumer research can be adapted to circumvent the problem of unpredictable market changes by focusing less on the consumers' specific needs for new products. Instead, they could look at specific problems in existing products, and see what more general needs for new products result from this. In our example of disposable nappies, consumers may not be able to tell what a trainer nappy should look like (since future competition may change their outlook on nappies), but they may well be able to tell what problems they have with the nappies they are currently using (e.g. older children hate to wear them) and what needs result from this (some solution for older children). Such needs can certainly be thought of as more enduring and less dependent on changes in the market. From this we can deduce that

early in the development process, when market entry of the new product is still far away, companies would be wise not to research the specific product wants of consumers, but, instead, focus on the more general needs and problems that consumers have with respect to a certain product domain. The interpretation to detailed product specifications could then be helped by deducing concrete wants from the more general needs.

To conclude, the problems that companies encounter in assessing exact consumer needs do not make these needs less important for the company, especially since these problems can be handled and, to some extent, be solved. Hence, the dynamic aspect of a market should not direct companies away from a consumer orientation. So the question is not so much whether a consumer orientation will help the company, but how it can help the company.

When companies want to get an idea of consumer needs, one of the options is to carry out consumer research¹. As noted earlier, research can be directed at the product needs and problems that consumers have in general, or it can be directed at some specific wants that consumers have with respect to a specific product. Different research methods have been developed to provide design engineers with information during the various stages of the new product development process (see De Bont, 1992, for an overview). In the early stages of the process, a number of techniques exist to help developers find those product ideas that have a high chance of succeeding in the market. These techniques can be subsumed under the heading of 'need assessment' (for an overview of these techniques, see Wind, 1982). At later stages of the development process, consumer research serves a different function, namely to assess how consumers evaluate the product that is under development. The procedures that are used here are better known as 'product' or 'concept tests'. In the case of product tests, the company has a fully developed prototype of the product, ready to put on the market (or already on the market) and lets consumers evaluate this product. Concept tests are carried out in earlier stages of the product development process, when there is no product available yet to show to the consumer. In such a case, only a concept of what the product may come to look like exists. A concept can be defined as a new product idea which is transformed into some kind of lasting medium (De Bont, 1992). This means that a concept is always more than a product idea, it is an idea that has been made communicable to the consumer, either textually, pictorially or in the form of a three-dimensional model.

So the general picture is that companies design products that have some apparent value for consumers and that the consumers' judgements about the design of the product can induce companies to change their products in a way they think more

¹ Most models of new product development regard consumer research as an important way of gathering relevant market information, next to research on macro-data, competition, and the distributors' and suppliers' wishes. The company's technological skills, and its capacity to organise those skills and focus them on market performance are regarded as the other main areas of concern in new product development.

suit to the consumers' wishes². Note that with this description of consumer research in new product development we have used a rather broad conception of what constitutes the design of a product.

Product design

Many ideas exist of what product design is. In one definition, the design of a product is only a plan. Such a plan describes how a function is translated into a form (Roozenburg & Eekels, 1991, p.51; Simon, 1968). Here, the design process comprises of two steps. First, the functions of the product are determined. This is done inductively, where individual opinions about products and specific product examples are translated to more general requirements, which are the functions of the product. Secondly, these functions are given a specific form. This second process can be regarded as a deductive process, where a specific form is created to meet more general principles, which are the functions that the product has to perform.

Other literature on the design process, however, has criticised this strict 'functionalist' separation between deductive and inductive design processes³ (Schön, 1988; Schön & Wiggins, 1992). A design usually comes about in several attempts. During this process, the resulting forms of the product are not only evaluated on their functional requirements but, in addition, they inform the designer about what the requirements should be. It is only through the design process itself that the more general principle (i.e. the function of the product) becomes clear to the designer him- or herself. So the different attempts are not only useful to find forms that better and better meet a list of functional criteria, they are also a way to explore the functional criteria that can be attached to forms. Here, the function need no longer be explicit; it is also implied by a form. Hence, the maxim 'form follows function' (Sullivan, 1896/1979) can be supplemented with its counterpart: 'function follows form'. This way, the design process is 'conversational', rather than 'functional'. It recognises that design can only be evaluated within the social context that is created by each attempt and, hence, that the resulting design is more than a strict plan that describes how some

² Cooper, but also other models (see Biemans, 1989, for an overview), propose that information from consumer research can and should be one of the major inputs for the new product development process. Later authors (Griffin & Hauser, 1991; Wheelwright & Clark, 1992) have stressed that within the process of new product development, information on the consumer's wishes is not only to the benefit of marketing, which is focused on positioning the new product on the market. It is also important for design engineering, where the actual product is first conceived, to know what consumers want (Hansen & Raabe, 1991; Hauser & Clausing, 1988). Earlier we have stated that design engineers are those most affected by the problems posed by subjectivity in consumer response, and this now leads us to consider consumer research especially for those activities where the product is designed.

³ We refer to functionalism here not as a specific style in the history of design (i.e. the functionalist styles of Bauhaus and the Chicago school), but instead to functionalism as a school of thought that states that the meaning of things lie not in the things themselves, but in their consequences (after Lycan, 1988).

explicit function can be given a form⁴. Therefore, instead of speaking about design in terms of a plan (which stresses that the form is dependent on functional criteria), the design of a product could better be viewed as a "representation of a thing to be built" (Schön, 1988, p.182).

Here we will adopt a conversational approach of what constitutes the design of a product. We do this for the following reason. In an Aristotelian sense, every representation of a thing exists either in some actual form (i.e. some extension in space⁵), or it exists as a reflection that someone has of a possible form (Lloyd, 1968). For example, we can have an actual form of a vacuum cleaner that is not switched on. In its actual state, the vacuum cleaner does not perform a function, although it nevertheless has the potential to clean. This potential is the vacuum cleaner's function. It is not an actual, but a possible state, and we need it to explain the transition from one state to another: how a vacuum cleaner can be switched on and how it sucks in little dust particles. Functionalism accounts of the design process place most weight on the possible form of a product. If it can be reliably assessed that all criteria will be met by possible forms then there is even no need to produce an actual form. For example, for a functionalist design engineer, the design of a bridge can consist only of the plan to build it. If the design engineer can calculate that the bridge will meet its criteria (e.g. cars can drive over it, will not fall down, must look harmonious) then the design is finished. Here, the actual form of a product is needed only if it cannot be reliably assessed whether or not a criterion is met. If that is the case, the designer can produce an actual form (e.g. a drawing or a model of the bridge) and use it for testing whether it meets the criteria given earlier. In our example of the bridge-builder, the third criterion, 'must look harmonious' can be tested by making a model of the bridge and assessing whether the contractors find it harmonious. If they do, the bridge can be built. If they do not find it harmonious, the bridge-builder can design a new form and test whether it is considered more harmonious.

In contrast, the actual form plays a much larger role in the design process when taking a conversationalist approach. Consecutive forms not only inform the designer to what extent the criteria listed earlier have been met, they also inform the designer about what the criteria are to which the actual form relates. Here, possible forms are only designed to produce actual forms. These are then assessed on their ability to function, and if they are found to function in other ways than expected, the criteria for subsequent designs could easily be changed to optimise the overall functioning of the design. Here, our bridge-builder could have derived from the actual form that it was very harmonious, but also rather dull. In addition, the contractor's reaction to the actual form may have given him the impression that the design lacked in prestige. Although dullness and prestige may not have been initial criteria, the bridge-builder may well be inspired to change the design to make it more prestigious. By doing so,

⁴ For an overview of this conversational approach to the design process, see Margolin (1989).

⁵ If we also think of 'extension in space' at the micro level, then material, colour, and texture can also be seen as an extension of atoms or molecules in space.

the design of the bridge acquires a new function, with far reaching social consequences for all the parties involved. It is not difficult to see that putting more stress on actual forms in design methodology leads to more emphasis by designers on those criteria whose assessment is most dependent on actual forms. It is logical that consumer researchers should follow.

When a conversationalist approach is taken to the practice of asking consumers to evaluate the design of products, we cannot restrict our attention to possible forms only. If consumer research was conducted solely on possible forms (i.e. product ideas), consumer research would be restricted only to those needs that consumers expect to value at some later point in time. In this case consumers would not be allowed to change their minds once the possible form of the product had actually come into existence. Such a restriction is unacceptable when conducting consumer research. A manifold of studies has shown that consumer choice can be very different from what they themselves had previously expected⁶ (for reviews, see Ajzen and Fishbein, 1977; Pieters, 1988; Wicker, 1969). Only when adopting a conversationalist approach to the design process could one allow consumers to be inconsistent in their judgements of different designs. The conversationalist would thrive on it, the functionalist blunder. This is a second reason for adopting the definition of design given by Schön: a design is a representation of a thing to be built (Schön, 1988, p. 182).

It should be noted that a more restricted view on product design exists, where it is regarded as only the aesthetic part of the product's actual form (Wind, 1982). The reason for not adopting this definition is that we cannot say that the more functional parts of a product's actual form are not 'designed' and that they cannot be aesthetic. If we are to follow Wind's line we should consider the aesthetics of a product as ornamental, like the curly bits on Louis XIV furniture, and not as an integral part of the product's function, as some German architects started to do in the 1930s. At the same time, it is difficult to maintain that aesthetic parts of a product's concrete form do not serve some function. For example, wearing nice clothes can be very functional for children who do not want to be teased at school, or who at a later stage in their lives, want to be welcome at certain clubs. Therefore, what is functional and what is aesthetic is not so much in the design itself, but it is to be found in what someone attributes to a specific design. These are two very different things, since there need not be an inherent connection between how a product is conceived by the designer, and how it is viewed by the consumer⁷.

⁶ On the other hand, if one were to conduct consumer research solely on the actual form of products, consumer researchers would be prevented from asking consumers to evaluate products beforehand. Hence, consumer research would be restricted to the consumer's direct needs for products, and they would not acquire any knowledge about the needs that the consumer expects to have with respect to a possible product. If actual forms cannot be related to what consumers expected earlier, then there is little room for consumer researchers to develop theories on how consumer choice comes about. It also renders the notion of consumer needs redundant: if needs are fully explained by consumer choice, who needs them?

⁷ A notable example of this is the case where consumers add functions to products that were never intended by the designer. For example, consumers can use their scissors for driving in screws, use orange crates as tables, or their brassieres as a political statement (Jencks & Silver, 1972).

Design attributes in consumer research

Consumer research is carried out in order to identify the consumer needs with respect to a certain range of products. Lancaster (1966; 1971) argued that these needs can be broken down to part needs for different attributes of a product. Here, an attribute is regarded as an objectively measurable, physical and quantifiable unit of utility. It follows that a consumer may well like a product for one such attribute and dislike it for another, and that it is the task of the product developer to make products that have optimal attribute combinations. Thinking of attributes as the physical parts of products releases the design engineer from worries about how to interpret the consumer's stated views on a particular type of design. How the consumer him- or herself views the design has become irrelevant. Since the design attributes are there for everyone to see (they are objectively measurable), one can assume that the consumer knows which design attributes the product has. All that is left to do is to assess how important these attributes are to the consumer. In effect, this is what is often done within the framework of new product development (for an overview, see De Bont, 1992). Different combinations of product parts can be shown to consumers as product concepts, and consumers can simply be asked to choose between one alternative and the other. These concept tests can be used to assess the importance of new products and their separate attributes for consumers. An example of this is conjoint analysis (Green & Rao, 1971; Green & Srinivasan, 1978; 1990). By systematically varying the attributes of product concepts, the effect of each product attribute on the preference of the consumer can be assessed. This way, the product developer receives information on which product attributes to change, and how to change them. Thinking about design attributes in a Lancaster fashion has the advantage of not needing explicit information about what consumers think that the design attributes are. All the developer needs to know about is consumer preference for one product concept over the other, on the basis of which the importance of different product parts can be assessed.

A problem that arises with Lancaster's theory and, as a consequence, with many conjoint analysis studies is that the attributes are prespecified and thus completely normative of what consumers might think the attributes are. The drawback of this approach is that if, for example, a conjoint analysis found that consumers preferred one particular blue car over a red one, it would remain unclear whether consumers prefer all shades of blue over red. For this, one would have to confront consumers with all possible shades of blue. Here, it becomes tempting to simply ask consumers exactly what attributes they themselves consider to be relevant. By doing so, however, one adopts an entirely different definition of what an attribute is. Attributes can no longer be thought of as physical product parts, but instead, they exist only in the mind of the consumer. This has been proposed by Wilkie & Pessemier (1973), who do not consider attributes as objectively measurable, universal, quantitative and physical. Instead, they define an attribute within the expectancy value theories of Rosenberg (1956) and Fishbein (1967). Within this framework, design attributes are thought to exist in the mind of the consumer and on the basis of this, the consumer forms an attitude towards the design of a product. The advantage of this approach to the

practice of consumer research is that consumer preference can be linked to those attributes that the consumer feels are important to him or her. So in this case, consumer preference can be composed on the basis of those attributes that consumers feel are important to them. Note that this is in contrast to the approach favoured by Green and Rao (1971), where consumer preference is decomposed into attribute importances, and where the attributes that consumers feel are important are inferred from consumer preference. This distinction has come to be known as one between the compositional versus the decompositional approach (after Day, 1972).

Defining design attributes in psychological, rather than physical terms solves the problem of which attributes are relevant to the consumer. With the help of compositional techniques it can be made clear which design attributes are typically wanted by consumers, and the product developer is left with the task of translating these attributes into parts of the product. This suggests that the product developer can only make use of compositional techniques to the extent that he or she can link the attributes that consumers feel are important to real product solutions. As Wilkie and Pessemier (1973) suggest:

Given that the marketing manager can control to some extent the physical characteristics and associated images of his brand, careful assessment of cognitive structures offers a natural approach to formulating important aspects of a marketing strategy. (p. 428)

Both the approaches of Lancaster and Wilkie and Pessemier have their strengths and weaknesses in the context of product development. When taking the view that design attributes are physical, the product developer has the advantage that the attributes obey the laws of physics and can be handled. The disadvantage, however, is that there is no way of telling whether the attributes that the product developer wants to handle are those that are considered relevant by the consumer. On the other hand, when taking the view that design attributes are psychological, the product developer can find those attributes that are relevant for the consumer, but now he may have the problem of not knowing how to translate these attributes into real product solutions. To give an example, suppose that a design engineer wants to design a telephone and he or she wants to know whether consumers prefer a console where each function has its own key, or one where more functions can be put under one key. In that case he or she may not find very relevant answers in consumer research if consumers consider 'simplicity' a more relevant attribute of a telephone than 'number of keys'. On the other hand, if the product developer learnt from consumers that they prefer telephones that have 'simplicity', he or she would again run into problems because there is no exact information as to how this 'simplicity' could be achieved.

In practice, both decompositional and compositional techniques have stressed the importance of this link between the consumer's product understanding and the developer's product handling. In case of decompositional - conjoint analysis - techniques, this has led to stressing that the attributes that are varied over different product concepts should be relevant to consumers. This should increase the "believability and

hence the predictive validity of preference judgements" (Green & Srinivasan, 1978, p. 109). Compositional techniques, on the other hand, have long stressed the importance of asking questions about which attributes are important in such a way that answers are open to "unidimensional interpretation" (Wilkie & Pessemier, 1973, p. 429). Although both approaches can be praised for dealing with their inherent weaknesses, they have also been criticised in one important respect. Both decompositional and compositional approaches have narrowed their focus to those attributes that best bridge the gap between the psychological constructs by which the consumer understands a product and the physical constructs that are under the control of the product developer. If the gap becomes too wide the attribute is not considered.

One approach to fill this gap has arisen in the early eighties (Finn, 1985; Gutman, 1982; Myers & Shocker, 1981). Here a distinction is made between the actual, physical product attributes, and the consequences that these attributes have for the consumer. Instead of deriving value directly from the attributes of the product, here the attributes are regarded by consumers as instrumental in achieving certain consequences. It is these consequences, rather than the attributes themselves, that are valued by the consumer. For example, consumers are not thought to value a car because it has an airbag (an attribute) but because it safeguards them from severe head injuries (a consequence). Provided that it is equally effective, other safeguards from head injuries would be equally valued by the consumer. This theory on the hierarchical organisation of attributes, consequences and values is better known as 'Means End Chain Theory' (after Gutman, 1982)⁸.

In most cases where consumer research is directed at the product's consequences, it is assumed that the consequences that are valued by consumers can be directly traced back to some physical product attribute that is under the control of the designer. (Johnson, 1989; Johnson & Fornell, 1987; Olson & Reynolds, 1983). A problem with this view arises, however, when consumers fail to do this. That is when they cannot link the consequences that they feel are important to attributes that are easily manipulable for the product developer. It is here that consumer response becomes subjective.

Design attributes as subjective attributes

Not all attributes through which consumers describe products are equally clear to everyone. For instance, when consumers say that it is important for a car to have

⁸ Means end chain theory has come with its own research methodology, called 'laddering' (Reynolds & Gutman, 1988). Laddering is an in-depth interview technique that comprises of two steps of enquiry. First, the key distinctive attributes of the product within a certain product category are selected. These attributes are then used in a second step where the consumer is asked why these attributes are important to him or her. The subsequent answer that the consumer gives is not taken for granted; the interviewer repeatedly asks for the importance of each consecutive answer, until there is no further answer. The relevance of this technique to the theory of means end chains is obvious. The attributes that are elicited at the beginning of the interview are considered to be on a level closest to that of concrete product attributes. Subsequent answers shed light on the consequences that these attributes have for the consumer, and the final answers would reveal the terminal values of the consumer.

power steering, there will be little disagreement on how we can satisfy the consumers' wishes. However, if the same consumer says it is important for the car to have a modern appearance, then there may be more controversy over how to achieve this. We can, of course, ask what the consumer means by 'modern', what it implies for the design of the car. In that case we may well find that different consumers make different lists of implications, because they disagree upon what the word 'modern' really means. If there is no correct list of criteria that make a product 'modern', the meaning of the attribute 'modern' is subjective, and open to the consumer's own interpretation. A subjective design attribute is such an attribute that is open to interpretation, and where not everybody will agree what is meant by it in objective terms. Disagreement exists over the meaning of these attributes and this means that they cannot be directly linked to attributes over which no controversy exists. Therefore, we need to make a distinction between those attributes that are understood by most people in much the same way, and those attributes over which controversy exists, which can be regarded as the consumer's more 'subjective' understanding of the design in question. The problem here lies in the way the attributes are described. The description can be clearly related to concrete, tangible objects (over which there is agreement), or it is not so clear. This distinction is most similar to that of Hirschman (1980) between tangible and intangible attributes, and that of Shocker and Srinivasan (1974), and Hauser and Clausing (1988), between actionable and non-actionable attributes. In later chapters, however, we will speak of the distinction between concrete and abstract attributes, because these are the terms in which the distinction has received most attention, both in the literature about word meaning (Paivio, 1975; 1978; Schwanenflugel & Shoben, 1983) and consumer research (Johnson, 1984; Johnson & Fornell, 1987).

The distinction also has consequences for how we define attributes. In the previous section we have seen that attributes have been defined as atomic parts in the need-satisfaction process; as separate units of utility (Lancaster, 1966; 1971; Wilkie & Pessemier, 1973). Subjective attributes, however, that describe an unspecifiable quality of the product can no longer be regarded as separate units of utility. Because it is unclear how the subjective attribute relates to objective attributes, there is no way of telling how its value is separate from that of other attributes. This leaves us with understanding an attribute in its most literal sense: a quality (or value) that is attributed to a product. Thus, from the perspective of the consumer researcher, subjective attributes can be anything that the consumer says they are⁹. Note, however, that our position does not imply that attributes are purely symbolic, or that they do not describe a

⁹ Some consumer research techniques have been developed to deal with subjective attributes (For a review, see Snelders & Stokmans, 1994; Steenkamp, Van Trijp & Ten Berge, 1994). Most of these let consumers qualify a larger group of products, and each individual qualification can be compared to another individual qualification on the basis of how similarly they discriminate between the different products. A more qualitative technique is symbolic analysis. Here, the scope of what each attribute can possibly mean is investigated by asking consumers what they regard as alternatives or opposites of the attribute in question (Durgee, 1985).

physical aspect of the product. All attributes are assumed to describe some aspect of reality for consumers¹⁰.

THE PROBLEM OF SUBJECTIVITY

If design attributes that are listed by consumer researchers are objective, the translation of these attributes into a product poses designers and engineers no problems other than technical ones. However, as we have shown above, not all attributes by which consumers qualify products are objective. If consumers have stated that they value design attributes that are more subjective in nature, designers and engineers not only have a technical problem, they are also faced with a problem of interpretation. How should an attribute, with no precise meaning, be translated into a concrete product?

At present, there are two answers to this question. The first is simply to focus all attention on the objective attributes and leave the subjective ones for others to deal with. For example, if consumer researchers have listed that consumers like a car with power steering, central locking and a 'flashy' appearance, design engineers may well just give the car power steering and central locking, and leave it to marketing to sell it as 'flashy'. Such an approach has the obvious drawback that it ignores information about attributes that have stated relevance for the consumer him- or herself. A second, alternative approach exists, where the design engineer interprets subjective attributes, and actually tries to design products that fit the subjective description. This approach is known as 'the semiotic approach to the design process', where subjective attributes are used as 'key concepts for designing' (Kawama, 1987). As Kawama has shown, such an interpretive approach need not be a chaotic attempt of an individual design engineer. Instead, design engineers were found to use more or less general rules for interpretation. In the case of their choice of colours, designers were found to make use of rules that described relationships between key concepts (i.e. the subjective attributes provided by consumer research), and actual product colours. For example, 'high tech' (a key concept) was consistently associated with 'cool colours', which were again associated with 'whitish colours'. Although such rules can be helpful for the designer to interpret subjective attributes, they do not provide a guarantee for consumer acceptance. For this purpose, the possibility exists to conduct further consumer research on how consumers evaluate the designer's first interpretive attempts. This would make consumer research for new product development a much more interactive process, where the design engineer can attempt to optimise the consumers' reactions to each design attempt (after Loosschilder, 1995).

¹⁰ As was pointed out by Baudrillard (1986), it is only a matter of presentation as to whether a value is 'symbolic' or 'utilitarian', and in this thesis we will present attributes as product qualities with real, utilitarian value. For a portrayal of the symbolic value of products, see Dingena (1994). The reason for building our story on utilitarian values is a simple one: we feel that this makes more sense to engineers.

PLAN OF THE THESIS

At the beginning of this chapter we have stated that our enquiry into subjectivity of consumer response is valuable to consumer research, especially in those situations where it is employed to help design engineers develop new products. Therefore, design engineers need to have an understanding of subjectivity in consumer judgements. This can help them in their efforts to translate subjective attributes into concrete designs. In this thesis we will investigate how subjective consumer judgements should be interpreted. In what way do they describe qualities of the product that can be handled by design engineers and under what circumstances are they used by consumers?

Before answering these questions we will first need to look at subjective attributes and how they come about in consumer judgements. This will be done in chapters 2 and 3. In these chapters we will propose 1) that consumer judgements are subjective when consumers experience their choices as emotional, and 2) that subjective attributes describe contextual product aspects. In Chapters 4 and 5 we will investigate the first proposition, in Chapters 6, 7, and 8 we will investigate the second. Finally, in Chapter 9 we will look at whether subjective attributes are indeed more frequent (and important) in judgements that are experienced as emotional. Chapter 10 will see how the findings, which are reported and discussed in the earlier chapters, are relevant for the interpretive attempts of design engineers.

It remains to say that the thesis will for the most part deal with which theory best describes subjective consumer judgements. We will have less to say about how to deal with them in consumer research. However, when investigating the nature of subjective attributes, we will make use of a large number of the consumer research techniques that are described above, and this will enable us to evaluate each of these on its capacity to properly handle subjectivity in consumer judgements. For this, an enquiry into subjectivity in the consumer's judgement of products will certainly help.

2

ON THE NATURE OF SUBJECTIVE ATTRIBUTES

INTRODUCTION

In Chapter 1 we have stated that in some instances consumers base their stated preferences on attributes that are subjective, in the sense that they are open to interpretation. Here we will look at the nature of subjective attributes. What is subjectivity, and how has it become important in consumer judgements? We will see that subjectivity has only come to play a role in consumer judgements with the rise of a romantic ethic in the late 18th and early 19th century. The resulting subjectivity in consumer judgements has been recognised by many theories that have been applied to the area of consumption. From this, it is argued that subjective product attributes (i.e. subjective attributes) can be characterised by two things: 1) consumers are thought to value them when in a more emotional, rather than rational state, and 2) the product attributes are abstract, rather than concrete.

A SHORT HISTORY OF THE PROBLEM OF SUBJECTIVITY

Subjectivity as a problem in philosophy

Take a subject (a person) who makes a judgement about some object (any other thing than that person). Now, subjectivity is that characteristic of a subject that makes it different from the objects over which it passes judgement. It is that aspect of the subject that cannot be reduced to its objective components. In this sense, subjectivity is thought of as residing in the "irreducibly subjective character of experience" (McClamrock, 1992, p. 177)¹¹. As Nagel (1979) puts it, "an organism has conscious mental states if and only if there is something it is like to be that organism - something it is like *for* the organism" (p. 166). Here Nagel gives us the example of the bat. Although we may know that bats navigate by using sonar, this, by itself, does not give us the information about what it is like to fly on sonar, how it feels for the bat to fly. This is not just because bats cannot speak and thus cannot tell us about their experiences. Husserl (1964) points this out in another example:

¹¹ This is not the same as to say that these aspects that make up subjectivity do not exist through such objective components. They may well do, but what McClamrock argues is that it is so close to impossible to find out how they do, that we should not bother.

A man born deaf knows that there are sounds, that sounds produce harmonies, and that a splendid art depends upon them. But he cannot understand *how* sounds do this, how musical compositions are possible. Such things he cannot imagine, i.e. he cannot "see" and in "seeing" grasp the how of such things.... (p. 4-5)

In Husserl's example, the deaf man may acquire all the knowledge there is about music, and also learn from the experiences of people who can hear the music, but all this information does not provide him with the information of what it is like to hear it. In essence, the argument is that people's experiences cannot be reduced to those constituent parts of the environment that initiate the experiences.

This argument can be traced back to the writings of Kant and the many German idealists and romantics who came after Kant (for an overview, see Bowie, 1990). Having discarded God's impact on the world, Kant placed the basis for our understanding of the world solely in ourselves, equating objective reality (nature) to the restricted intuitions of the subject. In Kant's earlier work (Kant, 1781/1970), these restricted intuitions need not be regarded as irreducibly subjective. Here it is possible to fully restate one's understanding in clear and distinct ideas about objective reality (Bowie, 1990). In Kant's later work (Kant, 1790/1987), however, it is argued that for some ideas, notably those that are aesthetic, this is not the case. Kant defines an aesthetic idea as:

That representation of the imagination which gives much to think about, but without any determinate thought, i.e. *concept* being able to be adequate to it, which consequently no language can completely attain and make comprehensible. (cited from Bowie, 1990, p.29).

Kant's work on aesthetics preceded the German idealists and romantics whose main interest became subjectivity and aesthetics. For the idealist, the task was to specify how such sublime and abstracted ideas of beauty could be related to our more clear and concrete ideas about objective reality. For example, Hegel's dialectics proposes that our ideas of objective reality are juxtaposed with our more abstract, aesthetic ideas, and that this is the starting point for our actions to create a new objective reality (see De Vries, 1988). For the romantic, however, the subjective experience of the sublime was all that was called for. In Bowie's words,

Early romanticism¹² acknowledges the indemonstrability of the sense of reality as a whole, but, ... cannot stop the endless attempt to grasp the infinite via a desire to see it in the sensuous. This expresses itself in 'longing', a notion that plays a major role in romantic philosophy and art. (p.43)

¹² Bowie distinguishes early German romanticism from later German romanticism, as advocated by nazi propaganda.

An example of this romantic ethic is Schlegel, who stated that "the feeling of the sublime must naturally arise for everyone who has really abstracted. Whoever has really thought the infinite can never again think of the finite" (cited from Bowie, 1990, p. 43). Romanticism started to have a pervasive influence on European societies in the 19th century, and this influence has not (yet) come to an end. Not least, it is thought to have played a major role in the patterns of people's consumption.

The romantic ethic of the consumer

In a most impressive book, entitled "the romantic ethic and the spirit of modern consumerism" Campbell (1987) shows how, next to a protestant work ethic (Weber, 1904/1976), a romantic, consumerist ethic evolved in Britain in the late 18th century. Unlike Germany, where the romantic tide was based on a philosophical debate among intellectuals, in Britain, romanticism evolved in the middle classes as a reaction to Christian ethics. Here the debate was based on the question of what pleasures were allowed for people.

On the one hand, a puritan doctrine existed that laid a stress on self-control, and only admitted 'rational recreation', i.e. only those pleasures that come about when serving a useful purpose. So, this doctrine did not prohibit acquisition of possessions, nor taking comfort in them, as long as these possessions served a purpose other than providing direct pleasure. As Campbell puts it, "Comfort but not comfort-luxury was the ideal" (p. 102). On the other hand, an alternative doctrine existed, that did allow people to experience strong direct emotions, and take direct pleasure from it. In its religious form, this doctrine is known as sentimentalism, and it started from the notion that our emotions (and thus our pleasures) can have a sign value, in that they signify the true believer. This allowed people to experience direct (rather than derived) emotions, and even exaggerate and cultivate them, since they could be regarded as something larger than life. While sentimentalism can be shown to have given a boost to the direct enjoyment of consumption, it had not given a proper legitimacy for it. This legitimisation only came about when our pleasures were not thought to have a sign value for the divine, but rather for our own spirits. Here, pleasure was detached from the objects that had brought about the pleasure. Instead, pleasures were considered as truly and irreducibly subjective, having no other contingency than the experience itself. This was advocated by the romantics, who stated that our pleasures sensitise us, and through this process make us better.

According to Campbell, the romantic ethic paved the way for an insatiable propensity in people to consume. New products (especially new art) were valued for their capacity to provide new sensations, and through this satisfy an insatiable want for ever more and newer sensations. In this way, the romantic ethic has not counteracted the protestant work ethic, but rather supplemented it. Where the protestant work ethic provides an explanation for the growing supply of goods during the industrial revolution (Weber, 1904/1976), the romantic, consumerist ethic can be held responsible for the increase in demand that preceded the industrial revolution and kept it alive.

These social rules for consumption that developed in the 18th century can be regarded as laying an economic foundation for modern societies. The principle that can be regarded as underlying modern consumption is that of subjective utility. Instead of laying the responsibility for our pleasures in the outside world, or with God, we have come to lay it within ourselves. However, following Campbell, the modern consumer has two options when dealing with his or her pleasures. First, there is the option of 'sense', the utilitarian option, where subjective utility is the rational, and predictable outcome of consumption. Secondly, there is the option of 'sensibility'¹³, the romantic option, where subjective utility is the emotional, and direct outcome of consumption. Although both options may be called subjective, it is only in the last option where subjectivity gives a problem of interpretation.

If subjective utility is a highly rational outcome of consumption, we must be able to locate it in some concrete objects that have (logically) led to the pleasure. If, however, subjective utility is a direct and emotional outcome of consumption, then, according to Kant, no explicit rule exists that can link concrete objects to subjective, and abstracted, utility. Because of this, in more recent times, subjectivity has come to be equated to the latter case (e.g. Köhler, 1947, p. 23). In the remainder of this thesis we will do the same. In essence, everything that consumers value can be regarded as 'subjective', and open to interpretation. However, we will speak about subjective judgements only in the case where it is not immediately clear how to interpret consumer response. In that case we do not know in what way consumer response relates to concrete product attributes over which no controversy exists. Likewise, we will speak of objective judgements when it is clear how to interpret them, and how they relate to the concrete aspects of a product.

As we have seen above, subjectivity has been specified with the help of two other distinctions. First, subjective judgements are emotional, rather than rational judgements, and second, subjective judgements are based on abstract, rather than concrete attributes of an object. For the remainder of the thesis, we will call a judgement emotional if it is based on the direct experience of an object (in our case, a product). We will call a judgement rational if it is based on the indirect, logical consequences of an object. In addition, abstract attributes are attributes that are hard to localise in a concrete object over which no controversy exists. Concrete attributes are attributes that can easily be localised in a concrete object over which no controversy exists. For the moment, these are our working definitions of emotionality and abstract attributes in consumer judgements. Later in this chapter we will explain how and why we have come to these definitions. But first we look at how they have played a role in the consumer's judgement of products.

¹³ The distinction between sense and sensibility is inspired by Jane Austen's book titled 'Sense and sensibility' (1811/1987).

Subjectivity in consumer behaviour

From Hirschman and Holbrook (1992) we can learn that theories about consumer behaviour have described both subjective and objective consumer judgements. However, we may add that most of them have not been adequate to both at the same time. First, the theories that have described the more objective consumer judgements. In Chapter 1, we have named a judgement objective, if it can be explained by concrete product attributes. Above, we have seen that this can be traced back to the utilitarian idea that pleasure should be derived logically from concrete attributes. The first theories to describe consumption on the basis of concrete product attributes, were of a behaviourist nature (for a review, see Kassarian, 1992). Behaviourist theories on consumption typically describe how consumers have come to learn which products to buy or not to buy. In behaviourism it is assumed that the consequences of our behaviour in a given situation will induce us to exert more (or less) of the behaviour when the situation arises again. This leads to discriminative learning, where some concrete parts of a situation (a product's attributes) are connected with certain consequences (pleasure or displeasure). Although we can say that, within the behaviourist framework, there is a rationale behind consumer behaviour that is based on concrete product attributes, we cannot speak of an objective consumer, whose judgements have led to the conclusive behaviour. This is because behaviourism postulates an automated mechanism that discards the role of consumer judgements. Because of this, behaviourism has been supplemented by cognitive theories about consumption, where more attention is being paid to the judgements that consumers make when deciding to use a product. Here, the behaviour is not explained by the consequences of past behaviours (as in behaviourism) but by the expected consequences of a product that consumers construct (Katona, 1951; Payne, Bettman & Johnson, 1992; Wilkie and Pessemier, 1973). While these theories on consumer behaviour supplement behaviourism, it is still assumed that the expected consequences are dependent on concrete product attributes¹⁴. Therefore, we can regard cognitive theories to be most appropriately applied to those instances where we would speak of objective consumer judgements.

Secondly, and in contrast, motivational and interpretive approaches to consumer behaviour have been more inclined to describe subjective consumer judgements. In Chapter 1, we have called the judgements subjective, if they cannot be explained by concrete attributes. Above we have seen that subjective judgements are based on the romantic experience of direct pleasure, which cannot be attributed to some concrete product part. Motivational and interpretive theories portray consumption either as being based on a personal motivation towards a product (the motivational approach) or a private understanding of it (the interpretive approach). Starting with the motivational approach to consumer judgements, we find that it has been mainly psycho-

¹⁴ This is in concordance with more general cognitive theories on which researchers in consumer behaviour have based their work. For the most part, according to these more general theorists, the concrete parts of a situation are thought to form the basis of cognition (e.g. Brunswick, 1943; Kelley, 1967; 1971; Rosenberg & Hovland, 1960, and later Anderson, 1983; Tversky, 1977)

analytic in nature (Dichter, 1967; Gardner & Levy, 1955)¹⁵. Here it is assumed that consumption is generally determined by motives of which the consumer is not conscious. These motives are instincts, notably a life instinct aimed at sexual pleasure and a death instinct aimed at aggression. Unconscious motives can lead consumers to take pleasure in products because they serve as replacements of the natural outlets of these instincts. As a consequence, the enjoyment of these products must be regarded as a direct emotional experience, unmediated by the consumer's rationality. It is through these explorations of the consumer's direct emotional consumption experiences that we conclude that the motivational approach is best applied to subjective consumer judgements.

More recently, a second approach to consumer judgements, and hence to consumer research, has come to the fore. This approach can best be described as interpretive, after Bergadaà (1991). Interpretive approaches depart from the phenomenological point of view that people construct their own realities (phenomena), depending on how they have interacted with their environment. Hence, the interpretive approach takes the individual experience of the consumer as a unique occurrence that is the starting point of all investigations into consumption. It aims to describe the experience of consumption in all its richness and variations (Hirschman, 1986; Hirschman & Holbrook, 1982; Levy, 1991). Amongst other things, this has led to a renewed interest in the symbolic character of attributes, which means that they are valued because of a connotation with a preferred state of being (Barthes, 1985; Hoshino, 1987). For example, consider two existing products for avoiding head injuries in car crashes, the airbag and Audi's Procon Ten system. It may well be that, although the systems are equally effective in avoiding head injuries, the airbag is most symbolic for the idea of a 'safe' car. That is, apart of performing its safeguarding function, the airbag also has a more symbolic (connotative) meaning to the consumer that corresponds with his or her idea of safety. Thus, the airbag is a part of the consumer's idea of safety that other, equally safe solutions, cannot reach¹⁶. Another focus of the proponents of the interpretive approach is the consumer's direct, hedonic experiences and the consumer's self. Many studies, notably by Belk (1988; 1989) have focused on the self and its role in creating experiences. As we have seen before, the idea of a creative self is a heavily romantic idea. It is difficult to see how such creative experiences, which are heavily dependent on the subject creating them, can be described in objective terms, i.e. the concrete attributes of the product. For this reason, Hirschman & Holbrook (1982) have argued that if consumer judgements of products are based on their direct, hedonic experiences, they are subjective and based on the more intangible, abstract attributes of the product.

¹⁵ For the most part, the application of psycho-analytic theory to the area of consumer research has been over-interpretive (Kassarjian, 1992). Although Hirschman and Holbrook (1992) have added that this is not necessarily the case, psycho-analytic market research practice that we know has not convinced us of the contrary.

¹⁶ Adapted from the original advertising slogan: "Heineken reaches parts that other beers cannot reach."

There are also approaches that have not followed the distinction between objective and subjective consumer judgements in the way we described above. These are the approaches that either aim to show how objective judgements are only objective in the sense that they create the illusion of being based on more concrete attributes or those that aim at describing how subjective judgements are dependent on concrete product attributes. To start with the first, some social philosophers (notably Foucault, 1988, p. 59-62, also reviewed by Karskens, 1986, p. 82-83 and Derrida, reviewed by Kamuf, 1991, p. 16) and psychologists (Billig, 1987, Potter & Wetherell, 1987, p. 92) are critical of the idea that the world is divided into objective facts on one hand and subjective judgements on the other. Carrying their argument to the area of consumption leads to a denial that concrete attributes are really different from abstract attributes. The argument is that concrete attributes merely have another social status than the more abstract ones. As a consequence, a concrete attribute would be thought of as being within a 'domain of agreed discourse' (Shaw & Gaines, 1984). This means that for such attributes, people agree on what they mean, and how they exist in reality. It can be argued then, that this agreement is enforced by those groups in society that seek to justify their actions by creating an illusion of rationality. Hence 'rational consumption', based on concrete attributes, can be regarded as an idea that is created by people as a means of justification. By claiming the concreteness of some attributes, and denying it for others, people can enforce consumption that is 'rational' and discard consumption that is 'emotional'. As a consequence, the distinction between rationality (based on concrete attributes) and emotionality (based on abstract attributes) in consumer judgements is considered more as a sociological artefact than as a fundamental aspect in consumer behaviour. Indeed, as Campbell (1987) has shown, the modernist idea of emotional versus rational consumption has a sociological base in the rise of the middle classes in the 18th century. These views are complemented by Welch (1987), who shows how utilitarianism was a civil response to the excessive consumption of aristocracy. However, this need not imply the relativist position that the distinction between rationality and emotionality in consumption is fully explained as a sociological construct (as was done by Bourdieu, 1980). It may well be that the concepts of emotionality and rationality do say something about the way consumers interact with products. Below we will address this issue under the heading 'emotional versus rational judgements'.

There is a second approach that fails to follow the maxim that is set by the distinction between objective and subjective judgements. This is the approach where it is assumed that even the most subjective judgements can be pinpointed to certain concrete product attributes. Examples of this approach can be found in consumer research on what constitutes the taste of food and drinks or catch our eyes' attention (for an overview, see Coren, Porac & Ward, 1978). Other examples of this approach can be found in experimental aesthetics, where it is assumed that the beauty of an artefact (in our case, a product) is dependent on certain concrete attributes (Berlyne, 1971; 1974). These approaches imply that the consumer's judgement of his or her sensations can be decomposed into their constituent parts. At first sight, one would regard this assumption as contradictory to the romanticist's idea that our creative

spirits (our 'selves' in Freudian terms) can abstract some quality of a product that is larger than its constituent parts. However, the romantic position is not so much to forbid the decomposition of a consumer's judgement, but instead, to regard the attempt as limited. This is because the techniques that are used in these approaches have focused on direct sensations that constitute the consumer's experiences - not on how these sensations acquire subjective meaning. In its most reductionist form, however, this view does constitute a grave assault to the romanticist view on subjective consumer judgements, since it is assumed that, even though consumers can abstract some higher quality of a product that has some meaning for them, these abstract product attributes can ultimately be 'explained' by a set of concrete product features¹⁷. Thus, abstract product attributes constitute the following problem: can they or can they not be decomposed into concrete product attributes? Below we will address this issue under the heading of 'abstract versus concrete attributes'.

To resume, we have looked at the history of the debate about subjectivity in consumer judgements. It is argued that the debate has its roots in modernism, both in a philosophical and socio-economic sense. From this we can learn that typically, subjective consumer judgements have been juxtaposed with more objective consumer judgements. Subjective judgements are considered to be dependent on the consumer's emotional experience of the product which can only be described in abstract product attributes. Objective consumer judgements, on the other hand, are considered to be dependent on the consumer's more rational decisions, based on the product's more concrete attributes. Recently, the distinction between subjective and objective consumer judgements has been much criticised. This criticism has either come from the relativist position that all consumer judgements are in some way self serving and thus equally subjective, or, in contrast, from the realist position that all consumer judgements are based on sensory input and thus equally objective. Therefore, if subjective judgements are truly different from objective judgements, then the distinction must be based not solely on the consumer, nor on the product, but on the way that the two interact. It is from such an interactionist viewpoint that we now consider the two aspects on which subjective judgements can be distinguished from objective judgements.

THE NATURE OF SUBJECTIVE CONSUMER JUDGEMENTS

Emotionality versus rationality

Consider first, the rational aspect of consumer judgements, which in the remainder of this thesis we will call 'thinking'. A very common idea about this aspect of consumer-product interactions is that it fits into a conscious planning mechanism

¹⁷ Attempts have been made to completely decompose subjective meaning into objective parts. Notably this has been done by a group of 'radical behaviourists' (Bem, 1972; Skinner, 1957), and later by a group of 'connectionists' (Harnad, 1987; 1990).

(Bridgeman, 1992). That is, when consumers consider a product, they do this with the possible future consequences of that product in mind. On the basis of certain logical arguments consumers build their expectations of what the future will bring them. This process is being made explicit in expectancy value models for decision making. For example, the theory of reasoned action of Ajzen & Fishbein (1980), and Weiner's version of attribution theory (Weiner, 1980) are both elaborations of the idea that people act on the basis of their expectations.

Often, an alternative system is proposed, where interactions are not based on the expected logical consequences of a product, but on the product as it exists in the here and now. That is, more or less automatically, bodily reactions make us value the direct experience of a situation over its logical consequences. Here, of course, we are referring to emotions, and there are several theories to suggest that emotions are directed at present, rather than future experience. For example, Frijda (1988, p. 4) defines emotions in terms of people's appraisal of the situation, and stresses its non-instrumental aspects. Gestalt-theoretical accounts of emotion (Van Buchem, 1983, p. 39; 1984) state that emotions are intentional, and stress that they are aimed at direct contact with the present environment. Finally, Sartre (1939/1987, p. 91) explicitly states that logical expectations are put aside when one is in an emotional state.

A further reason to explain the difference between rationality and emotionality in terms of people's temporal perspective can be found in evolutionary theory. The planning mechanism that allows people to have 'rational foresight' is thought to be an exclusively higher mental process, dependent on language, which is, in evolutionary terms only a very recent phenomenon (Lea, 1984; 1994). Emotions, on the other hand, are generally thought to be operative at all levels at which people process information (Izard, 1993), even before the information is recognised as a stimulus (Matlin, 1971; Moreland & Zajonc, 1979).

The emotion theories mentioned above mainly refer to emotions that are so strong that they completely overwhelm people. Within a consumer setting, however, emotions mostly exist on a much weaker level and are often instigated and cultivated by the consumer him- or herself (Belk, Wallendorf & Sherry, 1991; Hirschman & Holbrook, 1982). In addition, a lot of consumer sentiment is explained in terms of a longing for past and future experiences, rather than present ones (for nostalgia, see Belk, 1991; Holbrook, 1991; 1993, for daydreaming about the future, see Campbell, 1987, p. 89). This poses a problem for our distinction between rationality and emotionality. If emotions can also be about future experiences, how can they be different from rational decision making?

Here we enter the discussion of whether self-induced and weak emotions are or are not fully derived from more rational, cognitive elaborations. For clarification, consider first Zajonc and Markus (1984), who propose that emotions can be thought of in three different ways. First, there are two 'hard' observable aspects of emotions: arousal, which is defined in physiological terms, and expression, which is defined in terms of people's overt behaviour. A third, 'internal', representation of emotion exists, which is our experience of them. Within this model, a distinction can be made between strong and weak emotions. Strong emotions would start at the arousal or expression

level and work their way up to people's experience of emotions. In contrast, emotions can also start from experience, and through fantasies arouse us, and through communication make us express our feelings. These 'weaker' emotions may be based on consumers' conscious decisions, but they are still emotions. They are not aimed at future experiences that are the logical consequence of planned actions, but at future experiences as an image or fantasy to dream about now. For example, we can decide to go to a film to be entertained. The film will be a future experience about which we can fantasise in advance, and trailers of the film may persuade us to go and see it. However, it is only during the film that we can be sure that the fantasised experience is the same as the real experience of the film. This is because the value of the experience is direct, it cannot logically be inferred from fantasy.

Thus, if a consumer acts on the basis of outcomes that can logically be expected in the future, he or she is rational. If a consumer acts on the basis of an outcome that has direct value for him or her, the consumer's actions can be seen as emotional. Therefore, we can maintain that emotions are still different from expectancy value models, because they are not aimed at possible future events, but factual present ones.

Abstract versus concrete attributes

Previously, we have defined an attribute as a quality (or value) that is attributed to a product. This means that in consumer research, attributes exist as verbal descriptions. Now when looking at the distinction between abstract and concrete attributes, we will have to look at what it is that makes one verbal description different from another. For this, we need some theory about word meaning.

Theories on the difference between abstract and concrete words are dependent on how they both relate to someone's perceptual knowledge. In Paivio's 'Dual Coding Theory' (Paivio, 1975; 1978), it is assumed that the verbal knowledge that someone has of a product (the attributes) is stored in his or her memory in a different way than the perceptual knowledge of the product, by which is meant the imagery that the product can evoke¹⁸. From this, it is argued that when people need the aid of imagery to get to the meaning of a word, they can do this more easily with concrete words, "being the attributes of things", than with abstract words, "being the attributes of language" (Paivio, 1991, p. 232). In dual coding theory, concrete words are thought to be closer to imagery than abstract words. That is why one can find the following experimental effects:

1. Concrete words are easier to imagine than abstract words (Paivio, 1971; Paivio, Yuille & Madigan, 1968). People were asked to rate a word for its capacity to elicit a mental picture, a sound or another sensory picture, which constituted the imagery score of that word. They were also asked to rate the same word on concrete-

¹⁸ Although in the practice of research, dual coding theory has dealt exclusively with the relation between words and visual imagery, it is generally assumed that it applies in much the same way to other modes of perception (hearing, tasting, feeling and smelling).

ness, and it showed that words with a high imagery score also had high concreteness scores.

2. Concrete words are more easily remembered than abstract words (Paivio 1971; 1978), which is true no matter whether tasks deal with short or long term memory, recall, or recognition (McKelvie & Demers, 1979). This suggests that people can use imagery to get to the meaning of a word, which would be more effective for concrete words than for abstract words.
3. It takes people longer to decide which of a pair of abstract words is more pleasant than it does for a pair of concrete words, with a pair of pictures taking the least time. In the same experiment it is shown that there are individual differences in how long it takes to decide which one of a pair is more pleasant. (Paivio, 1991) Different groups of subjects were compared both on their verbal and imagery abilities. It is shown that the reaction times of the pleasantness ratings are the longest for the group of subjects with a low imagery ability, regardless of their verbal ability. However, for the group of subjects with high imagery ability, reaction times were significantly lower for subjects with a high verbal ability than for subjects with a low verbal ability. First, this effect suggests that high imagery abilities affect accessibility to affective judgements the most, and only after, do high verbal abilities take effect. This is in favour of dual coding theory, which postulates two distinct memory systems, one based on imagery, the other based on words. Another conclusion that can be drawn from this is that affective judgements can be more directly given for pictures than for words, and, within words, more directly for concrete than for abstract words. These findings suggest that affective information is represented in the imagery system of memory, something we will return to later in this chapter.

Recently, a competing theory on the difference between concrete and abstract attributes has come up. This 'Context Availability Theory' (after Kieras, 1978; Schwanenflugel & Shoben, 1983) states that abstract attributes are not further away from imagery, but instead they are only more context dependent. This means that the information from prior knowledge that is associated with an abstract word is cued to a more variable context (i.e. a more variable situation of use). According to this theory, it is not a lack of imagery, but a lack of availability of an association with a proper usage situation that causes the concreteness effects found in Paivio's studies. To demonstrate this discrepancy, context availability theory has outperformed dual coding theory on a list of additional findings:

4. Concreteness ratings are positively correlated with context availability ratings and negatively with the rated number of contexts to which a word can apply (Schwanenflugel & Shoben, 1983).
5. The difference in reading time between abstract and concrete sentences (with abstract sentences taking longer) disappears when the sentences are placed in paragraphs (Schwanenflugel & Shoben, 1983) that meaningfully situate the sentence (Wattenmaker & Shoben, 1987). The same effect can be found for

words that are meaningfully situated by placing them in a sentence. Here, the time that people need to decide that a word is really a word that they know (like 'house') and not a nonsense word (like 'vouse') is measured. It is shown that a difference in this 'lexical decision time' between abstract and concrete words exists when the words are presented in isolation, but that it disappears when the words are placed in a sentence (Schwanenflugel & Shoben, 1983). In addition, context availability is found to be a better predictor of these concreteness effects than imagery (Schwanenflugel, Akin, & Luh, 1992).

6. It takes longer to identify a picture of an object as an example of an abstract word than as an example of a concrete word. However when the picture displays the object in a meaningful situation, then the difference in identification times disappears (Murphy, 1991; Murphy & Wisniewski, 1989).

These findings show that, when placed in their proper context, abstract words are as easy to understand as concrete words. The findings also show how abstract words are more subjective than concrete words. Since the situations to which words are applicable are learned during an individual's personal development, they must start off as a very idiosyncratic bunch of situations. Words, however, put social restrictions on our understanding of the world (after Vygotsky, 1934/1986). The more restrictions that a word puts on the situations to which it is applicable, the less room is left for the subjectivity of the meaning of the word. Since concrete words are the most restricted, they can be regarded as the least subjective¹⁹. Although the meaning of some abstract words can be restricted by rules, in most cases abstract words leave more space to communicate a subjective understanding of the world around us. Thus, in some instances we may well relate abstract words to more concrete words, but in other cases, an abstract word can describe an aspect of a situation that cannot be caught by elements in that situation for which we have concrete words.

In the setting of consumer research, less attention has been paid to the distinction between abstract and concrete attributes. Although there has been much debate on the nature of abstract product attributes (for a review, see Johnson & Fornell, 1987) there has been little research on how abstract attributes are different from concrete attributes. Johnson, (1984) has shown that the less comparable two products are, the more abstract the attributes are on which the products are compared. Although Johnson has interpreted this result in terms of abstract attributes including several concrete attributes, his findings can also be explained by context availability theory (Schwanenflugel, Akin & Luh, 1992). Abstract attributes can be seen as referring to a much wider context, thereby making it easier to compare products that have a more distinct usage situation.

¹⁹ An exception to this is when concrete words are used metaphorically, in which case they can be applied to a more variable situation of use (e.g. a telephone rang so often that it was red hot). But metaphors require that a word is understood as *if* it is another word, not as the word itself. So in our example the telephone could have been white, but it was as *if* it was red. It is because the word is concrete that we need to give it an *as if* status when we want to apply it in another setting. For abstract attributes this is not the case. For example, we cannot say 'a telephone as *if* it is gloomy', the telephone is either gloomy or it is not gloomy, it cannot be as *if* it is gloomy.

Emotionality and abstract attributes as components of subjectivity

Up until now we have discussed emotionality and abstract product attributes as two separate aspects of subjectivity. Below we will consider possible relations between the two. Although it is widely believed that emotionality and abstract product attributes are related in that they both constitute subjective behaviour (e.g. Hirschman & Holbrook, 1982; Zajonc, 1980), we find two inconsistencies in this belief.

The first inconsistency is that some abstract attributes can be thought of as rational conclusions, fully derived from more concrete attributes. For example, the abstract attribute 'dairy' as in 'dairy-product' is fully derived from two more concrete attributes: 'is milk based' or 'eggs'. Another example, the abstract attribute 'vegan' as in 'vegan cheese' is the logical conclusion of all things that have *not* the more concrete attributes: 'made from animals' and 'made from animal products'. This raises the point that abstract words can sometimes be fully understood by rules, like the disjunction and the conjunction rules in the examples above, and these rules explain an abstract word as a combination of more concrete ones. Such examples are clearly in line with dual coding theory (Paivio, 1975; 1978), where it was implied that abstract words are sub-summations of more concrete words. However, in context availability theory (Kieras, 1978; Schwanenflugel & Shoben, 1983) it is implied that both abstract and concrete words can be 'first order' conceptual categories, direct derivations of our perceptions or indeed of our imagery, once there is clarity about the situation to which an abstract attribute applies. So, instead of abstract words being 'superordinate', and inclusive of concrete words (after Rosch, 1975; Rosch, Mervis, Gray, Johnson & Boyes-Braem, 1976), we can best think of abstract words as more polymorphous, and applying to a more variable situation of use (after Hampton, 1981; Ryle, 1949). Although we may think of rules that describe how a concrete word with a very restricted usage situation (e.g. hamburger) is subsumed under an abstract word with a very wide usage situation (e.g. food), it is not the rule that makes a word abstract²⁰. Indeed, only a small proportion of abstract words (mostly noun categories and/or words used for scientific purposes) can be thought of as strict summations of more concrete words.

The second inconsistency is that both emotionality and concrete attributes are linked with visual information and imagery. This, then, points to a link between emotionality and concrete attributes - not emotionality and abstract attributes. The confusion is caused by the fact that most literature on how consumers deal with visual information and imagery has followed Paivio's dual coding theory. By doing so, the main focus has been on the difference between visual and verbal information processing of consumers. In dual coding theory, both emotionality and concrete words are linked closest to imagery. Let us then consider the evidence for the two proposed links.

²⁰ In natural language development, we can see that relations between words (among others inclusion) is in the first instance assessed through a thematic coexistence of the words (for example, dogs are related to leashes because they are often seen together during one event). Taxonomic rules, on the basis of which abstract words can subsume concrete words, are learned only later (Markman & Callanan, 1984).

First the link between emotionality and imagery. As well as the effects reported above when discussing dual coding theory, we find additional evidence for this link in consumer research. Pictorial advertising material is both better remembered (Rossiter & Percy, 1983; Starch, 1966) and more persuasive (Mitchell & Olson, 1981; Rossiter & Percy, 1978) than verbal advertising material. Also, pictures of products are judged in a different way than verbal descriptions of the same products. However, it is found that these differences are dependent on the kind of product that is being evaluated by consumers. In the case of sweaters, Holbrook and Moore (1981) showed that pictorial product information is evaluated on the basis of a larger number of product attributes than verbal information. In the case of watches, however, Domzal and Unger (1985) showed that pictorial information, in comparison to verbal information, is evaluated on the basis of a smaller number of both attributes and attribute interactions. Domzal and Unger conclude that their findings diverge from those of Holbrook and Moore because of the more functional nature of watches in comparison to the more emotional nature of sweaters. Thus, while verbal information suffices for consumers when assessing the merits of functional products like watches, it may not be enough when assessing the aesthetic and emotional qualities of products like sweaters. This reasoning is in line both with Paivio's finding that imagery is more associated with emotions, and with the contention of classical aesthetics that the beauty of an object is dependent on the object's form (which can best be represented pictorially) and not on its functioning (which can best be represented verbally). This proposed link between imagery and emotions is suggested throughout literature, and has its roots both in brain lateralisation research (e.g. Hansen, 1981; Mittal, 1987), and in the fact that both imagery and emotion are thought to have a more direct link with sensation (Hirschman & Holbrook, 1982; Rossiter & Percy 1978; 1983).

However, when considering the proposed link between imagery and concrete attributes, we see that dual coding theory is less convincing. Reconsidering the evidence provided by context availability theory (notably by Murphy & Wisniewski, 1989), we can see that concrete attributes do not have a more exclusive relation with imagery than abstract attributes. Instead, the difference between concrete and abstract attributes is that concrete attributes can more easily be linked with the separate *objects* in a situation, while abstract attributes are more dependent on the *situation* in which these objects are positioned. Since we can have an image of a situation as well as an image of an object in that situation, there is no reason to believe in the implied link between imagery and concrete attributes and thus between emotions and concrete attributes.

Finally, when considering the literature where the link between abstract attributes and emotionality is directly researched, one can find that most typically, emotionality is linked with abstract word meaning. For example, when looking at the distinction between preference and similarity judgements, Lefkoff-Hagius and Mason (1990; 1993) found that abstract attributes are of a more evaluative nature than concrete attributes²¹. They found that abstract attributes received relatively more weight in preference judgements, while concrete attributes were given relatively more weight in similarity judgements. This is not what one would expect from Paivio's finding that

affective judgements are more quickly given for imagery and concrete words than for abstract words. Apparently, the importance of abstract attributes is not connected to the speed with which they come to mind. In fact, the findings of Lefkoff-Hagius and Mason are supported by research that has specifically looked into the relation between the use of abstract attributes and the role of emotions. One study by Claeys, Swinnen and Vanden Abeele (1990) reports higher instances of abstract and self referent attributes for consumers who have stated that their product choice is more emotional than for consumers who consider themselves rational. This is confirmed by a study of Schoormans, Van der Meer and Kessener (1991) where it was found that abstract attributes are more important for products that are typically bought for emotional reasons than for products that are typically bought for rational reasons.

On the basis of these findings we conclude that abstract product attributes are more likely to be associated with the emotional content of consumer judgements. However, we have only showed that the two normally coexist-exist. It remains to be seen whether they necessarily do so, and that both are necessary conditions for a judgement to be called subjective. For this, we need to consider how subjectivity in consumer judgements comes about. On the basis of that, we can formulate some hypotheses through which we can test the views expressed in this chapter.

²¹ The two papers by Lefkoff-Hagius and Mason report on two similar studies. In the first report (Lefkoff-Hagius & Mason, 1990) the concrete-abstract distinction is made in Hirschman's (1980) terms of tangible versus intangible attributes. In their second report (Lefkoff-Hagius & Mason, 1993) this distinction is renamed in characteristic attributes versus beneficial and image attributes, after Myers and Shocker (1981).

3

HOW SUBJECTIVITY COMES ABOUT IN CONSUMER JUDGEMENTS

INTRODUCTION

In the previous chapter we have seen that subjectivity in consumer judgments can be looked at as a problem of emotional product interactions and a problem of the use of abstract product attributes. We have also examined the way in which emotional judgements are different from rational ones, and how abstract product attributes are different from concrete attributes. In this chapter we will briefly consider a model that describes how emotionality and abstract product attributes come about in consumer judgements. We will look at emotionality and abstract attributes as two aspects of consumer behaviour. We will consider the possible causes of each and the possible relation between the two. On the basis of this, we will present a number of propositions about the role of emotionality and abstract product attributes in the model.

A MODEL OF CONSUMER BEHAVIOUR

Most models of consumer behaviour assume that the behaviour is contingent upon changes in the economic environment that surrounds the consumer. Between such 'contingency models' of behaviour, we can make a distinction between two different types: radical behaviourist models and cognitive models. The first type, radical behaviourist models depart from the idea of direct contingency, with the behaviour being directly contingent upon changes in reality. These models are also known as stimulus-response (S-R) models, with economic stimuli influencing consumer response. The second type of contingency models, the cognitivist models, allow for a better explanation of consumer behaviour by admitting mental phenomena (like motivation, perception and thought) to mediate between economic reality and consumer behaviour. Cognitivist models are also known as stimulus-organism-response (S-O-R) models, with economic stimuli being mentally processed by the organism (the consumer), thereby mediating the contingent response (the behaviour).

Both S-R and S-O-R models of behaviour can be called realist, in that ultimately, all consumer behaviour is based on changes in reality (i.e. the stimuli). Mental phenomena are only allowed in a model if the direct S-R model of behaviour fails to give a sufficient account of the behaviour. Thus, in realist models, the contingency of behaviour upon reality is the basis for understanding behaviour, and ultimately, explaining it.

Apart from the realist models, there are also mentalist models of consumer behaviour. In this view, mental phenomena have been put forward as an explanation for consumer behaviour, without making it clear how these phenomena are intermediates between economic stimuli and their contingent response²². In such cases, it is impossible to maintain that the behaviour is contingent upon mental phenomena. This is because such mental phenomena can only be understood in terms of the behaviour that they are supposed to explain (or alternatively, the behaviour can only be understood in terms of the mental phenomena that are supposed to cause it). This creates the risk that mentalist accounts of behaviour are tautological. Consumer behaviour is explained by mental phenomena, which themselves can only be explained in terms of the behaviour. It is because of this, that such mentalist accounts of behaviour deserve the neglect they often receive.

However, S-R and S-O-R models of consumer behaviour have flaws as well. The problem with these models lies in their view about what constitutes a stimulus. If both mental phenomena and behaviour are contingent upon reality, then so must people's reflections of reality be. This leads to the conclusion that consumers (or people in general) can define stimuli solely on the basis of their contingent behaviour. However, since S-R and S-O-R models assume that the existence of stimuli is independent from the contingent behaviours, it is unclear how this should happen. The conclusion is that there cannot be stimuli without a motivated organism to create them. So here we will assume the more naturalist position (after Papineau, 1993; Snowden, 1987; Stevenson, 1993) that both stimuli and their contingent responses arise out of an organism that interacts with its environment. The starting point in this model is the motivated organism which creates the stimuli to which there can be a contingent response. Thus, we need to start looking at behaviour as motivated in the first place, and only contingent in the second. We will call this standpoint an O-S-R model of consumer behaviour, with O being the motivated organism, S the perceived economic stimulus, and R as the conclusive consumer judgement. An O-S-R model can still be called realist, only here reality is viewed as an intentional system of values, rather than a formal system of stimuli. Note however, that this standpoint is not treated here as a theory under investigation, but rather as an assumption from which to depart when investigating subjectivity in consumer judgements²³.

Coming back to the problem of subjectivity in consumer judgements, how do these three stages in a behavioural process lead to emotional and abstract verbal behaviour? We will describe the motivated organism under the heading of motivation, the perceived economic stimulus under the heading of stimulus perception, and the consumer behaviour under the heading of categorical judgement. The reason for these names will be clarified below.

²² As we have seen in the previous chapter, there is a whole - romantic - school of thought, which has made a case for studying mental phenomena in cases when their position between reality and contingent behaviour is not clear.

²³ For a more explicit explanation of the distinction between SOR and OSR models, see Pieters (1993) and Snelders and Lea (1995).

Motivation

In the behavioural model that is described above, motivation is in the first place a logical assumption. However, the idea of a motivated organism can also be given some ecological validity. In ecological terms, motivation is defined here simply as the tendency of living organisms towards self-sustenance and replication (after Dawkins, 1976). It is therefore not a mental construct, that can arise solely in a conscious being, but something that separates all living bodies from non-living bodies. The way for the organism to achieve self-sustenance and replication is to behave in such a way that it has control over the resources in its environment. Motivation can also have a special target. For example, a motivation to assimilate positive resources is generally thought to be distinct from a motivation to avoid negative outcomes (Alderfer, 1969; Herzberg, 1966; Maslow, 1954). Also, a motivation to control resources for which there is heavy social competition may operate differently from a motivation to control a socially irrelevant resource (Adams, 1963; Snelders & Lea, 1995). A last example is that a motivation to control direct resources may be different from a motivation to control expected resources (Deci, 1975; Deci & Ryan, 1985; Vroom, 1964). Here the first (a motivation to control direct resources) is often regarded as interruptive of the second (a motivation to control expected resources) (Bettman, 1979; Simon, 1967). It is within the last example that we will discuss the role of emotions. In the previous chapter we have stated that emotions are more directed at things that give direct pleasure, instead of a postponed pleasure that is rationally expected. Throughout, however, the reader should keep in mind that all motivations must be considered as special cases of a motivation to control resources in the environment.

Returning to the problem of subjective consumer judgements, we can see how a motivation to control outcomes can motivate the consumer to attain outcomes with a direct and present value, rather than outcomes that are the logical consequence of a present situation (i.e. logically inferred outcomes). In the previous chapter, we have used this distinction to explain how emotionality is different from rationality. Here we can see how this distinction is a motivational one: emotional behaviour is targeted at the control of direct resources, while rational behaviour is targeted at the control of resources that are the logical consequence of the present situation.

Stimulus perception

If people are motivated to control the resources in their environment, they must be able to identify those interactions with their environment that lead to sufficient control over those resources. This means that people must have learned to associate distinct configurations in their sensory input with distinct behavioural patterns that enhance the control. Therefore, a stimulus is regarded here as a distinct configuration in one's sensory input. Note that such a configuration is not just a static image on our retina. As Gibson (1979) has noted, perception is a dynamic act, and the invariant information in our sensory input can also exist in a more complex way. For example, an invariant algorithm can describe how certain gradients change on a rotating object. In

addition, we subscribe to the Gibsonian idea that stimuli exist as affordances, which means that they only exist to be acted on. This is in line with the viewpoint expressed above, namely that stimuli are created by organisms for control over their environments. This is important in that perception may well change when our specific form of motivation changes.

Another focal point in Gibsonian thought, that of direct perception, we do not subscribe to. Perception may well be direct in that our awareness of stimuli in the environment is functionally equivalent to the invariant information that exists in the environment. However, this does not mean that perception is not hardwired, in that it can be viewed as a process of connected neurons, actively adapting to changes in sensory input (Ullman, 1980). By doing so, these neurons are *creating* the awareness, and such awareness can only be regarded as a symbolic reconstruction of the environment, i.e. an indirect, in-between phenomenon (Gordon, 1989, p. 195). Maintaining the idea of direct perception is in disregard of the intricate activities of our neural architecture to construct stimuli that are symbolic representations of invariants in the environment.

This symbolic character of stimuli becomes even more important when we consider the role of perception in people's reasoning. Although stimuli must in the first place always describe some invariant instance in our sensory input (Harnad, 1987), if they are to play a part in people's reasoning, they must be grouped into categories of roughly equivalent stimuli (Harnad, 1990)²⁴. Such categories mean that we can think about our sensory input in symbolic terms. This allows us to use concepts, and, as such, it forms the basis of our reasoned action.

When considering the role of perception in subjective consumer judgements, we can make two points. The first point is that we can see how the idea of complex invariant detection can be the mechanism on which abstract product attributes are based. In the previous chapter we have pointed out that abstract attributes should not be considered as derivatives of more concrete attributes, but instead, that they have the same status as concrete attributes. The difference would lie only in that abstract attributes have a more variable situation of use. Because of this, abstract attributes, having the same status as concrete attributes, must exist as invariants in our sensory input. The only difference is that abstract attributes refer to invariants of a more variant environment, i.e. they are more complex than concrete attributes.

Stating that abstract attributes can be perceived, instead of inferred, is a problem when one thinks of these invariants as solid objects that project closed blocks of light rays on our retina. For example, it is difficult to think of one such solid object that makes a product 'art deco'. However, when we consider all the Gibsonian examples of more complex invariants in our sensory input, we can see that this is not a problem

²⁴ It is quite impossible for people to remember every single input from their environment (see Solso's (1991) criticism on isomorphism). In addition, as we have argued earlier, what we are motivated to recognise from our environment is only as distinct as the behaviour pattern that it calls for. For example, we talk about our particular dog, chasing a general sheep. This is because we have a distinct behavioural repertoire for this particular dog, while we probably treat all sheep in much the same manner.

at all. Thus, we may identify an object as 'art deco', because there is a constellation of ellipsoids in our sensory input. These ellipsoids, however, need not exist as separate concrete parts of the object. Indeed, the ellipsoids may well be present in other, quite different situations with other objects in it. This suggests that the invariant information is less tied to objects, but more to aspects of the complete sensory input of the consumer. As long as it is invariantly present in an ellipsoid environment, we may call it art deco. This is not because we can infer the abstract attribute from the existence of other, less complex invariants in our sensory input, but because we can actually perceive 'art deco' as a complex invariant in our sensory input²⁵. It is this complexity that means that abstract attributes are more widely applicable and thus more subjective. For example, if a consumer states a preference for 'art deco', we are not sure whether he or she is talking about furniture, paintings, buildings or jewelry. Just as we described in Chapter 2, the abstract term has a much wider situation of use²⁶.

In the previous chapter, we have also seen that there is the suggestion of a link between being emotional and using abstract attributes. This means that there must also be a link between a motivation towards direct resources (emotionality) and the perception of complex invariants (abstract attributes). Such a link is not an evident one, but as literature suggests that there should be one, we can speculate as follows: suppose that the consumer is emotional, and motivated to attain direct resources in his or her environment. In that case, there is no reason for the consumer to consider a present situation as a distinct set of possible causes or indicators of logically expected resources. Therefore, there is no reason for a consumer to make such a strict distinction between invariants in one's sensory input that are possible causes of future resources and invariants that are not possible causes. Here, we speculate that what we can regard as possible causes are the least complex invariants, and most tied to fixed objects (in our case, the product). This is because it is easier to have expectations about fixed objects in future situations, than to have expectation about complex invariants in future situations. For example, we can expect that a chair in a 19th century art-deco house in Brussels will still be a chair in a 17th century canal house in Amsterdam and that we will still be able to sit on it. However, we would have a lot more trouble to predict that the chair would still be recognized as art deco if we took it to Amsterdam and that we could use its art deco-ness as something to boast about. For these more complex invariants that are dependent on the object's environment (the situation in which the product is portrayed), it will be more difficult to assess which logical consequences can be attached to them. For this reason, they will probably play a bigger role when the consumer is emotional, and not interested in logical consequences. Previously, we have said that abstract attributes are more complex and less

²⁵ Of course, we first have to learn from other people which invariant information is linked to the word 'art deco' and how and when it can be used.

²⁶ We cannot even know which exact product part a consumer is talking about, even if it is clear which product it is about. For example, if it is about jewelry: the art deco-ness of a piece of jewelry can reflect on the same complex invariant as there is in an art deco chair, while no precious metals or stones that are present in the jewel need be present in the chair.

tied to objects than are concrete attributes. We can speculate then that abstract attributes will be used more when one is in an emotional state.

Categorical judgements

We start here from the standpoint that consumer judgements are the result of formal reasoning. This is not because we believe that all judgements are based on formal reasoning (for counter-examples, see Beach, 1990), but because in the practice of consumer research we can only say something about those judgements that are communicated. Such communicated judgements are linguistic achievements, which can best be thought of as taking the form of conclusions on the basis of an argument. That is, these conclusions exist to convince oneself or others about what the logical consequences of a situation are (Billig, 1987). In evolutionary terms, we can think of such conclusions as expectations that allow people to make use of their rational foresight and plan ahead (Bridgeman, 1992). That is, people can construct logical consequences of a present situation on the basis of arguments.

Even though the logic employed in such arguments is sometimes far-fetched, the general form of such human reasoning is "if I value X, then I choose Y" (Simon, 1983). Of course, we can restate this general form in many specific ways. For example, we can learn from Aristotle that people can set up deductive, inductive and associative arguments (Lloyd, 1968). Another example is that if people value several things: their choices can be regarded as a sum of values; their choices can be compensated by what they value negatively; they can have one value overrule other values, and so forth (for an extensive overview, see Bettman, 1979).

As we have said before, these logical arguments exist as communications²⁷. As such, most of them will already be well known to people and not very original. Hence, it is more a matter of relating to known arguments than thinking of new arguments when someone passes a judgement. Yet, when passing judgement, people need not all relate to the same arguments in the same way. They can disagree amongst each other to very large extents. The reason for this must be sought at the premises of the arguments, i.e. what people postulate as the stimuli and values on which their judgements are based. In the case of consumers, we can think of such postulated stimuli as the attributes of the product. For example, one consumer can say that he or she prefers product Y, because it has the attribute X, and X leads to the satisfaction of value Z.

It is for this reason that we can say that consumer judgements are categorical. As the consumer categorizes something as a certain kind of product (after Lakoff, 1972), certain attributes can be recognized as present in the product, and from this it can be inferred that the product belongs to a group of things that one (according to some rule) likes or dislikes. Thus, categorization gives the product a conceptual identity and consumers can then employ an argument on the basis of which the product will be

²⁷ Even our conscious thought can be thought of as communication, in the form of inner speech (after Vygotsky, 1934/1986).

liked or disliked. Therefore, if a consumer passes judgement on a product, we can think of it as a process of categorization and logic: sensory input is categorized, and on the basis of the conceptual identity of the category, the consumer postulates attributes in the product, and this leads, by some inferential rule, to the conclusion that the product will or will not perform a certain desired function.

Note that with some product-interactions, the consumer will not bother employing an argument, but instead will act directly on the basis of categorization. For example, this is found to be the case if the product is exactly what one expected, and/or one has little knowledge or care about the product (Sujan, 1985a). In addition, some arguments that the consumer uses have been considered as post hoc justifications. That is, the argument arises only after the consumer has acted, and as such, has had no influence on the consumer's actions (e.g. Zajonc, 1984). This is thought to be the case when the consumer is in an emotional state. Thus, what we can say is that some arguments do not have a function in the planning process of consumers, in that they are not directed at logical expectations but at present findings. Here we argue that this is the case with emotional judgements.

This last point may seem contradictory to what was said before, namely that the function of arguments is to have rational foresight of future resources. In this sense, emotional arguments, which do not have a role in creating rational expectations, can be regarded as demand artifacts. That is, the only reason that the argument exists is for us to justify our judgements. We can easily think of occasions where one is asked to justify one's judgements, not in the least when conducting consumer research. This, however, is not to say that the emotional consumer arguments lack in validity. The fact that the argument does not serve to build expectations does not mean that it is nonsensical. The argument may still give a full and true account of the judgement. What we can say, however, is that the arguments that the consumer verbalizes do not have added value over what the consumer has perceived in a present situation. That is, if a consumer is emotional, his or her judgement on a product is solely based on perceptual information, not on the logical inferences that can be verbalized in an argument.

When looking at the role of abstract attributes in categorical judgements, we can argue as follows. In essence, abstract attributes do not play a different role in categorical judgements than concrete attributes. Since abstract attributes need not be inferred from more concrete attributes, they can be thought of as premises in logical arguments in much the same way as concrete attributes. However, having established how abstract attributes are abstract, in the sense that they describe complex invariants in sensory input that are not tied to fixed objects, we can see how judgements based on abstract attributes are more difficult to understand. Because abstract attributes are more complex, they cannot be communicated as straightforwardly as concrete attributes. Instead, when they are used in an argument, we need to know in what exact way the attribute reflects an invariant feature of someone's sensory input. How does the abstract attribute reflect on a figure out of a background of noise? As we have argued above, abstract attributes have a more variable situation of use. This means that they not only refer to objects in the situation, but also to aspects of the situation itself.

Therefore, if we want to know what is meant by an abstract attribute, we need to know more about the situation in which the attribute is used. In other words, we need to know more about the context in which the abstract attribute is used. Thus, we can state that the meaning of the abstract attributes that are used in arguments is only established when we know what background it has come up against in the argument.

RESEARCH PROPOSITIONS

A number of relations can be tested between the various concepts that were discussed above. These relations are described in Figure 3.1. As we can see, the relations deal with the role of emotionality and abstract attributes in consumer judgements, and the possible relation between the two.

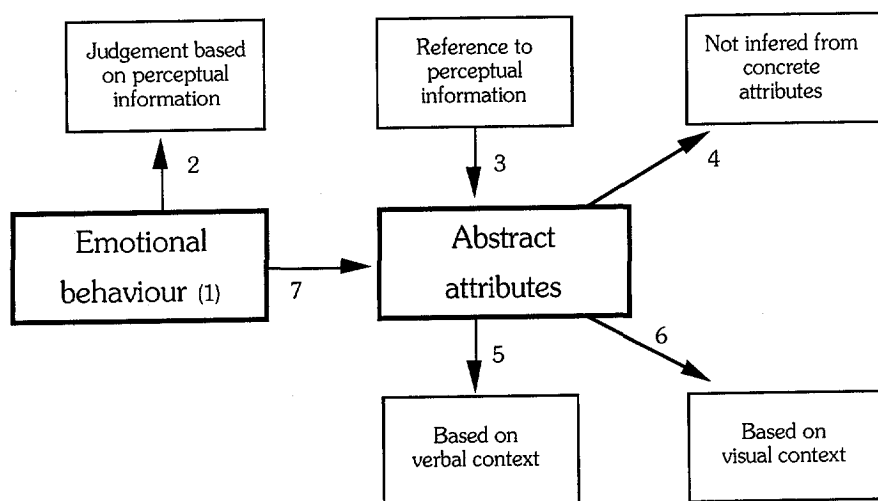


Figure 3.1. *The role of emotionality and abstract attributes in consumer judgements, and the possible relation between the two (numbers indicate tested propositions).*

Emotionality

Earlier we have stated that the difference between emotionality and rationality in consumer judgements is one between a motivation to control direct rather than logically expected outcomes. This leads to a distinctive process for emotional and rational consumer judgements.

Proposition 1.

We can make a distinction between emotional and rational consumer judgements.

This difference between emotional and rational judgments is most apparent in the way that product information is used by the consumer. We have argued that the arguments that are used in emotional consumer judgments, and the concepts or categories on which they build, mainly serve as a justification for the judgment. For this reason, they do not have added value to that which consumers have already perceived in a situation. This leads us to consider Proposition 2:

Proposition 2.

Emotional consumer judgments will be based more on perceptual information, while rational consumer judgments will be based more on conceptual information.

These propositions on emotionality will be operationalised and tested on their merits later in this thesis. We will deal with Proposition 1 in Chapter 4, and Proposition 2 in Chapter 5.

Abstract product attributes

Earlier we argued that abstract attributes can be thought of as describing a more complex pattern in our sensory input than concrete attributes. When considering the role of abstract product attributes in the judgment process, we can now see how this makes judgments based on abstract attributes different from those based on concrete attributes. First, we have argued that abstract attributes are meaningful, not in the sense that they are inferred from more concrete attributes, but that they can be perceived as complex invariants in the consumer's sensory input. Thus, abstract attributes need not be higher order concepts, but instead, concepts that describe more complex perceptual information. This leads us to consider Proposition 3.

Proposition 3.

Like concrete attributes, abstract attributes have a direct reference to perceptual information.

Secondly, having stated that all judgments can be understood as being conclusions of arguments, we have argued that abstract attributes, like concrete attributes, can be thought of as a premise from which the argument departs. Thus, when looking at the arguments that consumers use to facilitate their actions, we can say the following:

Proposition 4.

Abstract attributes need not be inferred from more concrete attributes, but instead, like concrete attributes, can function as a premise in the arguments on which consumer judgments are based.

Thirdly, we have argued that abstract attributes are more difficult to understand because they are applicable to a more variable situation of use. Therefore, when they

are used in an argument, there will be more potential situations of use to which the attribute can refer. For this reason, we can assume that abstract attributes will be richer in context. Since we have argued that abstract attributes are established in verbal arguments, we assume that they will be richer in verbal context. Since we have argued that abstract attributes are based on more complex perceptions that contain situational information, we also assume that they are richer in visual context. Thus, we can state the following two propositions.

Proposition 5.

Abstract attributes are richer in verbal context than concrete attributes.

Proposition 6.

Abstract attributes are richer in visual context than concrete attributes.

Again, these propositions on the nature of abstract product attributes will be operationalised and tested in later chapters. Proposition 3 in Chapter 6, Propositions 4 and 5 in Chapter 7 and Proposition 6 in Chapter 8.

The relation between emotionality and abstract attributes

Although both emotionality and abstract product attributes, by themselves, provide sufficient reasons for a consumer judgement to be subjective, we have also speculated that emotionality may actually induce consumers to come up with arguments that are based on abstract attributes. On the basis of this, we come up with a last proposition:

Proposition 7.

If the judgement of consumers is emotional, the underlying arguments will be based on abstract attributes. If, however, the judgement of consumers is rational, the underlying arguments will be based on concrete attributes.

This last proposition will be operationalised on the basis of the research described in chapters 4 and 7, and tested on its merits in Chapter 9.

To resume, we have argued that the problem of subjectivity is of a behavioural nature. Hence, we have described a behavioural model on the basis of three components: motivation, stimulus perception, and categorical judgements. The two aspects of subjectivity can be regarded as having arisen from these components; emotionality from a motivation to control direct, rather than logically expected outcomes, abstract attributes from the perception of complex invariants in the consumer's sensory input. On the basis of the position of emotionality and abstract attributes in the behavioural model, seven research propositions are put forward that are tested in Chapters 4 to 9.

4

THE RELATIVE INDEPENDENCE OF EMOTIONALITY AND RATIONALITY IN CONSUMER-PRODUCT INTERACTIONS²⁸

INTRODUCTION

Operationalisation of Proposition 1

In this chapter we will investigate Proposition 1, that there is a distinction between emotionality and rationality in consumer judgements. We have proposed this in Chapter 3 because the difference between emotionality and rationality is a fundamental aspect in the interaction between the consumer and a product. Namely, if consumers are rational, they are motivated to control future outcomes, and if they are emotional, they are motivated to control direct outcomes. This leads to a distinctive process for emotional and rational consumer judgements.

A problem with measuring this distinction between emotionality and rationality, is that it is generally thought to be operative at all levels at which people process information (Izard, 1993). However, in Chapter 2 we have expressed our interest in emotionality and rationality solely as aspects that influence information processes of which we are aware when passing judgements. Hence, we can discard the genetic code that make us cuddlers or cry-babies, and focus solely on the differences in our judgements of which we ourselves are aware.

Still, that leaves us with a number of choices for a measure of emotionality and rationality. As Zajonc and Markus (1984) have noted, emotions can be thought of in three different ways. First, there are two 'hard' observable aspects of emotions: expression, which is defined in terms of people's overt behaviour, and arousal, which is defined in terms of some bodily reaction. A third, 'internal', representation of emotion exists, which is our experience of them.

Since the first two components of emotion are most directly observable, it seems plausible to measure emotionality in terms of expression or arousal. However, one problem is that a lot of measures of emotion have been developed for measuring strong emotions. Indeed, strong emotions are very overt, both in terms of expressions (e.g. raised voices) and in terms of bodily reactions (e.g. arousal levels, crying, sweating). In addition, it is usually clear what the emotions are about (e.g. a burglar, a striking rollercoaster experience). Within a consumer setting, however, emotions most-

²⁸ With some alterations, this chapter has previously been published under the same title in Snelders, Schoormans and Creusen (1994).

ly exist on a much weaker level and are often instigated and cultivated by the consumer him- or herself (Belk, Wallendorf & Sherry, 1991; Hirschman & Holbrook, 1982). This means that the overt behaviour is not easily recognised as emotional or rational, and that it is very difficult to ascertain that bodily reactions are the result of product experience, and not of some other experience (Bagozzi, 1991). Another difficulty with measuring emotions as overt behaviour or bodily reactions, is that most such measures are emotion specific. For example, the way of measuring cheerfulness differs from the way of measuring sexual excitement, both in terms of expression and arousal measures. This means that it is unclear how we should combine such specific measures into a general measure of emotionality. For these reasons, we choose to measure the third component of emotion, which is the emotional experience of the consumer.

In Chapter 2, we have proposed that weak emotions start from experience, and through fantasies arouse us, and through communication make us express our feelings. These 'weaker' emotions may be based on consumers' conscious decisions, but they are still emotions. As we have seen above, it is difficult to measure such emotions by looking at the consumers' expressions or bodily reactions. For this reason, we will look at how people experience their behaviour as either being emotional or rational. We will use a most direct measure for doing this: the consumer's self reports. The reason for this is that we are only interested in those aspects of emotionality and rationality that are open to introspection, and that we do not believe that social desirability or any other constraint will induce people to give 'untrue' answers²⁹. Of course, as Foxall (1984) has noted, our verbal accounts of our behaviour must always be considered as behaviour on its own (i.e. verbal behaviour), and as such, we will need to validate these self-reports with other measures of emotionality and rationality. This is something we will do later, in Chapter 5.

Feeling, thinking and involvement

Vaughn (1980) identifies two general aspects of consumer-product interactions. The first is the feel/think distinction. This distinction represents two different ways in which an interaction can be appreciated by the consumer - one emotional, the other rational. The feel/think distinction has also received considerable attention from consumer researchers. Notions of rational, decision making activities (e.g. Bettman, 1979; Simon, 1983) have been contrasted with more emotional accounts of consumer-product interactions (e.g. Batra, 1986; Holbrook, 1986; Mittal, 1988; Zajonc & Markus, 1982; 1984). This has been in line with much of our theorising in Chapter 2.

A second aspect of consumer-product interactions described by Vaughn is involvement, which is described as attention for something, because it is somehow relevant or important. This means that the interaction can vary in its importance to a consumer, depending on how interested the consumer is or how much risk he or she perceives in the purchase. The involvement dimension has received a lot of attention,

²⁹ Questions about rationality and emotionality do not touch on moral standards or legal issues, which are the issues that make people give social desirable answers (Newell, 1993).

ranging from the first notions of it by Krugman (1965) to the development of psychometric scales for assessing the amount of involvement in certain interactions that consumers experience (Laurent & Kapferer, 1985; Ratchford, 1987; Zaichowsky, 1985).

Ratchford (1987) has developed three scales to measure the amount of feel, think and involvement with which a consumer-product interaction can be described. These scales are based on items where consumers report on their motives for preferring or buying products. The items tap on the consumer's self-reported emotionality, rationality and involvement. The feel scale is the average score of answers on items 7, 12 and 15 in Table 4.1, the think scale is the average score of items 5 and 8, and for involvement, items 6, 9 and 14. With these scales, scores on the feel/think dimension (i.e. the score on the feel scale minus the score on the think scale) and the involvement dimension are determined. In this chapter we will try to create feel, think and involvement scales that are equivalent to those developed by Ratchford (1987). The difference is that the items will be in the Dutch language, since our laboratory is in Delft, in the Netherlands. At the same time, however, we will try to come to terms with one aspect of the feel and think scales that is the cause for some controversy: the relation between the feel and think scales, and the relation of both with involvement.

Vaughn (1980) considers the feel/think distinction to be independent of involvement. In addition, he proposed that emotional and rational behaviour are opposites on one dimension. Park & Mittal (1985), however, contend that emotionality and rationality are linked with involvement. They argue that if a specific consumer-product interaction is high in thinking or high in feeling (or both), it will also be high in involvement. This has also been demonstrated by most studies on involvement measures, which have incorporated a distinct emotional aspect in their scales (Laurent & Kapferer, 1985; Robben & de Graaf, 1992; Zaichowsky, 1987). This implies that if one has strong feelings about a product, one will automatically be highly involved, and if one is very rational about a product, the same applies, and again one will be highly involved. According to these authors, there are two types of involvement, affective and cognitive. The strength of the motives determines the level of involvement (see also Celuch & Slama, 1993; Mittal, 1987; 1988; Park & Young, 1983; 1986). In this way three categories of involvement are distinguished: high-emotional, high-rational and low involvement (i.e. low in emotional and rational involvement).

It is plausible that both emotional and rational factors play a role in a single product judgement, since more than one motive can be working in a single purchase situation: "The antecedents of preferences may involve cognitive *and* affective components in a variety of combinations. In some cases the cognitive component may be dominant, in some cases the cognitive and affective factors may interact with each other, and in other cases the affective factors may be dominant and primary" (Zajonc & Markus, 1982, p. 124, italics in the original). That feeling and thinking are separate constructs, and not each other's opposite, is also mentioned by Vaughn (1980) and Ratchford (1987). However, they argue that this still allows us to consider one unidimensional feel/think scale:

While think and feel are separate dimensions, they can, for parsimony, be combined into one single scale which measures the relative amount of each which is present in a given purchase situation. (Ratchford, 1987, p.26)

As a consequence, Ratchford creates a composite feel/think scale by subtracting the mean score on two think items (Table 4.1, items 5 and 8) from the mean score of three feel-items (Table 4.1, items 7, 12 and 15) and adding a constant for normalisation purposes. Adding and subtracting, however, are only appropriate operations if the components are of the same or opposite kinds - not if they are independent of each other. Moreover, useful information will be lost. One cannot tell whether an average score on the feel/think dimension arises from low scores on both scales or high scores on both scales. Note that this is important for the remainder of this thesis, because, if feeling and thinking exist independently, we must consider them separately. For instance, feel and think can be used as two orthogonal factors in a research design, and if we want to know the effect of one relative to the other, we can look at an interaction term between the two scales (e.g. the product or the ratio of one over the other).

Hypotheses for Proposition 1

We now turn to the actual scales that were developed by Ratchford. While our immediate interest is in a Dutch validation of Ratchford's feel/think scale, we would also like to investigate the relation between the different components of the Ratchford scales. As mentioned before, Ratchford constructed both an involvement and a feel/-think scale. We expect the following relations between the scale-items that cover these three aspects.

Hypothesis 4.1

The Dutch items translated from Ratchford's involvement, feel and think scales will break down into the same three scales as the original English items.

Since the Dutch items are not directly comparable to the English items, we can only get a subjective estimate on the similarity of the scales. However, we still consider such a subjective judgement as important, because it bears on the stability and external validity of Ratchford's scales.

Hypothesis 4.2

A feel scale and a think scale will emerge that are independent of each other.

The relation between the feel and think scales will determine how the two should be combined. If the feel and think scales are negatively correlated, we can adapt Ratchford's composite feel/think scale. If the two are independent, we must consider feeling and thinking separately.

Hypothesis 4.3

An involvement scale will emerge that is positively related both to the feel and to the think scale.

Park & Mittal (1985) have suggested that if a consumer-product interaction is high in feel or high in think, it will be high in involvement. This relation should express itself in positive correlations between the feel and involvement scales, and the think and involvement scales.

Two questionnaire studies were carried out to construct the Dutch feel, think and involvement scales. In the first study, the Ratchford scale items were used after being translated into various Dutch wordings. The final scales are constructed from a selection of these items. To test the stability of this selection, a second study was conducted on a different sample of respondents and products.

STUDY 1: SCALES ON THE BASIS OF EXTREME FEEL/THINK PRODUCTS

Method

Selection of items

To start with, the items from the Ratchford study were translated into Dutch as precisely as possible. This resulted in three feel items, two think items and three involvement items. In addition to these items, another ten items were added. These were included for two reasons. The first was to assure that the right phrasing was used for the translated items. This was especially true for the feel items, where it was felt that the original American items were phrased with too much enthusiasm for the taste of Dutch respondents. The second reason was to provide the Ratchford scales with some extra dimensionality. If the Ratchford items represent the most relevant dimensions of consumer-product interactions, then adding other items that describe consumer-product interactions should not change the dimensional structure in the items. Items were added on personal interest to the involvement items (after Laurent & Kapferer, 1985) and items on personal taste and status to the feel items (after Ratchford, 1987). The resulting 18 Dutch items tested in the first study are shown in Table 4.1. All items were presented in seven point semantic differential format, with a positive statement on the left side of the scale, and its negation on the right side.

Selection of products

Following Ratchford, the 18 items were formulated in the context of the purchase of a specific product. Since purchase situations differ widely between products, the items were presented six times, each time referring to the purchase of a different product. The products were matches, a postcard, a refrigerator, eau de cologne/aftershave, a telephone set, and a car. They were chosen because the average scores on feel, think and involvement differ widely over these products (Ratchford, 1987; Vaughn, 1980).

Table 4.1 *Questionnaire items in Dutch and translated, used in Study 1. Items numbers indicate order of questioning, stars denote direct Ratchford translations*

1.	Ik heb interesse in dit produkt / ik heb geen interesse in dit produkt I am interested / not interested in this product
2.	Aan deze aankoop: besteed ik veel tijd / besteed ik weinig tijd When making this purchase: I spend a lot of time / do not spend a lot of time
3.	Mijn aankoop van komt gevoelsmatig tot stand / komt niet gevoelsmatig tot stand My purchase of is emotional / is not emotional
4.	Bij de aankoop van vindt ik het vervelend als ik een verkeerde keuze maak / vindt ik het niet vervelend als ik een verkeerde keuze maak When purchasing it annoys me if I make the wrong choice / it does not annoy me if I make the wrong choice
5*	Bij de aankoop van ... is: mijn keuze logisch en objectief / mijn keuze niet logisch en objectief When purchasing my decision is logical and objective / my decision is not logical and objective
6*	Bij de aankoop van ... is: mijn aankoop goed overdacht / mijn aankoop niet goed overdacht When purchasing my decision requires a lot of thought / my decision requires little thought
7*	Mijn keuze voor brengt mijn persoonlijkheid tot uitdrukking / brengt mijn persoonlijkheid niet tot uitdrukking My choice for expresses my personality / does not express my personality
8*	Bij de aankoop van ... is: mijn keuze gebaseerd op functionele eigenschappen / mijn keuze niet gebaseerd op functionele eigenschappen When purchasing my decision is based mainly on functional facts / is not mainly based on functional facts
9*	Ik vind de aankoop van een belangrijke beslissing / geen belangrijke beslissing For me, the purchase of is a very important decision / is not a very important decision
10	Mijn aankoop van komt intuïtief tot stand / komt niet intuïtief tot stand My purchase of comes about intuitively / does not come about intuitively
11	Bij de aankoop van kijk of informeer ik op meerdere plaatsen voor ik een keuze maak / kijk of informeer ik niet op meerdere plaatsen voor ik een keuze maak When purchasing I look in several shops / I do not look in several shops
12*	Mijn keuze voor is gebaseerd op hoe het produkt eruit ziet, smaakt, voelt, klinkt of ruikt / is niet gebaseerd op hoe het produkt eruit ziet, smaakt, voelt, klinkt of ruikt My choice for is based on how the product looks, tastes, touches, sounds or smells / is not based on how the product looks, tastes, touches, sounds or smells ³⁰

continues

³⁰ The five senses only featured in this item as far as they were applicable to the product. For example, we cannot taste or smell a telephone, so these senses were left out of the items when applied to telephones.

Table 4.1, continued

13	De aankoop van geeft mijn persoonlijke smaak weer / geeft niet mijn persoonlijke smaak weer The purchase of marks my personal taste / does not mark my personal taste
14*	Bij de aankoop van heb ik veel te verliezen als ik het verkeerde produkt kies / heb ik niet veel te verliezen als ik het verkeerde produkt kies When purchasing I have a lot to lose if I choose the wrong product / I have little to lose if I choose the wrong product
15*	Mijn beslissing voor is gebaseerd op gevoelens en emoties / is niet gebaseerd op gevoelens en emoties My decision to buy is based on a lot of feeling / is based on little feeling
16	Bij de keuze van let ik op wat er in de mode is / let ik niet op wat er in de mode is When choosing I consider the latest fashion / I do not consider the latest fashion
17	Bij de aankoop van is: mijn keuze gebaseerd op concrete kenmerken / mijn keuze niet gebaseerd op concrete kenmerken When purchasing my choice is based on concrete attributes / my choice is not based on concrete attributes
18	Mijn keuze voor een bepaalde geeft mijn status weer / geeft niet mijn status weer My choice for a certain marks my status / does not mark my status

Data collection

Two versions of the questionnaire were made on which the 18 items were applied to only three products each. This was done to keep the number of items per questionnaire low, to prevent fatigue in the respondents. The first version pertained to the products eau de cologne/after shave, matches and a car (in that order). The second version pertained to a refrigerator, a postcard and a telephone set (in that order). The questionnaires were sent out to 498 (249 for each version) members of the consumer household panel of the Faculty of Industrial Design Engineering, Delft University of Technology³¹. 405 (81%) people responded; 207 responded to the first version, 198 to the second version.

Results and discussion of Study 1

Factor analyses

Factor analyses³² were performed on the responses of each product separately, and on responses for all products taken together. Thus for the general factor analysis, the number of variables to be factor-analysed remained the same, while the number of

³¹ The panel consists of households in Delft and the near surrounding. The sample is drawn randomly from a list of telephone numbers (Tan, 1989).

³² Since we were looking for dimensions underlying all variables, all factor analyses were carried out following the suggestions in Everitt and Dunn (1991), which meant that a standard Principle Factor Analysis was used (PAF extraction on SPSS).

observations was six times as large (each product that respondents had rated was now seen as a list of new observations of the same variables).

The factor solutions of eau de cologne/after shave, the car, refrigerator, and telephone set all came up with distinct feel, think, and involvement factors. In the case of matches and postcards, however, some feel items (Table 4.1, number 7, 13, 15, 16, and 18) loaded high on the involvement factor. For both products, a separate feel factor exists as well. Although we have argued earlier that feel and involvement items may well be correlated, in this case, these feel items seem indistinct from the involvement items. We will come back to this when we discuss the relation between the items. Since separate feel and think factors did emerge for the other products, we will maintain that the feel and think items tap from separate constructs.

Since most of the separate factor analyses produced distinct involvement, feel, and think factors, the factor analysis over all products was forced into a three factor solution. The varimax rotated factor solution is shown in Table 4.2. The three factor solution explained 53.1% of the total variance in the 18 items, with the initial, unrotated Eigenvalues 6.35, 2.68, and .53³³. The Eigenvalue of the third factor is lower than one, but it consistently distinguishes between involvement and think items. For this reason we present the three factor solution.

The first factor is an involvement factor. On this factor seven items have loadings higher than .40. The three Ratchford items on involvement (items 9, 14 and 6) all load high on this factor. In addition, the four involvement items we formulated ourselves load high on this factor. The second factor is a feel factor. On this factor two of the original three Ratchford items (items 15 and 7) load relatively high. The third feel item of Ratchford (item 12) loads relatively low on this factor, but even lower on factor 1 and factor 2. The third factor is a think factor. On this factor the two original think items of Ratchford's scale and one item we formulated ourselves load relatively high. Also one of the items originated from the set of Ratchford's involvement items loads high on this think factor.

Item 6 loads both on the involvement and on the think factor in the solution of the factor analysis over all products. Although this item was an involvement item in the Ratchford scale, it loads highest on the think scale in our research. To explain this difference we have to reconsider the Dutch translation of this item. It turns out that we have translated the original 'requires a lot of thought' into something that is closer to 'is thought over carefully'. This subtle difference in meaning, however, makes the item fit more into the group of think items.

Earlier, we have proposed that our Dutch items break down into three distinct factors: a feel, a think and an involvement factor (Hypothesis 4.1). Both the general and the product specific factor analyses indicate that, in general, this hypothesis is accepted.

³³ Note that the initial unrotated Eigenvalues are not the same as the redistributed rotated Eigenvalues that can be calculated from Table 4.2.

Table 4.2 *Items, factor loadings (>.40) and communalities of Study 1.*

	Items	Factor			h ²
		1	2	3	
2	When making this purchase: I spend / do not spend a lot of time	.78			.72
11	When purchasing ... I look / do not look in several shops	.72			.62
9*	For me, the purchase of ... is a very important / not a very important decision	.72		.42	.71
14*	When purchasing ... I have a lot / little to lose if I choose the wrong product	.63			.54
4	When purchasing ... it annoys me / it does not annoy me if I make the wrong choice	.53			.56
1	I am interested / not interested in this product	.46			.40
15*	My decision to buy ... is based on a lot of . feeling / on little feeling		.74		.57
3	My purchase of ... is emotional / is not emotional		.73		.55
7*	My choice for ... expresses / does not express my personality		.70		.60
13	The purchase of ... marks / does not mark my personal taste		.67		.60
10	My purchase of ... comes about intuitively / does not come about intuitively		.62		.43
18	My choice for a certain ... marks / does not mark my status		.44		.28
12*	My choice for ... is based / is not based on looks, taste, touch, smell or sound ³⁴		.42		.35
5*	When purchasing ... my decision is / is not logical or objective			.72	.58
6*	When purchasing ... my decision requires a lot of thought / requires little thought	.50		.67	.74
17	When purchasing ... my choice is based / is not based on concrete attributes			.65	.51
8*	When purchasing ... my decision is based mainly / is not based mainly on functional facts			.64	.59
16	When choosing ... I consider/ do not consider the latest fashion				.27

Note: item numbers indicate order of questioning; stars denote direct Ratchford translations

³⁴ The five senses only featured in this item as far as they were applicable to the product. For example, we cannot taste or smell a telephone, so these senses were left out of the items when applied to telephones.

Scale construction and correlations

Composite feel, think, and involvement scales were constructed to investigate the relationships between the feel, think, and involvement items (Hypothesis 4.2 and 4.3). The internal consistency was calculated for each group of items that loaded high on one of the three factors. The internal consistency, measured by Cronbach's alpha, was optimised by discarding low correlating items. This approach led to feel, think and involvement scales with satisfactory levels of consistency: for the feel scale $\alpha = .82$, for the think scale $\alpha = .76$, and for the involvement scale $\alpha = .87$. The resulting feel scale consists of five items (Table 4.1, items 3, 7, 10, 13 and 15), the think scale of three items (Table 4.1, items 5, 8 and 17) and the involvement scale of four items (Table 4.1, items 2, 9, 11 and 14). The original Ratchford scales consist of three, two and three items, respectively.

The correlations between the composite scales are shown in Table 4.3. Here it is shown that the composite feel and think scales are uncorrelated. Since both are correlated with the composite involvement scale, it may be that involvement acts as a suppressor variable. For this reason, partial correlations between the feel and think scales are calculated, controlling for the effect of involvement. Again the two scales do not correlate, which affirms our contention that the feel and think dimension are independent of each other (Hypothesis 4.2). Product choice may be based on emotional or rational aspects, or both at the same time.

In addition, Table 4.3 shows moderate to high correlations between the feel and think scales on the one hand, and the involvement scale on the other. This result clearly supports our idea that the involvement dimension is positively related to the feel and think dimensions (Proposition 3). This bears on our discussion about the factor analyses, where we have questioned the distinction between the feel and involvement items. Since both feel and think scales correlate with involvement and not with each other, the involvement construct cannot be reduced to either the feel or think construct.

Table 4.3 *Correlations between the feel, think and involvement scale in Study 1.*

	r FI	r TI	r FT	r FT.I
Eau de cologne / after shave	.61**	.30*	.12	.24**
Matches	.52**	.19*	.14	.05
Automobiles	.27**	.65**	.14	-.04
Refrigerator	.11	.37**	-.19*	-.25**
Postcard	.46**	.47**	.29**	.10
Telephone set	.17*	.43**	-.03	.11
All products	.26**	.57**	-.02	-.02

* $p < .01$; ** $p < .001$

STUDY 2: SCALES ON THE BASIS OF AVERAGE FEEL/THINK PRODUCTS

Method

The second study is a check on our choice of items, products, and respondents in the first study. Because the scales that result from Study 1 were created by trimming down on a larger group of items, we wanted to make sure that the high levels of internal consistency of the scales were not caused by selecting items on the basis of 'shared error'. This may have happened because we have optimised the Cronbach α 's by throwing out those items that had low correlations with the other items in the same scale. As a result, the items that stayed in the scales had high intercorrelations, but because of the procedure that was used, part of these correlations may be on the basis of accidental, rather than systematic covariation. Therefore, the twelve items selected in Study 1 should in this study fall in the same scales with the same level of internal consistency, without the optimisation procedure used in Study 1. Furthermore, the semantic differentials are reversed, with positive statements on the right side of the scale, and negations on the left side. The item 'decision requires a lot of thought' is also tested again. This item was not included in the composite scales of Study 1 because of its ambiguous nature. However, since it originates from Ratchford's scale, it was included for reconsideration.

Apart from one product, products are used that are different from the first study³⁵. This was done for two reasons. First, the products that were selected for Study 1 had varied on the three dimensions to such an extent, that pooling the products for the general factor analysis may have forced the factor solution into these dimensions. Note that this can only have happened to a very small extent, since the separate factor solutions per product were all very similar to the general factor solution. A second reason is that the extreme positions of the products on the three dimensions can have led to a response set where respondents tend to answer according to these dimensions. For these reasons, the second study is based on products which we anticipated would, on average, occupy less extreme positions on the feel, think and involvement scales. The products are a coffee-maker, a clock-radio, a tent, a thermos flask, and a telephone set. To control for order effects, the products were presented in two different orderings. The resulting questionnaire contained 65 items (13 items for 5 products).

The questionnaires were sent out again to members of the consumer household panel of Delft University of Technology, after a complete renewal of the panel (Tan, 1992). They were sent to 795 people, all different from those in Study 1. 624 (78%) people returned the questionnaire within the allowed time.

³⁵Telephones were included twice in this study, because of a special departmental interest in them.

Results and discussion of Study 2

Factor analyses

Factor analyses were carried out in the same manner as in the first study. First for each of the five products separately. For three of the products (clock-radio, thermos flask and telephone set) separate feel, think and involvement factors emerged. For the two remaining products (coffee-maker and tent), one joint think/involvement factor and one factor of feel items emerged. However, in all five cases, the items of the feel, think and involvement scales of Study 1 load consistently on the same factors as before.

The conclusions that can be drawn from these factor analyses are in line with those for the factor analysis on all products taken together. The results of the general factor analysis are shown in Table 4.4. Separate involvement, feel and think factors are extracted from the thirteen items employed in this study. The initial, unrotated Eigenvalues for the three factors are 4.81, 2.24 and .98; the factors explain 61.8% of the variance in the data. As in Study 1, the general factor analysis shows a think factor with a relatively low Eigenvalue. The reason for this could be that, for some products (coffee-maker and tent), respondents consider think and involvement items indiscriminately. However, since the general factor analysis discriminates consistently between think and involvement items, we maintain that think and involvement are separate constructs, although they may well be related.

As in Study 1, the item 'decision based on a lot of thought' loads on both the think and involvement factor. We therefore stick to our conclusion that it was translated inaccurately. The other items load on the same factors as in the first study. This result shows that the relations between the items are stable over different products and respondents.

Scale construction and correlations

Cronbach's α was calculated for each group of items of the feel, think and involvement scales from Study 1. Note that here, we did not optimise Cronbach's α by throwing out low correlating items. This is because our intention was only to affirm the findings of Study 1. Again, all three groups of items have satisfactory levels of internal consistency: for the feel items, $\alpha = .77$, for the think items, $\alpha = .74$, and for the involvement items, $\alpha = .81$.

The correlations between the three composite scales are shown in Table 4.5. Here, the same pattern arises as in the previous study: the composite feel and think scales do not correlate with each other, while both do correlate with the composite involvement scale. Again the correlations between the composite feel and think scales all remain close to zero when controlling for the effect of involvement. These results reaffirm what we proposed earlier. Namely, feel and think scales have emerged that are independent of each other (Hypothesis 4.2), and an involvement scale has emerged that is positively related both to the feel and think scale (Hypothesis 4.3).

Table 4.4 *Items, factor loadings (>.40) and communalities of Study 2.*

	Items	Factor			h ²
		1	2	3	
11*	For me, the purchase of is a very important decision / not a very important decision	.82			.75
9*	When purchasing ... I have a lot to lose / little to lose if I choose the wrong product	.81			.69
1	When making this purchase: I spend a lot of time / do not spend a lot of time	.75			.68
6	When purchasing ... I look / do not look in several shops	.58			.47
2	My purchase of ... is emotional / is not emotional		.80		.65
8*	My decision to buy ... is based on a lot of feeling / is based on little feeling		.77		.62
5	My purchase of ... comes about intuitively / not intuitively		.76		.58
4*	My choice for ... expresses my personality / does not express my personality		.63		.54
10	The purchase of ... marks / does not mark my personal taste		.56		.50
7*	When purchasing ... my decision is based			.80	.67
3*	When purchasing ... my decision is / not logical or objective			.78	.65
13	When purchasing ... my choice is based / is not based on concrete attributes			.71	.59
12*	When purchasing ... my decision requires a lot of thought / requires little thought	.53		.63	.67

Note: item numbers indicate order of questioning; stars denote direct Ratchford translations.

Table 4.5 *Correlations between the feel, think and involvement scale in Study 2.*

	r FI	r TI	r FT	r FTI
Coffee-maker	.36**	.47**	.09	-.10*
Cock-radio	.42**	.49**	.20**	-.01
Tent	.43**	.78**	.36**	.04
Telephone set	.36**	.04**	.00	-.17**
Thermos flask	.37**	.35**	-.00	-.15**
All products	.40**	.53**	.18**	-.04*

* $p < .01$; ** $p < .001$

GENERAL DISCUSSION: FEEL AND THINK AS TWO INDEPENDENT CONSTRUCTS

Table 4.6 shows the Dutch feel, think and involvement scales that have been the object of this study. A comparison with Ratchford's original scale items (Ratchford, 1987) shows that we have successfully replicated the composite feel, think and involvement scales. The two studies that are reported here therefore contribute to the stability and external validity of the scales, in that the translated Dutch items have the same intercorrelations as the original American items.

Both studies also demonstrated a relationship between the scales that is different from the propositions of Vaughn (1980). Instead of one feel/think dimension and another involvement dimension, we should rather think of the feel and think dimensions as two independent aspects of involvement. As Park and Mittal (1985) argue, if a specific product-person interaction is high in thinking or high in feeling (or both), it will also be high in involvement. In our study almost every product has a relatively high positive correlation between involvement and both think and feel (even when corrected for the influence of the other aspect). It is thus plausible that both thinking and feeling are the antecedents of involvement.

How should we consider this independence between emotionality and rationality on a theoretical level? In the previous chapters, we have only discussed the possibilities of emotional or rational consumption, not that of emotional *and* rational consumption. However, we have also argued that emotionality and rationality are expressed with different arguments, and that consumers can have more than one argument for liking or disliking a product. Thus, when consumers are asked to self-report on their emotionality, they may only consider the number and weight of emotional arguments that they have constructed, irrespective of the number and weight of their rational arguments (and vice versa for rationality).

This apparent independence between the two constructs should not stop us from considering the two dimensions jointly in one research design (e.g. as two factors crossed in a factorial design). Although the feel and think scale are independent constructs, a combined study of them can provide useful insights into consumer-product interactions. The consumers' self-reports on his or her emotional and rational behaviour toward products is hypothesised to express the extent to which consumers let direct outcomes of the behaviour prevail over rationally expected ones. If this is the case, these self-reports are thought to be associated with the consumers' attention for perceptual versus conceptual product information. In the next chapter we will see if this is the case.

Table 4.6 *The feel, think and involvement scale (scores on the scales are averages over the items that make up the scales, translations are indented, stars denote original Ratchford items).*

FEEL SCALE (α (Study 2) = .77)	
Mijn aankoop van komt gevoelsmatig tot stand / komt niet gevoelsmatig tot stand	
My purchase of is emotional / is not emotional	
Mijn keuze voor brengt mijn persoonlijkheid tot uitdrukking / brengt mijn persoonlijkheid niet tot uitdrukking	
* My choice for expresses my personality / does not express my personality	
Mijn aankoop van komt intuïtief tot stand / komt niet intuïtief tot stand	
My purchase of comes about intuitively / does not come about intuitively	
De aankoop van geeft mijn persoonlijke smaak weer / geeft niet mijn persoonlijke smaak weer	
The purchase of marks my personal taste / does not mark my personal taste	
Mijn beslissing voor is gebaseerd op gevoelens en emoties / is niet gebaseerd op gevoelens en emoties	
* My decision to buy is based on a lot of feeling / is based on little feeling	
THINK SCALE (α (Study 2) = .74)	
Bij de aankoop van ... is: mijn keuze logisch en objectief / mijn keuze niet logisch en objectief	
* When purchasing my decision is logical and objective / my decision is not logical and objective	
Bij de aankoop van ... is: mijn keuze gebaseerd op functionele eigenschappen / mijn keuze niet gebaseerd op functionele eigenschappen	
* When purchasing my decision is based mainly on functional facts / is not mainly based on functional facts	
Bij de aankoop van ... is: mijn keuze gebaseerd op concrete kenmerken / mijn keuze niet gebaseerd op concrete kenmerken	
When purchasing my choice is based on concrete attributes / my choice is not based on concrete attributes	
INVOLVEMENT SCALE (α (Study 2) = .81)	
Aan deze aankoop: besteed ik veel tijd / besteed ik weinig tijd	
When making this purchase: I spend a lot of time / do not spend a lot of time	
Ik vind de aankoop van een belangrijke beslissing / geen belangrijke beslissing	
* For me, the purchase of is a very important decision / is not a very important decision	
Bij de aankoop van kijk of informeer ik op meerdere plaatsen voor ik een keuze maak / kijk of informeer ik niet op meerdere plaatsen voor ik een keuze maak	
When purchasing I look in several shops / I do not look in several shops	
Bij de aankoop van heb ik veel te verliezen als ik het verkeerde produkt kies / heb ik niet veel te verliezen als ik het verkeerde produkt kies	
* When purchasing I have a lot to lose if I choose the wrong product / I have little to lose if I choose the wrong product	

THE EFFECT OF EMOTIONALITY ON THE RELATIVE IMPORTANCE OF PERCEPTUAL AND CONCEPTUAL PRODUCT INFORMATION³⁶

INTRODUCTION

Operationalisation of Proposition 2

In Chapter 3 we proposed that emotional judgements are based more on perceptual information, while rational consumer judgements are based more on conceptual information (Proposition 2). We have proposed this because emotional consumer judgements are thought to be based on momentary product information, while rational consumer judgements are based on the logical consequences of the product, which the consumer expects on the basis of some inferential rule. In this chapter, we will investigate this proposition.

There are marked problems to face when trying to assess whether consumers have based their judgements on perceptual or conceptual information. Namely, when in an emotional state, conceptual arguments can be made explicit by the consumer for justifying purposes. That is, even if the consumer's preference is only based on the momentary, perceptual product information, the consumer may well need to justify his or her preference by providing all sorts of conceptual arguments on which the preference is based. However, when the reasons that consumers have for preferring a product are left implicit, we may well discover that emotional consumers base their preference more on perceptual information. Rational consumers, on the other hand, are thought to base their judgement on conceptual arguments about the expected consequences of the product. For the rational consumer, perceptual product information will only be valued on the basis of its expected consequences, for which the consumer needs to set up a conceptual argument. This will be true, even if the arguments are only implicitly present in the consumer's preference. Thus, to incorporate this problem, we can make our proposition more specific for implicit consumer judgements only. That is, if the consumer's judgement is based on implicit product aspects (i.e. aspects that are not explicitly stated), emotional judgements will be based more on perceptual product information, while rational judgements will be based more on conceptual product information. This question can be answered with the help of conjoint analysis.

³⁶ With some alterations, the content of the pilot study in this chapter has previously been published in Snelders, Schoormans and De Bont (1993).

Product and concept tests are often carried out without explicitly asking consumers for the reasons for their judgements. This is done because explicit questions are thought to affect explicit answers in that they are made more in concordance with the conclusive judgement. This leads to a 'halo-effect' where the general judgement (positive or negative) creates a bias in the reported reasons (Beckwith & Lehmann, 1975). Conjoint analysis is an alternative way of asking consumers for the reasons behind their judgement in a more implicit way. Conjoint analysis starts by making a number of possible product concepts. These are presented to consumers. By systematically varying the product characteristics of these concepts, the effect of each product characteristic on the preference of the consumer can be assessed. In this way, information about which product characteristics are most important to the consumer can be extracted, without explicitly asking the consumer about this³⁷ (for reviews, see Green and Srinivasan, 1978; 1990).

Here, we will use conjoint analysis in order to establish that emotional judgements are based more on perceptual information about the product and that rational judgements are based more on conceptual information. This can be done by looking at how much of the variance in preference for the different concepts can be regressed to systematic variation in the different product characteristics. With emotional judgements, variance in preference for the concepts is thought to be explained to a much larger extent by variation in perceptual product characteristics, while with rational judgements, variance in preference for the concepts is thought to be explained much more by variation in conceptual product characteristics. There is one problem with this approach. The use of perceptual information in conjoint analysis is regarded as problematic (Stokmans, 1992). The reason for this is found both in the structure of conjoint analysis, and in the unspecific nature of perceptual product information. In conjoint analysis, people are asked to make tradeoffs between one level of a characteristic and another. The structural models that are used in conjoint analysis assume that two levels of a characteristic do not interact in any unspecified way. Especially in the case of perceptual product characteristics, this assumption is violated. This is because there is no non-conceptual way to establish the independence of two terms in a structural model. Thus, if the product information is of a perceptual nature, there is no conceptually clear and distinct way of telling how one unit of information is different from another (Harnad, 1990). Since we have argued that emotional judgements are based more on perceptual information, we can expect that less of the variance in their judgements is explained by the procedures of conjoint analysis.

We can operationalize emotional and rational judgements, and perceptual and conceptual product information as follows. First the assessment of emotional and rational judgements. As we have seen in the previous chapter, whether a judgement is emotional or rational can best be assessed by asking the consumer to self report on his or her judgement. We have seen that two independent, feel and think scales can measure these self-reports reliably.

³⁷ Of course, the importance of each characteristic can only be assessed relative to the other characteristics that were systematically varied.

Secondly, we need to be more specific about what is meant by perceptual and conceptual product information. Here, we will follow the most commonly made operationalization, where perceptual information is presented pictorially, and conceptual information is presented textually (after De Bont, 1992; Domzal & Unger, 1985; Holbrook & Moore, 1981). This means that in the conjoint analysis task, concepts of products will be presented to consumers both pictorially and textually. On the basis of this, we can formulate the following hypotheses.

Hypotheses for Proposition 2

We start from Proposition 2 in Chapter 3 which states that emotional consumer judgements will be based more on perceptual information, while rational consumer judgements will be based more on conceptual information. Because of the different operationalizations for assessing whether judgements are emotional or rational (the separate feel and think scales developed in the previous chapter), we can make two hypotheses:

Hypothesis 5.1

The higher consumers score on the feel scale, the more their preference for products is explained by variation in pictorial product information.

Hypothesis 5.2

The higher consumers score on the think scale, the more their preference for products is explained by variation in textual product information.

Conjoint analysis is thought to be weak at explaining variance in preference by variation in perceptual product information. This may result in a lack of results for Hypothesis 5.1, since emotional judgements are thought to be more dependent on perceptual product information. So it may well be that we will not find that consumers with a high feel-score have more of their preference explained by variation in pictorial information, just because conjoint analysis cannot handle pictorial information. So we can only find an effect for Hypothesis 5.1 if a greater importance given to perceptual information does not create a situation in which less of the preference for all information (both perceptual and conceptual) is explained by conjoint analysis. This means that we must control for two things:

1. Consumers with a high feel-score have just as much of their preference explained by variation in pictorial *and* textual product information as consumers with a low feel score.
2. Consumers with a high think-score have just as much of their preference explained by variation in pictorial *and* textual product information as consumers with a low think score.

Below we will look at whether these two assumptions are violated or not.

Two studies were carried out to investigate these hypotheses in more detail. The first, a pilot study, is a limited test of these hypotheses because it was carried out before the construction of the Dutch feel and think scales, and instead of pictorial information, three-dimensional mock-ups were used. Only in the main study were we able to make a distinction between emotional and rational judgements on the basis of the Dutch feel and think scales that were presented in Chapter 4. Apart from these two studies, a third, post study is reported in this chapter, which served to clarify some questions arising from the main study.

PILOT STUDY

An experiment was carried out to test the idea that the predictive power of conjoint analysis is influenced by the way consumers interact with the product. Consumers who regard the product in a 'think' way were hypothesized to consider textual product information in forming their preferences, while consumers who regard the product in a 'feel' way were hypothesized to base their preference on pictorial product information. The pilot study was carried out before the construction of the Dutch Feel/think scales, so only a direct translation of Ratchford's original scale could be used (Ratchford, 1987). As a consequence, a unidimensional composite feel/think scale was used here, consisting of three items (two think items minus one feel item). For this reason, the results of this study are not a full test of the hypotheses stated above. Another departure from the main study is that perceptual information was operationalised here by a set of three dimensional mock-ups, while colour photo-copies of photographs were used in the main study³⁸.

Method

Subjects

To test our hypotheses, the data of an already existing experiment on conjoint analysis (De Bont, 1991) were used and we extended it with a small questionnaire study³⁹. For the conjoint analysis experiment, members of the household panel of the Delft University of Technology (N=87) were invited to our laboratory. The panel is an a-select sample of inhabitants of Delft and the surrounding area (Tan, 1989).

Material for the conjoint analysis task

The stimuli that were used in the conjoint analysis task were product concepts of electric filter coffee makers (but for the rest of the thesis they are just called coffee

³⁸ The three dimensional mock-ups were made of polystyrene, which showed global forms and quite some detail, in an all white colour, whereas the colour photo-copies of the photographs showed two dimensional form with roughly the same amount of detail, but now in full colour.

³⁹ For a full description of the conjoint analysis study, see De Bont (1991).

makers). Such a coffee maker is a very common durable in the Netherlands, with an ownership rate of about 90% (De Bont, 1991). Six product characteristics were systematically varied over the different concepts. These are five textual characteristics and one perceptual characteristic. Price, removable water reservoir, drip stop, thermos flask and high speed were presented textually, the form was presented perceptually, as a three-dimensional mock-up. Price and form both had three levels, the other characteristics had 2 levels (absent or present). The levels of the characteristic form were represented by means of three-dimensional mock-ups. All other characteristics were presented as (written) verbal statements. Thus, each concept consisted of a combination of a mock-up and a card containing the level-descriptions of the five remaining characteristics.

Design of the pilot study

With the help of 'Conjoint Designer' (Bretton-Clark, 1986), a fractional factorial design was set up, consisting of sixteen combinations of characteristic levels. In the experiment, the subjects had to rate each of the sixteen concepts. The amount of variance in these preference ratings, explained by the systematic variation in the different characteristic levels of the coffee maker can be expressed as an R-square value (Boecker & Schweikl, 1988). For each particular subject, this value indicates how well the variance in the concept ratings can be explained by a systematic variation in the characteristics of these concepts. The R-square value ranges from zero to one, with low values indicating that little variance is explained, and high values indicating that the variance in the concept ratings is to a large extent explained by the variance in the characteristic levels.

Procedure

In this study, R-squares were calculated for each subject, but on three different sets of characteristics. First, R-squares were calculated expressing the percentage of the variance in the concept ratings that was explained by the textual characteristics of the coffee maker (R-square Textual). Next, the R-squares were calculated only on the basis of the perceptual characteristic of the coffee maker (R-square Perceptual), and thirdly this procedure was repeated for both the textual and perceptual characteristics (R-square Total). The R-squares for textual characteristics were calculated using four characteristics: removable water reservoir, drip stop, thermos flask and high speed. The R-squares for the perceptual characteristic were calculated using only the characteristic form. The R-squares Total were calculated on the basis of both the textual and perceptual characteristics. (Price was excluded from our analyses since it can interact with both the textual and perceptual product information.)

Each set of R-squares was split into two groups: one that consisted of the R-squares of subjects who regarded a coffee maker as a feel product, and one that had the R-squares of subjects regarding a coffee maker as a think product. In order to assess which subjects fell into one group or the other, extra data were collected sometime after the experiment. This extra information, about the way that subjects regarded a coffee maker, was gathered with the help of a brief questionnaire. The question-

Table 5.1 *Summary of questionnaire items employed in this study (Dutch), and the original English items from which these were adapted.*

1.	Weinig op logische en objectieve criteria / Vooral op logische en objectieve criteria. Decision is not mainly logical and objective / Decision is mainly logical and objective.
2.	Weinig op concrete eigenschappen van het apparaat / Vooral op concrete eigenschappen van het apparaat. Decision is not mainly on functional facts / decision is based mainly on functional facts.
3.	Veel gevoelens en emoties / Weinig gevoelens en emoties. Decision based on a lot of feeling / decision is based on little feeling.
4.	Hoe het apparaat er uitziet, voelt of klinkt / Weinig op hoe het apparaat er uitziet, voelt of klinkt. Decision is based on looks, touch or sound / Decision is not based on looks, touch or sound.
5.	Drukt veel van mijn persoonlijkheid uit / drukt weinig van mijn persoonlijkheid uit. Decision expresses one's personality / Decision does not express one's personality.
6.	Is vooral gevoelsmatig / Is weinig gevoelsmatig. Decision is emotional/ decision is not emotional.

naire was adapted from Ratchford (1987), and contained ten items. The items were semantic differentials on a 7-point scale. The items used to measure the feel/ think dimension are reported in Table 5.1. The remaining four were supposed to measure involvement, and were left in to make the questionnaire more varied and substantial for the respondents.

In order to test the difference between the feel and think groups, the R-squares were normalized by Fisher-Z transformations of the square root of the R-square⁴⁰ (Hays, 1981, p. 465). This transformation from R-square to Fisher Z-scores (FZ-scores) means that we can test the difference between the feel and think groups by regular t-tests.

Results

Of the 87 respondents who had earlier engaged in the conjoint analysis task, 75 returned a completed questionnaire (response rate of 86%). In order to assess how people score on the feel/think dimension, a single scale was created. This feel/think scale consisted of items 1, 2 and 6 from the questionnaire (see Table 5.1). The internal consistency of this feel/think scale gave a Cronbach Alpha Coefficient of 0.67. There was little variation in the response to this scale: the respondents tended to regard the coffee maker as a think product. This meant that a distinction could not be made

⁴⁰ The range of R-square values is limited from 0 to 1, meaning that it does not follow a normal distribution, which has no such limits. A Fisher-Z transformation normalises a distribution of R-squares by stretching the distribution to normality.

Table 5.2 Average FZ-scores of, and t-tests between groups of feelers and thinkers on the basis of three different sets of characteristics (perceptual, textual, total) of coffee-makers. Average R^2 s are listed between brackets. Note that the FZ-scores are non-linear transformations of the R^2 s, which can lead to the peculiarity that an average R^2 based on one specific group of R^2 s may lead to another average FZ-score than the same average R^2 based on another group of R^2 s.

COFFEE MAKER									
	Feelers			Thinkers			t-value	df	p-value
	FZ	SD	(R^2)	FZ	SD	(R^2)			
Perceptual	.68	.43	(.34)	.58	.43	(.27)	.60	28	.554
Textual	.67	.23	(.34)	.93	.35	(.51)	-2.23	28	.034
Total	1.36	.71	(.68)	1.50	.38	(.78)	-.62	13.42	.547

between 'feelers' and 'thinkers' on the basis of a median split, since too many thinkers would fall into the 'feel' group. Even taking the lower and upper thirds of the responses resulted in too many thinkers falling into the other group. Thus, only the 11 respondents who had scored as genuine feelers, and the 19 respondents who had scored as genuine thinkers, provided the data for the analysis.

Three t-tests were conducted, on differences in the FZ-scores, between the 11 respondents who regarded the product in a feel way and the 19 respondents who regarded it in a think way. The FZ-scores that were used in the first t-test were measures of the individual percentages of variance in consumer choice that were explained by the textual product characteristics. The FZ-scores in the second t-test were those percentages explained by the perceptual product characteristic. In the third t-test, the FZ-scores were the percentages of explained variance obtained by using both the textual and perceptual characteristics in the prediction of consumer choice. The three t-tests are listed in Table 5.2. Two assumptions are made when using t-tests. First, that the groups of FZ-scores being compared are normally distributed; and second, that they have the same variance. Both assumptions were tested, the first by Kolmogorov-Smirnov tests, the second by F-tests. No group departed significantly from being normally distributed. In one case, that of the FZ-scores that were based on both perceptual and verbal characteristics, the feel and think group had different amounts of variance ($F(18,10) = 3.46$, $p < .021$). Here, t-tests were calculated on the basis of separate variance estimates.

Table 5.2 shows that the FZ-scores of 'feelers' differed from the ones of 'thinkers' when textual product characteristics were used ($t = -2.23$, 28 df; $p < .034$), and that this difference was in the proposed direction: using textual product characteristics to predict consumer choice leads to larger FZ-scores when people regard the product in

a think way, than when they regard it in a feel way. No significant difference between the FZ-scores was found between feelers and thinkers when perceptual product characteristics were used ($t = .60$, 28 df; n.s.). In the case where both textual and perceptual characteristics were used, thinkers tended to have larger FZ-scores than feelers, but this difference was not significant ($t = -.62$, 13.42 df; n.s.).

Discussion

The results of this study are in line with Hypothesis 5.2. Namely, the lower consumers score on a composite feel-think scale (i.e. the more 'think' they are), the more their preference for products is explained by a variation in textual information. Hypothesis 5.1, which predicted the opposite effect for pictorial information was not confirmed, though the reported difference is in the expected direction. It is unlikely that this lack of result for Hypothesis 5.1 has been caused by the unsuitability of conjoint analysis to deal with pictorial information. As the results show, the assumption that the predictive power of a conjoint analysis on both verbal and pictorial information is the same for people scoring low and high on the feel/think scale is not violated.

These results look very promising, although we must also consider some limitations. The first is that the results are based on a limited number of data. A coffee machine appeared to be mainly appreciated in a 'think' way, so that only a very small group of subjects qualified as 'feelers'. This means that the statistically significant effects that were found in this study may well prove to be unstable. At the same time, however, the effects that were reported here should be considered as strong effects, since they led to statistical significance on a sample size of only 30.

Another limitation of the pilot-study was the questionnaire that was used to assessing emotionality and rationality. The more reliable feel and think scales that were presented in Chapter 4 may well have made a different split over the 75 respondents who took part in the pilot study, and this may have made the differences between groups more salient.

MAIN STUDY: THE EFFECT OF FEEL/THINK ON THE PREDICTIVE POWER OF CONJOINT ANALYSIS

The main study was undertaken to overcome the limitations in the pilot-study. First, to overcome the difficulties with the extreme think position of the coffee machine in the pilot study, different products were used which were not regarded predominantly in an emotional or rational way. Secondly, the feel and think scales that were presented in Chapter 4 are used here instead of the direct Ratchford translation that was used in the Pilot study.

Method

Subjects

There were 124 subjects taking part in the experiment. Subjects were members of the refreshed consumer household panel of the Delft University of Technology (Tan, 1992). The sample is an a-select sample of the inhabitants of Delft and the surrounding area. Note that the same subjects had previously filled in the feel, think and involvement questionnaire that is reported in Chapter 4, Study 2.

Material for conjoint analysis task

The stimuli used in the conjoint analysis task were product concepts of two products from the second questionnaire study of Chapter 4. The products were thermos flask and clock radio⁴¹, and they were selected because consumers had varied widely in their responses on the feel and think scale and the answers were normally distributed. For the selection of textual product characteristics, 39 members of the old household panel (Tan, 1989), from various age groups and both sexes, were asked which characteristics of thermos flasks and clock radios they would consider when buying the product. These characteristics are listed in Appendix 5.1. The product characteristics that were selected for the conjoint analysis study were among the most frequently mentioned. For each characteristic, different levels were specified to let subjects make trade-offs between one level of the characteristic and another. The textual product characteristics, and their levels, are shown in Table 5.3. In addition, three pictures of different products were used for each product as the pictorial product information. The pictorial product characteristics are shown in Figure 5.1. The product concepts to be evaluated were presented on cards, presenting selected levels of each product characteristic. On the left side of the card, the pictorial information was given in the form of a colour copy of a photograph of the product. On the right side of the card, the textual information was given as a list of statements about a specific level of each product characteristic.

Design of the main study

For clock radio, a 3 (pictorial) x 2 (time display) x 2 (radio) x 2 (repeat key) x 2 (battery) design was made. As in the pilot study, fractional factorial designs were used, to limit the number of cards that would be presented during the experiment. This resulted in 9 cards, each containing a product concept to be evaluated by the respondents. The fractional design was made with the help of 'Conjoint Designer' (Bretton-Clark, 1986). For thermos flask, a 3 (pictorial) x 3 (content) x 2 (isolation) x 2 (pours easily) x 2 (cleaning) design was made. Fractioning this design with the help of conjoint designer resulted in 17 cards, each containing a product concept.

⁴¹ Originally, telephones were also included in the study, but this product cannot be given any further consideration, due to an error discovered too late in the computer program that made the design of the conjoint analysis study.

Table 5.3 *Textual characteristics, and their levels, of clock radio and thermos flask, as used in the main study (Dutch / English).*

CLOCK RADIO	
Characteristic	Level
Tijdsaanduiding / Time display	- normale cijfergrootte (1,5 cm) / normally sized numbers (1.5 cm) - tijdsaanduiding: extra grote cijfers (3 cm) / time display: extra large numbers (3cm)
Radio / Radio	- FM en AM ontvangst / receives FM and AM - AM ontvangst / Radio: receives AM
Herhaaltoets / Repeat key	- herhaaltoets / repeat key - geen herhaaltoets / no repeat key
Batterij / Battery	- aanwezig, beschermd tegen stroomuitval / present, protected against power cuts - afwezig, geen bescherming tegen stroomuitval / absent, no protection against power cuts
THERMOS FLASK	
Characteristics	Level
Inhoud / Content	- 6 koppen (0,75 liter) / 6 cups (0.75 litre) - 8 koppen (1 liter) / 8 cups (1 litre) - 12 koppen (1,5 liter) / 12 cups (1.5 litre)
Isolatie / Isolation	- normale isolatie (2 uur op temperatuur) / normal isolation (keeps temperature for 2 hours) - extra geïsoleerd (5 uur op temperatuur) / extra isolation (keeps temperature for 5 hours)
Schenkgemak / Ease of pouring	- normale schenktuit / normal spout - speciaal ontworpen knoeivrije schenktuit / specially designed spill-free spout
Schoonmaak / Ease of cleaning	- brede hals (past makkelijk afwasborstel in) / wide neck (fits any cleaning brush) - normale hals (niet alle afwasborstels passen erin) / normal neck (does not fit all cleaning brushes)

The amount of variance in these preference ratings for these concepts, explained by the systematic variation in the different characteristic levels of the clock radio or thermos flask is again expressed as an R-square value. For each subject, an R-square value is calculated on the basis of variation in pictorial product characteristics, textual product characteristics, and the total of both pictorial and textual characteristics.

Each subject is then grouped in two different ways. First, all subjects who had taken part in the feel/think questionnaire reported in Chapter 4 are grouped in tertiles on the basis of their scores on the feel scale (low, medium, high) and on the basis of their scores on the think scale (again, low, medium, high). This results in nine groups of subjects (3 feel groups x 3 think groups), and a set proportion is drawn from each of these nine groups, in order to maintain the distributional properties of the different

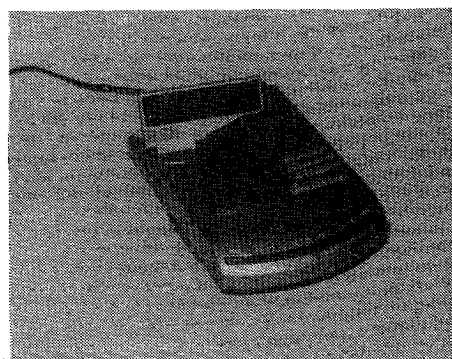
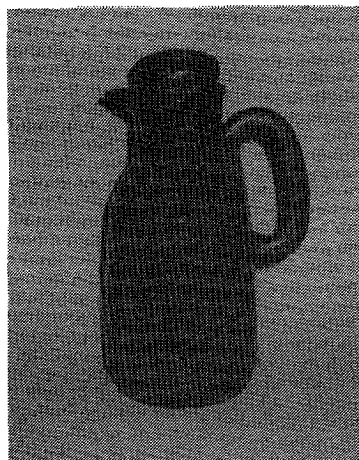
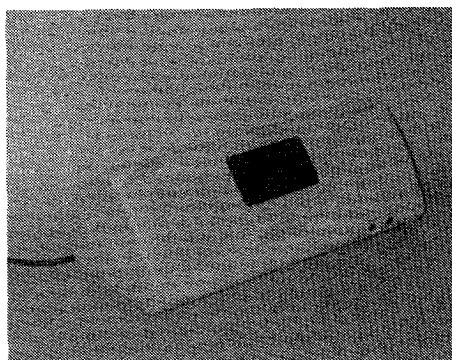
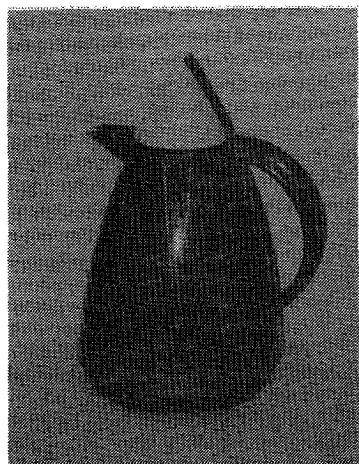
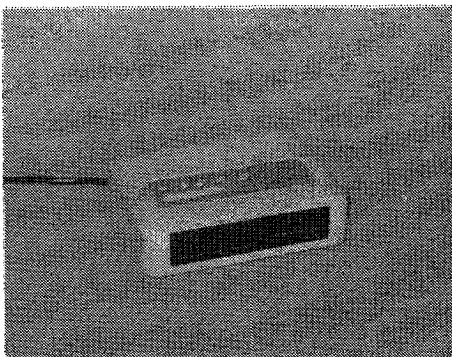
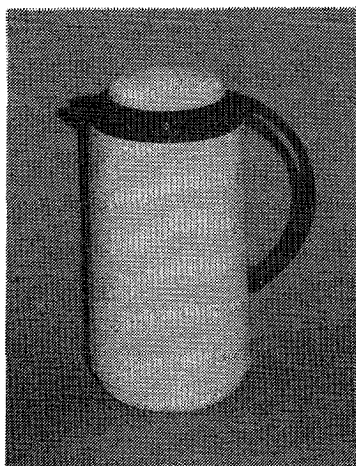


Figure 5.1 *Different levels of pictorial information of clock radio and thermos flask, as used in the main study.*

think groups in each feel group, and vice versa, of the different feel groups in each think group.

For comparisons on the basis of the feel and think scales, a two way analysis of variance is carried out. Subjects with, low, medium and high scores on the feel and think scale are compared in a 3 (feel: low, medium, high) x 3 (think: low, medium, high) design. Both feel and think are between subjects factors.

Procedure

Subjects who, two months earlier, had filled in the feel, think and involvement scale (described in Chapter 4, Study 2) were asked to come to the Product Evaluation Laboratory (PEL) at the Delft University of Technology. Subjects were first introduced to the characteristics of the clock radio and thermos flask that were used in the study. Next, they were asked to rank the product concepts of one product (presented in random order) in an order from most attractive ('aantrekkelijk') to least attractive ('onaantrekkelijk'). This was done to let subjects get acquainted with the range of concepts whose importance they would rate later. Next, the cards were put in a set order, and subjects were asked to rate the attractiveness of each card on a seven-point scale, ranging from very unattractive (totaal niet aantrekkelijk) to very attractive (zeer aantrekkelijk). After completion of the task, the same procedure was followed for the other product. To control for order effects, the order in which the concepts of clock radio and thermos flask were presented was changed each time a new subject was let in. The whole procedure lasted for about 45 minutes. At the end of the experiment, subjects received a small reward. They were informed of the purpose of the experiment at the end of the year, in a booklet that is sent to all panel members each year.

Results

In order to calculate the R-squares, and subsequently the Fisher Z-scores, we have first carried out six regression analyses per subject; three for each product: first a regression analysis where the pictorial characteristics were regressed on the subjects' preference for the product concepts, second where the textual characteristics were regressed on the subjects' preferences, and third, a regression analysis where all characteristics were regressed on the subjects' preferences. All characteristics that were used in the study were regressed as dummy variables. This means that the effect of each characteristic with k levels, was assessed by taking k-1 dummy variables into the regression model (Green & Srinivasan, 1978). FZ-scores were calculated to provide a measure to test between the different feel and think groups. Table 5.4 shows the average Fisher Z-scores for the groups with low, medium and high scores on the feel scale and the think scale.

Before comparing the differences in Fisher Z-scores with the help of analysis of variance, two assumptions are made. First, that the groups of FZ-scores being compared were normally distributed; and second, that they had the same variance. Both assumptions were tested, the first by Kolmogorov-Smirnov tests, the second by Bartlett Box F-tests. Both the normality assumption and the assumption of homoge-

Table 5.4 Average FZ-scores on the basis of three different sets of characteristics (pictorial, textual, total) of two products (clock radio, thermos flask) for the different comparison groups (low, medium, high scores) on the feel and think scale. The average R^2 s for the comparison groups are listed between brackets. Note that the FZ-scores are non-linear transformations of the R^2 s, which can lead to the peculiarity that an average R^2 based on one specific group of R^2 s may lead to another average FZ-score than the same average R^2 based on another group of R^2 s.

CLOCK RADIO: PICTORIAL								
Feel scale	low (n=42)		Think scale medium (n=48)		high (n=34)		average	
	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)
Low (n=40)	.55	(.24)	.23	(.06)	.43	(.19)	.45	(.18)
Medium (n=42)	.45	(.20)	.44	(.16)	.48	(.22)	.45	(.18)
High (n=41)	.48	(.32)	.86	(.38)	.97	(.37)	.89	(.36)
Average	.61	(.25)	.56	(.23)	.63	(.26)	.60	(.24)
CLOCK RADIO: TEXTUAL								
Feel scale	low (n=42)		Think scale medium (n=48)		high (n=34)		average	
	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)
Low (n=40)	1.46	(.69)	2.01	(.91)	1.56	(.74)	1.60	(.75)
Medium (n=42)	1.68	(.78)	1.78	(.79)	1.63	(.74)	1.72	(.78)
High (n=41)	1.33	(.67)	1.14	(.55)	1.30	(.56)	1.24	(.59)
Average	1.48	(.71)	1.58	(.72)	1.48	(.68)	1.52	(.70)
THERMOS FLASK: PICTORIAL								
Feel scale	low (n=45)		Think scale medium (n=45)		high (n=34)		average	
	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)	FZ	(R ²)
Low (n=41)	.68	(.34)	.99	(.44)	.64	(.34)	.78	(.37)
Medium (n=42)	.48	(.22)	.48	(.23)	.47	(.20)	.48	(.22)
High (n=41)	.77	(.39)	.79	(.36)	.96	(.47)	.83	(.40)
Average	.66	(.32)	.73	(.33)	.69	(.34)	.69	(.33)

continues

Tabel 5.4, continued

Feel scale	THERMOS FLASK:TEXTUAL					
	low		Think scale		high	
	(n=45)		medium		(n=34)	average
	FZ	(R ²)	FZ	(R ²)	FZ	FZ (R ²)
Low (n=41)	1.00	(.52)	.91	(.45)	1.06	.99 (.49)
Medium (n=42)	1.07	(.56)	1.35	(.65)	1.24	1.24 (.63)
High (n=41)	.99	(.50)	1.03	(.52)	.83	.96 (.48)
Average	1.01	(.52)	1.12	(.55)	1.05	1.06 (.53)

neity of variance were supported only for the feel and think groups on the Fisher Z-scores for textual and for all characteristics. One exception is the high feel group for all characteristics of the clock radio with a standardized deviation from normality (expressed as a K-S Z-score) of 1.509 ($p < .021$). For the Fisher Z-scores on the basis of pictorial characteristics, a different picture emerges. For clock radio, the medium and high feel group, and all think groups had non-normal distributions of Fisher Z-scores on pictorial characteristics: medium feel: $Z = 1.539$, $p < .018$; high feel: $Z = 1.523$, $p < .019$; low think: $Z = 1.551$, $p < .016$; medium think: $Z = 2.024$, $p < .001$; high think: $Z = 1.470$, $p < .027$. For thermos flask, the deviations from normality are less dramatic: medium feel: $Z = 1.603$, $p < .012$; medium think: $Z = 1.477$, $p < .026$. According to the Bartlett Box F-test, the Fisher Z-scores of the pictorial characteristics seem to have different variance over the different feel and think groups. However, since the Bartlett procedure is extremely sensitive to the normality assumption (O'Brien, 1981) these are not reported here, and no conclusions can be drawn from this. On the basis of these tests of the assumptions of variance of analysis, we can conclude that we can safely use this technique with the Fisher Z-scores of textual and all product characteristics. For the Fisher Z-scores of pictorial characteristics, it is a different story. Although "analysis of variance is generally robust to violations of the normality assumption" (Maxwell & Delaney, 1990, p. 109), we will need to be more careful in interpreting the results of the Fisher Z-scores for the pictorial characteristics.

To test for differences between the groups, a number of analyses of variance were carried out. For each product, two analyses of variance were carried out on the basis of the separate feel and think scales. A first anova had the Fischer Z-scores of pictorial characteristics as the dependent variable, the second had Fischer Z-scores of textual characteristics as the dependent variable. The results of these analyses are reported in Table 5.5.

Analyses of variance: Clock radio

For clock radio, it is shown that there is a significant difference between the different feel groups in the amount of variance in their preferences that is explained by pictorial

Table 5.5 *Results of the four analyses of variance on the separate feel and think scales for the two products (clock radio, thermos flask).*

CLOCK RADIO: PICTORIAL					
Source	SS	df	MS	F-value	p
Within cells	53.543	115	.466		
Feel scale	5.430	2	2.715	5.831	.004
Think scale	.231	2	.115	.248	.781
Feel x Think	.509	4	.127	.273	.895
CLOCK RADIO: TEXTUAL					
Source	SS	df	MS	F-value	p
Within cells	67.606	115	.588		
Feel scale	5.274	2	2.637	4.486	.013
Think scale	.301	2	.151	.256	.774
Feel x Think	1.948	4	.487	.828	.510
THERMOS FLASK: PICTORIAL					
Source	SS	df	MS	F-value	p
Within cells	42.208	115	.367		
Feel scale	3.133	2	1.567	4.268	.016
Think scale	.265	2	.132	.361	.698
Feel x Think	1.008	4	.252	.687	.603
THERMOS FLASK: TEXTUAL					
Source	SS	df	MS	F-value	p
Within cells	45.373	115	.395		
Feel scale	1.807	2	.904	2.291	.106
Think scale	.151	2	.076	.192	.826
Feel x Think	.900	4	.225	.570	.685

and textual product characteristics. When looking at the averages in Table 5.4, we can see that these differences are in accordance with what we proposed in Hypothesis 5.1. Namely, the higher consumers score on the feel scale, the more their preference for products is explained by variation in pictorial product information. The opposite effect of the feel scale on the Fisher Z-scores of textual product characteristics is less surprising. Since the calculation of the R-squares are based on the relative importance of the pictorial and textual characteristics, a rise in R-squares in one set of characteristics, may automatically lead to a fall in the estimated importance of the other set. A post hoc comparison between the mean Fisher Z-scores of the three feel groups shows that for pictorial characteristics, the overall significance of the analysis of variance is attributable to the difference between the low and high group, and the difference

between the medium and high group. For textual product characteristics, the significance is attributable to the difference between the medium and high feel group⁴².

No support was found for Hypotheses 5.2. First, no effect was found when comparing the different think groups on the amount of variance explained by pictorial or textual product characteristics. Thus, the think scale did not have an effect on the amount of variance in consumers' preferences that is explained by textual information.

In addition, no effects were found when comparing the different feel and think groups on the Fisher Z-scores that are based on all product characteristics (for feel $F_{(2,115)} = 1.458$, $p < .237$, for think $F_{(2,115)} = .073$, $p < .930$) Thus, a high score on the feel scale did not lead to lower R-squares on the basis of all characteristics, nor does a high score on the think scale lead to higher R-square scores on the basis of all characteristics. This is in accordance with the assumptions made earlier, that consumers with a high feel-score (or a low think-score) do not have less of their preference explained by variation in both pictorial and textual product information. Apparently, the extra importance that is given to pictorial characteristics by the high feel group has not lowered the predictive power of conjoint analysis.

Lastly, it should be mentioned that none of the interaction effects between the feel and think scale turned out to be significant. We can conclude from this that the combination of one level of the feel scale with another level of the think scale has no incremental effect on the amount of variance in the subjects' preferences that is explained by either pictorial or textual product characteristics.

Analyses of variance: Thermos flask

A somewhat different picture emerges when looking at the results for thermos flask. Again we find that the difference in Fisher Z-scores on the basis of perceptual information between the three feel groups is significant. However, when looking at the average Fisher Z-scores in Table 5.4, we can see that these differences are not in accordance with Hypothesis 5.1. Post hoc comparisons between the mean Fisher Z-scores of the three feel groups confirm this: for thermos flasks, the largest difference in Fisher Z-scores exists between the medium feel group with low Fisher Z-scores on one hand, and the high feel group with high Fisher Z-scores on the other. Although the mean Fisher Z-score for the medium group is also substantially lower than that of the low feel group, this difference is not significant. Complementary to these findings, we can see that the medium feel group has somewhat higher Fisher Z-scores on the basis of the textual product characteristics, although this difference between the medium group and the low and high feel groups is not significant.

Again, no support was found for Hypothesis 5.2. There were no substantial differences between the low, medium and high think groups in the Fisher Z-scores on the

⁴² Because the number of comparisons affects the critical value of the F-statistic at which a difference between means becomes significant, the critical value for each separate comparison was made higher according to Tukey's method (Maxwell & Delaney, 1990, p. 199). However, the comparisons that were significant in this chapter, would also have done so under the more conservative Scheffé method.

basis of textual product characteristics, nor for the Fisher Z-scores on the basis of pictorial product characteristics. The tests on the assumption that the different feel and think groups have the same Fisher Z-scores on all product characteristics was not violated, both the effect of feel and of think was non-significant (for feel $F_{(2,115)} = 2.139$, $p < .122$, for think $F_{(2,115)} = 2.199$, $p < .116$).

No significant interaction effects between the feel and think scale were found with the thermos flasks. We can conclude from this that there is no extra effect of the amount of feel relative to think when looking at the Fisher Z-scores on the basis of pictorial, textual or both product characteristics.

Involvement as a covariate

Since both the feel and the think scale are correlates of the involvement scale reported in Chapter 4, it may well be that the effects that were reported above were really involvement effects. That is, with rising levels of feel or think, Fisher Z-scores may also be higher because subjects were on the whole more involved with the product. This can be checked for by taking involvement in as a covariate in the analyses of variance that are reported above. Following this procedure, we can assess what the effects are of feel and think on the Fisher Z-scores, if the level of involvement is made constant over the different levels of feel and think. By doing so, the possible confounding effect of involvement in the assessment of the effects of feel and think is ruled out (Maxwell & Delaney, 1990, p.353).

None of the results reported in the analyses of variance reported above had been significantly affected by involvement. For the clock radio, the effect of involvement on the Fisher Z-scores is not significant for pictorial product characteristics ($F(1,114) = .324$, $p < .570$), nor for textual characteristics ($F(1,114) = .021$, $p < .885$), nor all characteristics ($F(1,114) = .446$, $p < .505$). The same applies for the thermos flask: again, the effect of involvement on the Fisher Z-scores is not significant for pictorial product characteristics ($F(1,114) = 1.001$, $p < .319$), nor for textual characteristics ($F(1,114) = .135$, $p < .714$), nor for all characteristics ($F(1,114) = 2.597$, $p < .110$).

Non-parametric analysis of variance

Since the different feel and think groups did not have normally distributed Fisher Z-scores of pictorial characteristics, the interpretation of differences between the groups may be lacking sufficient statistical conclusion validity. This problem can be overcome by comparing the different feel and think groups separately on a lower level of measurement. The Kruskal-Wallis one-way analysis of variance does exactly this; it performs an analysis of variance by rank-ordering all Fisher Z-scores and comparing the mean ranks of each group (see Siegel & Castellan, 1988).

For each product, two Kruskal-Wallis tests were carried out: one that compared the differences between the three feel groups, and one that compared the differences between the three think groups. For clock radio, the results of the analysis of variance on the Fisher Z-scores on pictorial characteristics were confirmed: the difference in the mean ranks between the three feel groups was significant ($\chi^2 = 7.870$, 2 df, $p < .020$) and in the hypothesized direction. Again, the difference between the three think

groups was not significant. For thermos flask, the difference that was found the medium and high feel group became somewhat smaller and the overall comparison over the three groups was no longer significant. Again, no difference was found between the three think groups.

Discussion

The results of the general study confirm only a part of the hypotheses for only some of the products that were used. Starting with Hypothesis 5.1, that consumers who score high on the feel scale will have more of their preferences explained by variation in pictorial product information. For the clock radio, we can see that there is clear evidence in favour of this hypothesis. The high feel group had significantly more of its preference explained by pictorial information than did the low and medium feel group. This is shown both by the metric and non-metric analyses of variance that were carried out. For the thermos flask however, a different picture emerges. The high feel group tends to have more preference explained by pictorial information than the medium feel group, significantly so according to the metric analysis of variance, but not when the non-metric procedure is followed.

Hypothesis 5.2 states that the higher consumers score on the think scale, the more of their preference is explained by variation in textual product information. Clearly this hypothesis is not supported, either for the clock radio or for the thermos flask. In fact, if there is an influence on the amount of variance explained by textual information it is from the feel scale. The high feel group had significantly less variation in textual information explained than the medium feel group for the clock radio and the same tendency existed for the thermos flask. However, as we have noted above, it is unclear to what extent this is a real effect, or an artifact of the conjoint analysis procedure. That is, the extra importance of pictorial information in the high feel group may have forced consumers in the task to pay less attention to the textual information.

Finally we can see that the assumption which stated that the variation in preference for all product information is independent of feel and think levels, has not been violated. Both for the clock radio and the thermos flask, there are no marked differences between the different feel and think groups on the total amount of variation in preferences explained by all product information. This means that the higher importance for pictorial characteristics that was found in the high feel groups did not lead to weaker overall predictions of the consumers' preferences. From this we may conclude that the importance of pictorial characteristics in the high feel groups are not severely underrated because of the inbuilt weakness of conjoint analysis to deal with pictorial product characteristics.

However, the fact that a high feel score did not severely lower the amount of variance explained by conjoint analysis does not mean that pictorial product characteristics can be used in conjoint analysis without hesitation. The reason for this is the finding that the amounts of variance explained by pictorial characteristics (the Fisher Z-scores pictorial) were not normally distributed, with the average amount of variance also being the most frequent one. Instead, we found these amounts to be

skewed towards very low amounts of variance explained by pictorial characteristics, and bimodal, in that some consumers had very high amounts of variance explained by pictorial characteristics. There is a much lower incidence of the pictorial information being moderately important, where the pictorial information is traded off against all other sources of information. This suggests that the consumers' preferences on the basis of pictorial information are much more categorical decisions (after Sujan, 1985b), which means that the way the product looks is not traded off with other characteristics, but is either not at all important or all important. Post hoc, we can see that this may have affected our results in another way. If consumers do not make trade-offs on the basis of pictorial characteristics, the conjoint analysis procedure will not force subjects to change their preference rating on the basis of all the characteristics that are varied systematically, but instead, only with the pictorial characteristics. A possible consequence, therefore, is that a higher importance for pictorial characteristics does not lead to a lower percentage of variance in preference ratings that is explained by variation in the pictorial characteristics, but instead, that it will lead to a smaller absolute amount of variation in preference data. If this should be the case, subjects in the high feel condition, with more variance explained by perceptual information, would have lower absolute amounts of variance in their preference data. A reconsideration of the data shows that this has not been the case: both for the clock radio and thermos flask, subjects' feel scores did not correlate negatively with the total amount of variance in their preference ratings (for clock radio, $r = -.07$, $p < .447$, for thermos flask, $r = .11$, $p < .234$).

It remains to discuss one last point: why was Hypothesis 5.1 fully supported in the case of the clock radio (and the coffee maker in the pilot study), and not in the case of thermos flask? In operational terms, there are two possible answers here. The first, of course, is that the effect of the feel scale on the importance of pictorial product information is product specific. A reason for this could be that the distribution of scores on the feel scale somewhat more skewed towards the high end. Thus, the clock radio and the coffee maker in the pilot study are in general less feel than the thermos flask, and it may be that for these products, a more salient distinction has been made between high and low feelers. However, there is a good reason to refute this. This is because for all three products that have been under investigation (clock radio and thermos flask in the main study, coffee maker in the pilot study) the scores on the feel scale varied widely. This means that the very low feel scores for thermos flask are low to any standard, and comparable to clock radio and coffee maker.

A second possible reason for finding no support for Hypothesis 5.1 in the case of thermos flasks is more plausible. This is that the lack of an effect of the feel scale on the importance of pictorial product information is caused by the concepts that were used in the conjoint analysis design for thermos flasks. When looking at these concepts, we can see that for thermos flask, the distinction between the pictorial and textual product information is much more obscured than it is for the coffee maker or the clock radio. This means that the pictorial information not only communicates form characteristics of the thermos flask, but also functional characteristics, which have been used as the textual product information. For example, we can assess from look-

ing at the picture of a thermos flask whether it will pour easily, what content it will have, and whether the neck of the flask is wide enough for the cleaning brushes that are typically used in the Netherlands. This is much less the case for the other two products that were used in the study. Therefore, this lack of an effect for thermos flasks may be based on the consumer interpreting the perceptual information in the light of the accompanying textual information. This can have a detrimental effect on the relation between the feel scale and the importance of pictorial information. Because the perceptual information is interpreted as information about the product's functioning, low feelers can regard the perceptual information as importantly as high feelers, be it for different reasons. Thus, the perceptual information not only informs subjects about the products form, it also informs them about the product's functioning and this may be the cause of finding no effect of the feel scale on the importance of pictorial information for thermos flasks. In a post study, we have tested whether this has indeed been the case.

POST STUDY

Method

In the post study, 26 subjects were asked to rate each picture that was used in the conjoint analysis task in the main study (see Figure 5.1). They were asked how well they could infer from the picture that it had a number of functional attributes. Subjects were a convenience sample of design engineering students, and academic and administrative staff at Delft University of Technology.

For each picture, the subjects were asked two questions. First, whether they thought that the product in the picture had a certain attribute (yes, no, completely unsure). Second, if subjects had answered the first question with a yes or no, they were asked to rate on a scale to what extent they were sure about this from looking at the picture. The scale ranged from one (completely unsure/geheel onzeker) to seven (completely sure/geheel zeker). If subjects had been completely unsure whether the product had the attribute, they were given a score of one (completely unsure) for the second question. These two questions were asked for all attributes that were previously assessed as attributes to which consumers pay most attention when evaluating a product (Appendix 5.1). All attributes from Appendix 5.1 that were mentioned eight times or more were included in the study, except form and colour. For each picture that was used in the main study (three clock radios and three thermos flasks), subjects were asked the two questions for each attribute.

Results and discussion

The ratings of how sure subjects were that a picture contained functional information were averaged for each subject over all attributes and pictures of one product. For each product, this leads to a variable that expresses to what extent a subject perceives

functional product information in a picture. So there is a variable that indicates to what extent functional information is perceived in the pictures of the clock radios, and a variable that indicates to what extent functional information is expressed in the pictures of the thermos flask. Both variables are averages of a list of quasi-metric scales, but had bimodal distributions. This is because many subjects had responded to the first question that they did not know whether an attribute was visible in the picture. These subjects received a score of one on the second question. However, if subjects had responded the first question with a yes or a no, then they had the tendency of giving moderate to high certainty scores on the second question. The resulting bimodal distribution per item was lost when the scores were averaged over the different attributes and the different pictures. However, this does not mean that we should accept that the average scores are normally distributed, since they are not normal by nature - but by the way we averaged our data.

A Wilcoxon matched pairs signed-ranks test (Siegel & Castellan, 1988) was carried out to assess whether the pictures of the thermos flask display more functional information than the pictures of the clock radios. 17 subjects had a higher score for thermos flask than for clock radio, and for only 8 subjects the reverse was true. In addition, the mean rank of the differences between the two scores was 14.91 for the 17 subjects with a higher score for thermos flask and 8.94 for the 8 subjects with a higher score for clock radio (a higher mean rank means that the differences between the two scores are larger). This results in a significant test statistic: $Z = -2.449$, p (two sided) $< .014$. This result shows that the pictures of the thermos flasks do indeed show more functional information than the pictures of the clock radio.

Note that this finding does not necessarily have implications for the main study. It may well be that the functional information that is displayed in the picture has been constant rather than variable over the different pictures. In that case, the influence of the functional information on the evaluation of the pictures could not have been measured within the design that was used in the main study. However, we need not fear that this was the case since the answers of subjects on the first question (whether they thought the picture of the product displayed an attribute) varied widely over the different pictures that were used. This was particularly the case for thermos flasks, where the majority of yes- over no-sayers reversed in four of the eight attributes that were used (for clock radio, this changed in only three of the nine attributes that were used). Again, this strengthens our assertion that the weaker results in the main study for thermos flasks are caused by the larger amount of functional information that varies over the different pictures of the thermos flasks that were shown to subjects.

GENERAL DISCUSSION

The results of the pilot, main and post study leave us to the following conclusions. First we look at the hypotheses that were tested. Hypothesis 5.1 states that the higher consumers score on the feel scale, the more their preference is explained by variation in pictorial product information. With one exception (that of thermos flask), the results

in this study clearly indicate that there is a positive effect of a person's feel score on the importance of pictorial product information. However, the exception of the thermos flask, where this result did not occur, shows that we may have tested something else. For the coffee maker and the clock radio, pictorial information was mainly form information. For the thermos flask, however, the pictorial information consisted of a considerable amount of functional information, and this may have caused the lack of effect of the feel score on the importance of pictorial information for the thermos flask. Thus it may have been better to speak of an effect of *form* information, instead of an effect of *pictorial* information.

Hypothesis 5.2 states that the higher consumers score on the think scale, the more their preference is explained by variation in textual product information. No evidence for this hypothesis was found in this study. The textual (functional) product information was as important for high thinkers as it was for low thinkers. Thus, the extent to which a consumer considers his or her actions as rational does not seem to determine how important functional information is for his or her preferences.

Finally, we did not find a violation of the assumptions that there is no effect of the feel and think scale on the amount of variation explained by all characteristics in the conjoint analysis design. Note that we have controlled for these possible effects because of the suggestion by Stokmans (1992) that pictorial information in a linear additive model is not suited as a variable on which conjoint analysis is based. In this study, however, we did not find that a smaller percentage of variance in preferences could be explained in the condition where pictorial information was more important, nor did we find that there was a smaller amount of variance to be explained in this condition. What we did find was that the importance of pictorial information did not have the same distribution properties over subjects as verbal information. That is, the importance of pictorial information was much more an all or nothing decision of subjects: either pictorial information was very important, or it was not important at all.

The findings reported above have implications on a theoretical and practical level. First about our theory of subjectivity. The finding that consumers with a high feel score give more importance to the product's form, can be regarded as evidence for our theory on emotional judgements. Namely, that emotional judgements are directed at the product's immediate attraction, based on what they directly perceive in the situation, and this is the actual form of the product. We can regard the product's functioning as an aspect of the product's postponed attraction, and in this sense, in the indirect consequences of perception.

After reconsideration, the finding that consumers with a high think score did not give more importance to the product's functions does make some sense. The fact that a product judgement is not very rational does not, by itself, necessarily imply that functional information is less important in someone's judgements. Indeed, what we originally argued in Chapter 2, is that in a rational judgement, functional information will be used logically (i.e. consistently) to attain an expected outcome. This will not lead to a higher importance of functional characteristics, so much as to a higher consistency of this importance over time.

There is also an implication on a practical level, about the procedures that are used in conjoint analysis. The finding that the importance of pictorial characteristics have a bimodal distribution suggests that pictorial information is either very important, or it is not important at all. This means that in the procedure of conjoint analysis, no trade-offs are made between pictorial information and the other characteristics. Since conjoint analysis was designed especially to force subjects to make such trade-offs, we may well conclude that on an individual level, conjoint analysis is not the most suitable method of assessing the importance of pictorial information. On an aggregate level, however, the group of high feelers, who found pictorial information more important, did not end up with having less of their preferences explained by all characteristics than did low feelers. So we must conclude that, although conjoint analysis may not be very *suitable* to measure the effect of pictorial information on an individual level, it may well be *sufficient*, in that it can give an estimate of the effect of pictorial information for a preselected group of consumers.

THE SALIENCE OF ABSTRACT PRODUCT ATTRIBUTES IN CONSUMER PERCEPTION⁴³

INTRODUCTION

In this and the next two chapters, the focus of our attention shifts from emotionality to abstract product attributes. In Chapter 3 we have proposed that the nature of abstract product attributes is best explained by context availability theory (Schwanenflugel & Shoben, 1983). In line with context availability theory, an abstract product attribute is not different from concrete attributes because it is derived from them, but only because it is less clear to other people in what context the attribute is meaningful. Thus, if a concrete attribute is named by a consumer, like 'made of steel', it is clear what is meant by this because people in general have accepted in which specific situations we can use this concrete word to qualify a product. However, if an abstract attribute is named by the consumer, like 'modern', it is less clear what this means, because people in general have not strictly accepted in which specific situations we can use this word to qualify a product.

This view on the nature of abstract attributes is in contrast with dual coding theory (Paivio, 1975; 1978), which is often interpreted as an assumption that abstract product attributes are different from concrete attributes because they subsume a list of more concrete attributes. Now in Chapter 3 we have argued that some abstract attributes, like 'dairy', may well be subsumptions of more concrete attributes, like 'milk based or eggs', but that this is not the reason for considering them abstract. The reason that we consider them abstract, is that the attribute dairy can reflect on a very unspecific list of situations, while for milk and eggs, this is much less the case. Thus abstract attributes are attributes that have a more variable situation of use.

In this part of the thesis we propose that context availability theory provides a better explanation of abstract product attributes than dual coding theory. This can be done by showing that there exist abstract product attributes that are not subsumptions of concrete product attributes. Instead, abstract attributes exist that have a direct reference to what is perceived in a situation. The existence of such abstract attributes would be an anomaly for dual coding theory, since it assumes that it is the derivation that makes the word abstract. The focus in this chapter is on the position of abstract attributes in the consumer's perception. We will start by testing the proposition that abstract attributes have a direct reference to perceptual information. In this chapter we will see whether there is a reference to perceptual information, and in the next chapter

⁴³ With some alterations, this chapter has previously been published in Snelders and Stokmans (1994).

(Chapter 7) we will see whether this reference is a direct one, underived from more concrete attributes. Also in Chapter 7, and in Chapter 8 we will focus on the nature of abstract attributes; on what it is that makes them different from concrete attributes. There we will try to show that abstract attributes are richer in context, in that they can be associated with a more variable situation of use. We can think of this both in terms of how abstract attributes are used verbally, which we will do in Chapter 7, and how abstract attributes relate to perceptual information, which we will do in Chapter 8.

Operationalisation of Proposition 3: Reference to perceptual information

In this chapter the proposition that abstract attributes have a direct reference to perceptual information is investigated (Chapter 3, Proposition 3). We will try to demonstrate this by asking consumers to list those attributes that have direct reference to perceptual information. We will ask consumers to list the attributes that they directly see in the product. If they list a substantial number of abstract attributes, then this indicates that abstract attributes refer to perceptual information⁴⁴. In order to be able to investigate this proposition, there is a problem that must first be met. The problem is that, when asked to report on what they see in products, consumers may well refer to some private association with the product, rather than what they perceive in the product itself. For example, someone may associate a chair as one that his or her grandfather always sat in, and however modern that chair is, it would be called a grandfather chair. It has been argued that such attributes are so subjective that they are no longer product attributes, but attributes of the consumer (e.g. Myers & Shocker, 1981). That is to say, if the grandfather had just died, the consumer may well associate everything with grandfather, no matter what it was. Although we believe that in such a case, there would still be something of grandfather in the chair, we would like to avoid a discussion about this by limiting our study to attributes which we are sure are product referent. In order to do this, we must place two restrictions on which abstract attributes we can investigate. The first is that an abstract attribute must *meaningfully distinguish* those products that have the attribute from those that do not have the attribute: it should have discriminatory value. This means that the attribute should not apply equally to all products. Note that we will therefore have to investigate the attributes of groups of products, rather than just one product.

The second restriction is that the abstract attributes should not have idiosyncratic meaning (that could refer to anything), but instead, should have a more general meaning that is communicable and thus shared with other subjects. For example, when a consumer says that a product is 'beige' it should not reflect on only that peculiar type of beige that his particular dog has. Instead, it should be the 'beige' that people in general think it is, which is much more socially restricted. The reason for this is purely a design matter: we can only make sure that an attribute refers to the product if it does so over subjects. At first sight, there may seem to be a problem in this, namely that

⁴⁴ Whether this reference is really direct, in the sense of being unmediated by more concrete attributes, we will investigate in chapter seven.

abstract attributes are subjective by definition and thus we can never be completely sure whether an abstract attribute refers to the product or the subject. However, our second restriction is not placed on the attribute names that are listed by subjects, but instead, only on the meaning to which these attribute names refer. The two are not necessarily the same; subjects can have various abstract, and thus subjective attribute names that still relate to the same specific aspect of their perception of a product. In this study, we will try to demonstrate that such attributes exist.

Different methods of measuring consumer perceptions

In the practice of consumer research, there are a number of methods available for finding the discriminative attributes of products having a general meaning for a group of consumers. Typically, these methods let consumers compare different product alternatives and look at the main distinctions that consumers make between products. This can be done by asking consumers for a direct similarity between products (in the case of multi-dimensional scaling), or by asking them to rate all products on a list of attributes (in the case of factor analysis). Both methods result in a 'perceptual map' (Green, Tull & Albaum, 1988; Urban & Hauser, 1980). This is a multidimensional space in which the perception of a product relative to other products in the market is reflected. The dimensions which make up the perceptual map are regarded as the critical perceptual qualities of the products. The position of a product on a dimension can therefore be interpreted as the extent to which the product possesses such a perceptual quality. Both for factor analysis and for multidimensional scaling it is possible to relate explicit attribute ratings to these perceptual dimensions. Basically, this is what we want: a perceptual map which relates attributes to the perceptual dimensions of products. However, for both methods, all the attributes which make up the product need to be known in advance. This means that these methods are not suitable for our problem, because we want consumers to name attributes of products in their own words.

An alternative to these methods is a technique called natural grouping. This technique was first introduced by Kuylen and Verhallen (1988), and can be regarded as a special case of 'subjective clustering' (Green, Carmone & Fox, 1969). The technique starts when respondents are presented with a set of products, and they are asked to split these products into two separate groups. In addition, respondents have to label each group with an attribute name. Next, they are asked to make further splits into yet smaller groups, just as long as they feel that they can create meaningful groups. Again every group that is formed has to be labelled by respondents with attribute names. With natural grouping, the attributes of a set of products are generated by the respondents themselves. Consequently, all relevant attributes are included and they are all stated in terms that are meaningful to the respondent. Surprising perhaps to those researchers who feel that the more standard survey methods would be better understood by respondents, natural grouping is not a difficult task for respondents. Respondents find these grouping tasks surprisingly easy to carry out, and can denominate the groups that they create with little effort. Natural grouping apparently asks people to

do something which they are very good at. Indeed, it is undisputed among cognitive psychologists that the categorization of objects is a very integral part of people's thinking (see Lakoff, 1986 for an overview).

The procedure of natural grouping results in a structure which shows which criteria (i.e. the product attributes) the respondent uses to discriminate one set of products from another. Figure 6.1 gives an example of such a structure. There has been some debate on how to interpret and analyze such a structure. Although these structures by themselves express only how people categorize groups of products, some have argued that the number of steps down the structure during which products remain in the same group can be regarded as a measure of similarity (Green, Carmone & Fox, 1969). In the example of banks in Figure 6.1, A would be regarded as very similar to B, somewhat less similar to C and D, and different from E, F and G. This way, an individual tree-structure can be transformed into measures of similarity between products. This transformation provides the opportunity to aggregate the individual structures and to create one perceptual space for all respondents, with the help of multidimensional scaling.

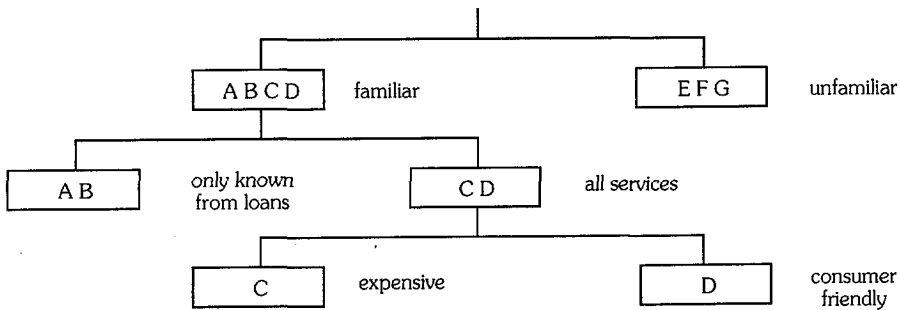


Figure 6.1 Example of the tree-like structure from one respondent's natural grouping of banks (after Kuylén & Verhallen, 1988).

The suggestion of converting grouping structures into similarity data goes back before the introduction of natural grouping (Poiesz, 1982). Yet, when natural grouping was introduced, the most appropriate method for it was thought to be correspondence analysis (Greenacre & Blasius, 1994; Hoffman & Franke, 1986). Here, the individual structures are combined in one frequency table and this table serves as the input for a correspondence analysis. The transformation of the individual structures into an aggregate frequency table proceeds as follows. First, the attribute names that denote the different groups are content-analyzed, resulting in a limited set of attribute categories. Next, the frequency with which each product falls under one of the attribute categories is counted over all respondents, resulting in one aggregate frequency table, with the products in the columns and the attribute categories in the rows. Correspondence analysis is carried out on the basis of a decomposition of the χ^2 value for this table. This results in the placement of all columns (products) and rows (attributes) in a

n-dimensional Euclidean space, with n as the smallest number of rows or columns minus one. The position of columns (products) and rows (attributes) in this space is determined by two rules: a) if two rows have the same relative distribution over the columns, they will be positioned close to each other, and b) if a row has the same relative distribution over the columns as the marginal distribution of rows over columns, then it will be positioned more in the centre of the Euclidean space.

Results from correspondence analysis on natural grouping data have been compared to multidimensional scaling solutions (Verhoeven, 1991) and they have been shown to be remarkably similar. However, there are two reasons for using correspondence analysis instead of multidimensional scaling. First, with correspondence analysis, the dimensions on which products are portrayed can be interpreted with the help of the attribute names that respondents have given. Second, the information in the tree-like structures that natural grouping provides is not strictly ordinal. The number of times that two objects remain in the same group only expresses the similarity between these objects to the extent that every split between two groups of objects has the same relevance to the meaning of these objects. Since this is not necessarily the case, the measures of similarity on which multidimensional scaling is based are error-prone.

A third way of analyzing natural grouping data has been suggested by Steenkamp (1989). The method that is proposed here is procrustes analysis (Gower, 1975). However, there are several reasons for deciding against the use of procrustes analysis for natural grouping data, both for practical and more theoretical reasons. First, procrustes analysis needs complementary data in the form of attribute importances or saliencies. Unlike multidimensional scaling, where each product has to be rated on each attribute, information is needed only about the importance or saliency of the attributes themselves. Although this is relatively little work for respondents, it still implies that the natural grouping task has to be complemented with another task in order to conduct the analyses proper. Secondly, it is impossible to ask respondents how salient an attribute is without referring to a specific product. This implies that one can only ask consumers to rate general importances of attributes. However, there are severe difficulties with the notion of 'general importance'. Attribute importances do not say anything about the consumer's general understanding of attributes, but only about their function in specific situations of use (Myers & Shocker, 1981). This means that procrustes analysis undermines the reason for giving respondents a natural grouping task, namely to provide perceptual, rather than preferential data.

So here we will look at the general positioning of products on the basis of the attributes that consumers have used to distinguish groups of products. This will be done with the help of a correspondence analysis of natural grouping data. These data describe how consumers group products, and how they do this on the basis of attributes that they have come up with themselves. Correspondence analysis will lead to an n -dimensional Euclidean space in which both attributes and products can be positioned. For those dimensions on which the position of attributes and products is meaningfully interpretable, we can see to what extent each attribute contributes to the dimensions. On the basis of this we propose the following:

Hypothesis 6.1

In a solution of correspondence analysis of natural grouping data that is meaningfully interpretable, a substantial part of the contributions to the dimensions comes from abstract attributes.

Note that we will not test the hypothesis on its statistical significance because we only have a subjective understanding of what makes up a substantial number of abstract attributes and what makes up meaningful perceptual dimensions. However, since abstract attributes have been regarded in the literature as attributes of language rather than objects (Paivio, 1991), we can regard any substantial number of abstract attributes that we can come up with as anomalous, and a necessary condition for the view that abstract attributes refer to the perception of an aspect of the product. Therefore, if this hypothesis is found to be true, we will have demonstrated that a substantial number of abstract attributes will meaningfully distinguish products over general perceptual dimensions.

METHOD

Respondents were 43 members of the consumer household panel of Delft University of Technology who were invited to our laboratory to take part in the natural grouping task⁴⁵. The panel is a random sample of the inhabitants of Delft and the surrounding area (Tan, 1992). Seven telephones were used in the task, four of these were selected on the basis of the diversity in their appearance, and three more were added randomly. The telephones that were used were regular telephones, and at the time of the research, February 1991, they were all on sale at the P.T.T. telephone shops in the Netherlands. They are shown in Figure 6.2.

On average, the whole procedure lasted about 10 minutes⁴⁶. The procedure of this research started with an instruction. First, it was explained to the respondents how the natural grouping task worked. They were asked to make distinctions between sets of telephones, but solely on the basis of how they looked. They should think of the telephones as being 'all of the same price and all having the same possibilities and quality'. Next, they were shown the 7 telephones which they had to take a good look at. Then the actual natural grouping task started, and the respondents had to split the group of telephones and denominate each group. In total one can make six splits from seven telephones, and thus create $6 \times 2 = 12$ distinctive groups, each labelled with a distinctive attribute. There was no obligation to make groups of comparable sizes. So, for example, a first split of the telephones could be into groups of three and four, but

⁴⁵ A sample of 43 may seem small, but it is twice the number at which consumers are generally found to give no new answers when asked questions about a product (Griffin & Hauser, 1991).

⁴⁶ For this reason, this research was carried out in combination with some other enquiries from other researchers. The other tasks were unrelated to the present one: other types of questions about other products were asked by another experimenter.

also into groups of one and six. After no more splits could be made by the respondents, the respondents were thanked and informed about our intentions for the data they had provided.

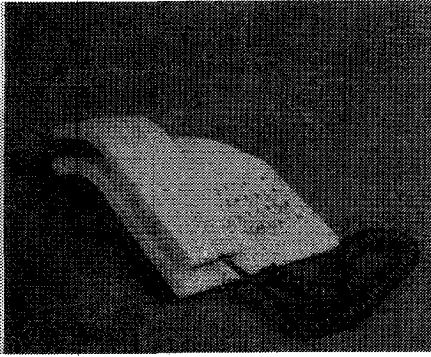
The 43 respondents gave 516 distinctions which means that all subjects had created the maximum number of 12 groups. These 516 distinctions were categorized into 50 distinct attribute categories. The 50 attribute categories were created by two judges who had first independently looked at these distinctions and after that had discussed which attribute categories to choose. The categories are listed in Table 6.1. All attribute categories were rated by another six judges on their concreteness⁴⁷. This was done with the help of a seven point semantic differential, ranging from 'zeer concreet' (very concrete) to 'zeer abstract' (very abstract). This measure has been used previously by Johnson and Fornell (1987) and was found to have a sufficient level of reliability. The average agreement between the six judges can be expressed by the average correlation of each judge with the remaining five judges. This measure is Cronbach's α and in this case, there was a high level of agreement with $\alpha = .83$.

RESULTS AND DISCUSSION

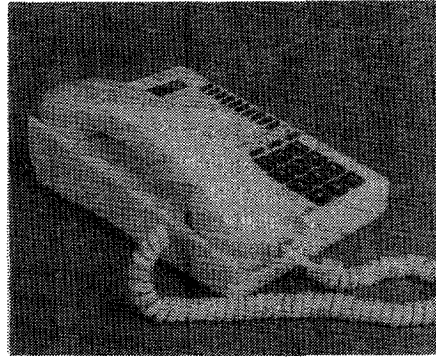
To resume, each respondent was given a natural grouping task and in each task respondents had to put the seven telephones into two distinct groups, and within each group two further groups until no further splits could be made. For seven telephones, this means that each respondent could make a total number of 12 groups, sub-groups, sub-sub-groups, etc. Since each respondent had created the total number of groups $43 \times 12 = 516$ groups had been made. Each group had been given a name that was later identified as belonging to a specific attribute category. In total, 50 attribute categories had been identified.

Every time a product was put into a group by a respondent, it was recorded as falling under a specific attribute category. This resulted in a two-way table of frequencies with 7 columns (the products) and 50 rows (the attributes), listing the number of times that a product was put into an attribute category by a subject (Table 6.1). The total frequency of this table came to 882, from which it can be derived that the respondents had made groups which contained, on average, $882/516 = 1.709$ products. With seven products, this average number of products per group ranges from 1.667 (if even splits are made with groups containing an equal number of products) to 2.25 (if every split separates just one product from the group). This makes it a good measure for assessing whether in the natural grouping task subjects have actually made groups of products (in which case the number would be 1.667), or whether each time they have singled out one product to describe (in which case the

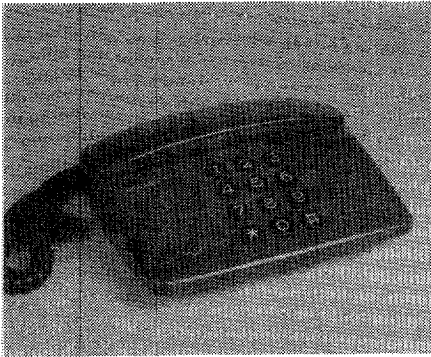
⁴⁷ Note that there are more judges to rate the answer categories on their concreteness (six) than there were to create the answer categories in the first place. This is mainly for practical reasons: putting 516 distinctions in 50 answer categories is a lot more work than rating the 50 answer categories on a seven point scale.



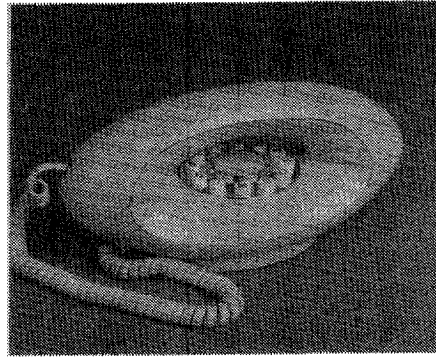
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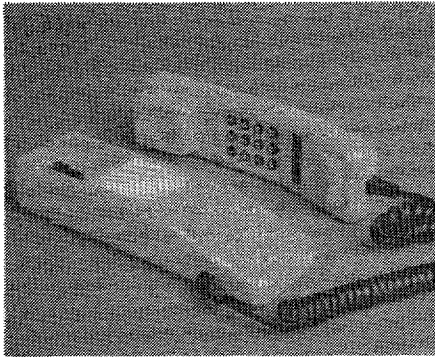
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number would be 2.25). A number of 1.709 thus means that subjects have made groups of relatively even sizes.

The content of Table 6.1 was decomposed with the help of correspondence analysis⁴⁸. A three-dimensional solution was chosen since three dimensions were meaningfully interpretable, and a scree plot of the levels of inertia per dimension suggested a three dimensional solution. Together, the three dimensions explained 74% of total inertia⁴⁹. A graphical display of the results, in the form of a symmetric plot, is shown in Figure 6.3. The numerical results of this analysis are shown in Table 6.2.

⁴⁸ The correspondence analysis was carried out with the help of CORAN (Netherlands' Central Bureau of Statistics, 1988).

⁴⁹ Inertia is the variance estimate of nominal data.



5



6



7

Figure 6.2 The seven telephones, as used in the natural grouping task. Colours: T1 white, T2 beige, T3 dark grey, T4 apricot, T5 yellow, T6 grey, T7 black and white.

Dimension 1 (34.2% of total inertia)

On the positive side of this dimension we find three telephones: the telephones T1, T4 and T5 of Figure 6.2. On the negative side of this dimension we find telephones T2, T6 and T7. Telephone three is positioned right at the centre of this dimension, with a coordinate close to zero. The contributions of the telephones show which telephones have had most impact in determining the orientation of this dimension: telephones T4 and T2 (accounting for 27.7% and 24.8% of the inertia of dimension 1), and to a lesser extent telephones T5 and T6 (19.0% and 12.8%).

For an interpretation of this dimension we turn to the coordinates and contributions of the attribute categories. Those attribute categories of interest are those that have a positive or negative position on this dimension and, at the same time, contribute disproportionately to the inertia on which this dimension is based (explained inertia > 3%). On the positive side these are: 'living room', 'colourful', 'small', 'ugly', 'kitsch',

Table 6.1 *Frequency table of 7 telephones, falling under 50 attribute categories.*

Attributes	Telephones							Total
	T1	T2	T3	T4	T5	T6	T7	
Coarse	0	2	1	1	1	1	2	8
Elegant	8	1	4	7	5	3	2	30
Smooth	0	1	2	1	1	2	1	8
Big	0	8	2	3	0	13	5	31
Kitsch	0	0	0	7	2	0	0	9
Ugly colour	1	0	0	2	4	0	1	8
Round receiver	0	3	1	1	1	1	0	7
Rectang. receiver	1	1	2	0	0	2	3	9
Awkward receiver	3	0	1	0	0	1	0	5
Convenient receiv.	0	2	1	2	2	0	3	10
Lightweight	3	1	1	0	0	2	1	8
Light colour	2	2	1	0	0	0	6	11
Dark grey	1	0	4	0	0	1	1	7
Practical	5	11	11	2	7	10	15	61
Impractical	5	5	2	8	6	7	2	35
Eye-catching	7	5	1	13	6	3	0	35
Ordinary	5	8	13	0	6	9	15	56
Keys in receiver	0	1	1	0	5	0	1	8
Keys next to rec.	3	2	0	0	0	4	0	9
Small keys	4	0	0	2	2	2	2	12
Large keys	0	1	7	0	0	2	3	13
Colourful	0	1	3	5	9	1	1	20
Square	2	0	0	0	1	3	0	6
Round	1	1	1	2	2	1	3	11
Chique	1	0	3	5	1	1	2	13
Modern	15	3	5	5	10	13	7	58
Classic	0	6	4	6	0	1	4	21
Playful	2	0	3	2	1	0	0	8
Sombre	0	0	3	0	0	0	0	3
Flat	2	1	3	0	2	1	0	9
Cheap	0	0	4	0	2	0	0	6
Attractive	7	3	5	6	5	2	1	29
Ugly	3	3	4	12	5	1	6	34
Businesslike	3	12	4	0	2	10	8	39
Living room	8	0	8	7	8	3	4	38
Complicated	1	22	2	2	1	11	3	42
Uncomplicated	7	1	7	1	4	4	15	39
Big receiver	0	3	0	0	0	1	1	5
Easily soiled	3	1	0	0	1	0	1	6
Easily cleaned	0	0	1	0	2	0	0	3
Unreliable	2	1	0	1	0	3	0	7
Reliable	3	7	3	0	0	4	6	23
Oblique angles	2	0	0	0	0	0	0	2
Stylized	4	1	0	1	1	2	0	9
Unusual	2	1	2	4	1	1	0	11
Horizontal receiv.	0	0	4	3	0	0	4	11
Vertical receiver	3	4	0	0	3	4	0	14
Fits in everywhere	2	0	1	2	1	0	0	6
Rich in contrast	0	0	0	0	0	0	2	2
Small	10	2	2	2	11	0	0	27
Total	131	127	127	115	121	130	131	882

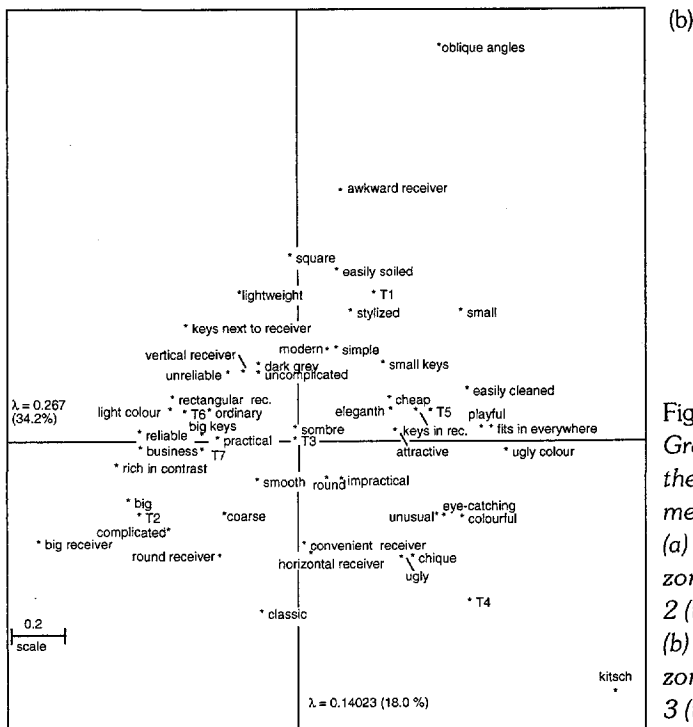
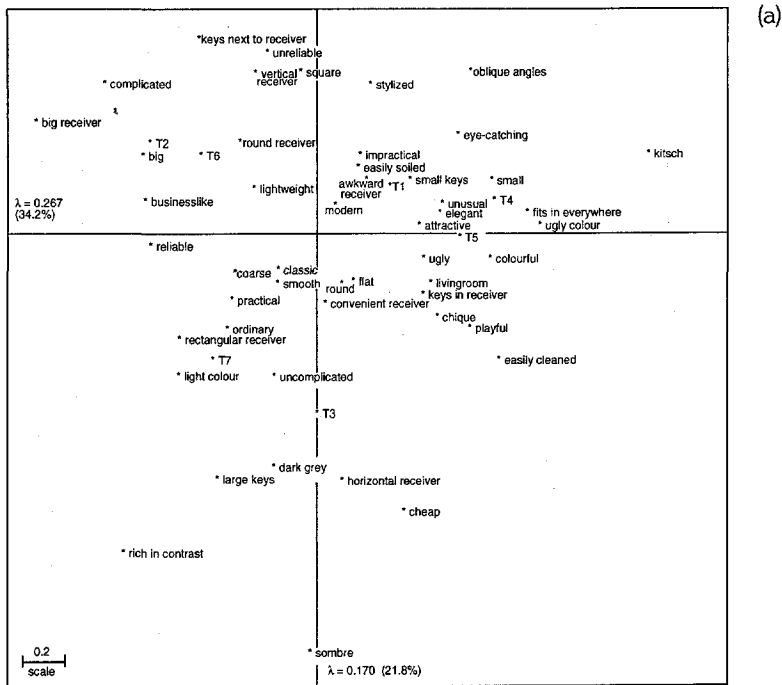


Figure 6.3
Graphical display of the coordinates of dimension 1, 2 and 3.
(a) Dimension 1 (horizontal) by dimension 2 (vertical)
(b) Dimension 1 (horizontal) by dimension 3 (vertical).

Table 6.2 *Coordinates and contributions of dimensions 1, 2 and 3.*

	Coordinates			Contributions		
	1	2	Dimensions 3	1	2	3
T1	0.332	0.273	0.650	6.134	6.512	44.701
T2	-0.678	0.408	-0.315	24.818	14.095	10.162
T3	-0.006	-0.703	0.028	0.002	41.888	0.080
T4	0.753	0.172	-0.669	27.717	2.278	41.579
T5	0.608	0.029	0.125	19.010	0.067	1.527
T6	-0.482	0.361	0.132	12.841	11.288	1.845
T7	-0.412	-0.522	-0.032	9.477	23.872	0.105
Coarse	-0.317	-0.112	-0.359	0.342	0.067	0.834
Elegant	0.516	0.094	0.113	3.397	0.178	0.311
Smooth	-0.171	-0.181	-0.190	0.100	0.176	0.233
Big	-0.719	0.348	-0.250	6.816	2.510	1.567
Kitsch	1.396	0.341	-1.315	7.461	0.697	12.579
Ugly colour	0.934	0.064	-0.073	2.968	0.022	0.035
Round receiver	-0.321	0.375	-0.506	0.308	0.657	1.451
Rectangular receiver	-0.551	-0.424	0.167	1.163	1.078	0.202
Awkward receiver	0.196	0.231	1.127	0.082	0.178	5.131
Convenient receiver	0.024	-0.255	-0.476	0.002	0.436	1.834
Lightweight	-0.258	0.219	0.633	0.226	0.256	2.590
Light colour	-0.559	-0.546	0.124	1.461	2.191	0.136
Dark grey	-0.163	-0.936	0.329	0.079	4.095	0.612
Practical	-0.353	-0.221	0.021	3.233	1.997	0.022
Impractical	0.206	0.349	-0.153	0.634	2.839	0.662
Eye catching	0.604	0.467	-0.347	5.434	5.102	3.401
Ordinary	-0.371	-0.387	0.122	3.279	5.597	0.676
Keys in receiver	0.470	-0.204	0.102	0.753	0.223	0.068
Keys next to receiver	-0.492	0.830	0.549	0.929	4.134	2.192
Small keys	0.365	0.237	0.381	0.679	0.448	1.410
Large keys	-0.436	-1.000	0.010	1.050	8.682	0.001
Colourful	0.740	-0.090	-0.314	4.663	0.108	1.591
Square	-0.056	0.670	0.811	0.008	1.798	3.189
Round	0.114	-0.182	-0.167	0.061	0.244	0.247
Chic	0.503	-0.304	-0.496	1.401	0.803	2.589
Modern	0.120	0.167	0.384	0.357	1.075	6.927
Classic	-0.157	-0.123	-0.735	0.222	0.211	9.179
Playful	0.668	-0.361	0.057	1.518	0.695	0.021
Sombre	-0.012	-1.706	0.074	0.000	5.826	0.013
Flat	0.151	-0.199	0.430	0.087	0.237	1.348
Cheap	0.384	-1.114	0.161	0.377	4.968	0.126
Attractive	0.430	0.083	0.054	2.281	0.134	0.069
Ugly	0.459	-0.095	-0.498	3.045	0.205	6.816
Businesslike	-0.699	0.148	-0.027	8.101	0.573	0.023
Living room	0.491	-0.192	0.141	3.904	0.938	0.613
Complicated	-0.877	0.613	-0.386	13.750	10.536	5.050
Uncomplicated	-0.165	-0.542	0.296	0.454	7.644	2.754
Big receiver	-1.134	0.515	-0.450	2.737	0.886	0.819
Easily soiled	0.166	0.296	0.769	0.070	0.352	2.869
Easily cleaned	0.781	-0.522	0.247	0.778	0.546	0.148
Unreliable	-0.196	0.765	0.272	0.114	2.737	0.419
Reliable	-0.688	-0.014	0.020	4.635	0.003	0.007

continues

Table 6.2, continued

	Coordinates		Dimensions	Contributions		
	1	2		1	2	3
Oblique angles	0.643	0.662	1.735	0.352	0.585	4.867
Stylized	0.225	0.653	0.595	0.194	2.561	2.576
Unusual	0.548	0.138	-0.334	1.404	0.140	0.994
Horizontal receiver	0.103	-0.967	-0.491	0.049	6.869	2.140
Vertical receiver	-0.252	0.690	0.304	0.378	4.444	1.048
Fits in everywhere	0.894	0.087	0.051	2.043	0.031	0.013
Rich in contrast	-0.799	-1.268	-0.084	0.543	2.146	0.011
Small	0.727	0.252	0.589	6.081	1.141	7.586

'eye-catching' and 'elegant'. On the negative side these are: 'complicated', 'big', 'businesslike', 'reliable', 'practical' and 'ordinary'. So, the first dimension makes a distinction between large complicated business telephones versus small 'expressive' telephones for in the living room.

Dimension 2 (21.8% of total inertia)

Telephones T2 and T6 have high positive scores on the second dimension, and at the same time account for some inertia: 14.3% and 11.3%. The most extreme scores, however, are found on the negative side of this dimension for telephones T3 and T7 (accounting for 41.9% and 23.9% of the inertia of dimension 2). Here, attribute categories with high positive scores that contribute to the inertia are: 'keys next to the receiver', 'eye-catching', 'complicated', and 'vertical receiver'. On the negative side, these are: 'sombre', 'dark grey', 'cheap', 'ordinary', 'uncomplicated', 'large keys' and 'horizontal receiver'. On the one hand there is a distinction between the plain and simple, cheap telephones that are rather sombre versus the more complicated and eye-catching telephones. However, since the plain and simple goes together with horizontal receiver, and the complicated and eye-catching telephones go together with vertical receivers, this dimension also touches on old style versus new style telephone design: old style telephones, that were plain, greyish and simple all had horizontal receivers in the Netherlands, while new style telephones, that came with new functions and designs, tended to have vertical receivers.

Dimension 3 (18% of total inertia)

Although this dimension explains only slightly more than it would if all dimensions were made by chance, we have included it because it is meaningfully interpretable. Telephone T1 has a relatively high positive score on the third dimension, while telephones T2 and T4 have relatively high negative scores on this dimension. The remainder of the telephones are positioned close to zero. The contributions of the telephones show that T1 and T4 are of most importance to this dimension (accounting for 44.7% and 41.6% of the inertia that is explained by dimension 3). The attribute categories that both have high scores and substantial contributions are, on the positive side of dimension 3: 'oblique angles', 'awkward receiver', 'square', 'small' and

'modern'. On the negative side, these are: 'kitsch', 'classic', 'ugly', 'complicated' and 'eye catching'. This dimension is fully accounted for by the two telephones with the most deviant designs, T1 and T4. It positions the avant garde telephone T1 with its oblique angles against its counterpart, T4, with its unashamedly classic appearance (even kitsch to some).

One last thing should be mentioned concerning the position of the attribute categories that are highly evaluative in nature. Note that for the first and second dimensions 'attractive' and 'ugly' are positioned very close to each other. For the third dimension, 'ugly' loads somewhat on the negative side. However, it is not opposed to 'attractive' in this dimension, but to 'modern'. These findings clearly indicate that natural grouping data indeed reflect on product perception, and not on product preference.

Finally, we can see to what extent abstract attributes contribute to this three dimensional solution. For this, we have calculated the contribution scores of all attributes on all three dimensions, and related these to the concreteness scores of the same attributes, as rated by six judges. The distribution of the average concreteness scores of the attributes turned out to be tri-modal. The average scores on the seven point scale had local modes on the intervals 1.65 - 1.95, 3.75 - 4.05, and 4.65 - 5.25. As a result, the attributes were divided into tertiles of concrete, medium and abstract attributes, and each tertile nicely centred around one mode (tertile boundaries were set on 3.3 and 4.5). This shows that a substantial proportion of the attributes that consumers listed are abstract, in the sense that six judges had given more than a third of the attributes a score indicating that the attribute was more abstract than concrete.

For each group of attributes, the average contributions to the perceptual dimensions were calculated. The average contributions and standard deviations per attribute category are listed in Table 6.3. The table shows that on average, the abstract attributes explain as much of the inertia as concrete attributes, regardless of which interpretable dimension we look at. Although we cannot test the assertion that there are no differences, the opposite case, that there are differences, can certainly be discounted: analyses of variance on the differences between the three attribute groups on their contribution to the three dimensions are all non significant (for dimension 1, $F(2,47) = 1.270$, $p < .290$, for dimension 2, $F(2,47) = .406$, $p < .669$, for dimension 3, $F(2,47) = 1.565$, $p < .220$, for all dimensions together, $F(2,47) = 1.202$, $p < .310$). Thus in a solution of correspondence analysis of natural grouping data, a substantial part of the contributions to the dimensions comes from abstract attributes.

GENERAL DISCUSSION

Correspondence analysis has made our natural grouping data intelligible on an aggregate level. It has come up with interpretable, general dimensions of how consumers view products. When considering the role of abstract attributes we can see that they are as important as concrete attributes in the make up of these meaningful dimensions. The contribution of abstract attributes to the dimensions was not smaller

Table 6.3 *Average contributions and standard deviations of concrete, medium and abstract attributes.*

Attributes	Contributions							
	Dimension 1		Dimension 2		Dimension 3		All dimensions	
	mean	sd	mean	sd	mean	sd	mean	sd
Concrete	1.416	2.091	2.474	2.538	1.431	1.883	5.321	4.088
Medium	2.835	3.865	1.829	3.018	2.925	3.680	7.588	7.314
Abstract	1.715	1.607	1.725	2.064	1.610	2.011	5.051	3.311

than the contribution of concrete attributes, nor was it more variable. From this we may conclude that, when asked to list the distinctive attributes of a group of products, consumers are as likely to list abstract as concrete attributes of the product. This is in confirmation of our proposition that abstract attributes have a direct reference to perceptual information. However, it is not a full test of this proposition, since we do not know whether this reference to perceptual information is direct. The abstract attribute may be the first thing that someone says about a product, but that does not necessarily mean that he or she did not think of some concrete attributes first and from this derive and state that an abstract attribute was present. If that were true, there would be a reference to perceptual information, but this reference would not be direct, in the sense of being unmediated by concrete attributes. So we will also need to test whether the reference of abstract attributes to perceptual information is a direct one. This we will do in the next chapter.

THE POSITION OF ABSTRACT PRODUCT ATTRIBUTES IN CONSUMER ARGUMENTATION⁵⁰

INTRODUCTION

Although the previous study has demonstrated that abstract attributes refer to perceptual product information as much as concrete attributes do, we cannot be sure that this reference is direct, in the sense of not being mediated by more concrete attributes. For example, the attribute 'elegant', which was rated as very abstract in the first study, can still have been derived from a more concrete attribute like 'smooth edges' that consumers simply have not verbalized. Thus, even though the abstract attribute is the first thing that consumers have named when asked to describe the looks of a product, it may well be that the abstract attribute is the consumer's conclusion of unvoiced concrete attributes. Therefore, we need to investigate the proposition that abstract attributes need not be inferred from more concrete attributes, but instead, like concrete attributes, can function as a premise in the arguments on which consumer judgements are based (Chapter 3, Proposition 4). For this we need to look at how consumers set up arguments on which they base their preferences. In such arguments, abstract attributes must then be able to play the role of a premise in the argument (i.e. a first statement serving as a basis of the argument) and not a conclusion.

In this study we will look at the arguments that consumers use when they state their preferences. We will directly probe for these arguments by a structured interview technique called laddering. Laddering is an in-depth interview technique that comprises two steps of inquiry. First, the most important attributes of a product are selected. These attributes are then used in the second step where the respondent is asked why these attributes are important to him or her. Subsequently, the reason the respondent gives is not taken for granted; the interviewer continues to ask for the importance of this reason, and repeats this for every new reason that comes up (for a more extensive overview of the technique, see Reynolds & Gutman, 1988). Thus laddering gives respondents an aid for setting up instrumental arguments, which go from the concrete to the abstract. Within these arguments, we can then look at the position of abstract attributes and see whether or not they are fully derived from more concrete attributes. If not all abstract attributes are fully derived from more concrete attributes, we can no longer say that they are abstract because they are derived from more concrete attributes.

⁵⁰ Parts of the introduction to this chapter have previously been published in Snelders (1992).

An alternative explanation for abstract attributes was given by context availability theory. According to this theory, abstract attributes are different from concrete attributes, because they have a more variable situation of use. As a result, abstract attributes can be used in a much wider context than concrete attributes. The proposition that follows is that abstract attributes have a richer verbal context than concrete attributes (Chapter 3, Proposition 5). This proposition will be investigated with a technique called symbolic analysis (Durgee, 1985). Symbolic analysis aims to clarify the meaning of a consumer response by asking the consumer what the opposite of the response would be. In the case of attributes, we could ask what the opposite of the attribute is. This makes it clear from which conceptual background the attribute was chosen. Context availability theory suggests that there are more different conceptual backgrounds for abstract attributes than for concrete attributes. It follows then that there will also exist more opposites for an abstract attribute than for a concrete one. Before investigating these two propositions, we will first discuss the rationales for the two proposed methods in more detail.

Laddering

The theory that lies behind the laddering technique proposes that the attributes that are the starting point of the interview will be important to consumers because they have certain consequences. In turn, these consequences will be important to consumers because of the values that they uphold. In this sense, attributes are regarded as a means to an end, and the laddering technique will result in strings of answers, ladders, that are 'means-end chains' (Gutman, 1982). Note that means-end chain theory is very much in line with what we have stated in Chapter 3. There, it was stated that the arguments, on which consumer judgements are based, can always be broken down into in the form: if I value X, then I choose product Y (Simon, 1983). In addition, we stated that product Y would be qualified by a set of attributes which would have consequences for product use and thus be responsible for the attainment (or blocking) of value X. In this sense, we can regard each ladder as an argument on which judgement is based.

We depart from means-end chain theory when dealing with the proposed motivational content of consumer values. This is because we believe that, in the past, laddering data have had an excess of motivational interpretation. The reasons that consumers give in a laddering interview are nothing more than just that. An interpretation of these reasons in terms of underlying values that motivate behaviour (Rokeach, 1968) exaggerates the motivational content of laddering data and, by doing so, it oversimplifies consumer choice. The reasons that consumers give us do not unproblematically direct consumer choice, rather they are a social construct, providing a structure that facilitates and justifies choice. It is in this capacity that laddering data can contribute to a better understanding of consumer choice, in that it clarifies the social position of the product (in terms of attributes), the interaction of the consumer with the product (in terms of consequences), and the consumer (in terms of values).

The position of abstract attributes in laddering

Here we compare the position of abstract product attributes in laddering data with that of concrete attributes. We expect that abstract attributes can have the same position in consumer arguments as concrete attributes. Note that earlier, we have conceded that abstract attributes can sometimes be derived from more concrete attributes, and in these cases, abstract attributes can indeed have a secondary position in consumer arguments. However, we have argued that the derivation per se is not what makes the attribute abstract, and there will be a large number of abstract attributes that are not derived from concrete attributes.

There are a number of ways of classifying laddering data, and thus to determine the position of concrete and abstract attributes in those data. The first way of classifying laddering data is given by Olson and Reynolds (1983). Here, laddering data are considered as falling into one of six possible categories: concrete attributes, abstract attributes, functional consequences, psycho-social consequences, instrumental values and terminal values. Olson and Reynolds have made means-end chain theory (Gutman, 1982) more elaborate, and assume that terminal values are of the highest level of inclusion, and therefore most abstract, while concrete attributes are of the lowest level of inclusion, and thus the most concrete. Note that, according to Olson and Reynolds, the typical position of abstract product attributes in an argument is between concrete attributes that are more concrete, and functional attributes that are thought to be more abstract. Thus, contrary to what we believe, abstract attributes are here again regarded as being derived from more concrete attributes. An alternative view is given by Van Raaij and Schoonderbeek (1993), who argued that there exists a class of 'non-physical, psychosocial' attributes that are directly referent to product information, without being derived from concrete attributes in the first place. Still, both types of attributes are considered to have their own place in people's arguments, pointing to consequences and values. It is exactly along this line that we believe that abstract attributes are organized in the consumer's arguments: as unmediated product referent attributes leading to consequences that have value for the consumer.

A second way in which laddering data can be classified is proposed by Johnson (1989). Johnson criticizes the distinction made by Olson and Reynolds because of the indistinctiveness of attributes, consequences and values. For example, take the answer 'homely'. This answer can both reflect on the product (in which case 'homely' is an attribute), the interaction between product and consumer (in which case 'homely' is a consequence), or the consumer him- or herself (in which case 'homely' is a value). Another criticism on the classification of Olson and Reynolds is that in their case, all product attributes are on the concrete side of the continuum. Even the most abstract of product attributes are considered as more concrete than the most functional of all consequences. As Johnson argues, this is difficult to maintain if we cannot immediately tell whether an answer is an attribute, a consequence, or a value. As an alternative, Johnson proposes that all answers that consumers provide when asked about a product can be regarded as attributes, and the best dimension on which they can be classified is their level of abstraction (also known as concreteness). Still, Johnson

assumes that if the answer categories are classified by their concreteness, they will be placed in roughly the same order as by Olson and Reynolds. This is because the abstraction level is again thought to be determined by the level of inclusion of the answer categories. Thus, contrary to our proposition, abstract attributes are again considered as being derived from more concrete attributes. This, however, leaves us with a problem in itself. Namely, our proposition that abstract attributes need not be derived from concrete attributes is now applied to all answers that are given by consumers in a laddering interview. If we followed this line, we would have to conclude that in these arguments, values are not derived from consequences, and in turn, that consequences are not derived from attributes. As we have seen in Chapter 3, that is certainly not our intention. Our proposition is only intended for abstract attributes that are product referent. Still, Johnson's argument that it is difficult to assess whether answer categories reflect on attributes, consequences or values does make a valid case for comparing the classification of Olson and Reynolds with that of Johnson.

Two more ways of classifying laddering data exist: one by Pieters, Baumgartner and Allen (1992), and another by Van Rekom (1994). Both methods, however, start with the sequence in which the answers are given. Thus, answers are classified by their average relative position on a ladder: answers given in the beginning of an argument are called concrete, and answers given at the end of an argument are called abstract. Although both methods produce an index of level of abstractness, we will not consider these ways of classifying laddering data because for these measures, one would find that answers with a high score on the index of level of abstractness are fully derived from answers with a low score on the same index by definition. Indeed, as Van Rekom (1994) has shown, such indices of abstractness do not even correlate with what people normally regard as abstract and concrete.

To resume, laddering data give a good description of the arguments that consumers typically use when evaluating a product. A review of the literature on laddering data suggests that abstract attributes are still relatively concrete, when compared with consumer response that reflects on the product's consequences or their values. Here we will look at the position of abstract attributes in laddering data. We have proposed that abstract attributes need not be inferred from more concrete attributes and on the basis of that we make the following hypothesis:

Hypothesis 7.1

If laddering data are categorized in the way proposed by Olson and Reynolds (1983), there will be a substantial number of abstract attributes that are not derived from concrete attributes.

Symbolic analysis

If we want to find the associative context of an attribute we will need to consider other data than those that result from the laddering procedure. This is because the question that is posed in laddering; "why is that important to you?" only provides instrumental

relations, and these only provide a very limited, directional context⁵¹. Thus we need to use a different questioning technique when looking for a fuller associative context. The most straightforward, of course, would be to ask for all the associations that an attribute has, and see whether abstract attributes have more associations than concrete attributes. However, this would not be the most desirable approach. The reason for this is that not all associations will be equally relevant for the proper understanding of the attribute. (e.g. the association modern-Bauhaus is more communicative and less surreal than the association modern-fish). In addition, the associations may not be very distinct from each other (e.g. compare modern-Bauhaus and modern-le Corbusier, where there is a clear link between Bauhaus-le Corbusier). For these reasons, we are less interested in an absolute number of associations that the attribute has, than in the way in which these associations are clustered to form distinct backgrounds against which the attribute acquires its meaning. It is in these conceptual backgrounds that we are interested. A method for uncovering distinct conceptual backgrounds has been proposed by Levi-Strauss (1963), who argued, much in line with gestalt-theorists like Koffka (1935), that the meaning of a word is dependent on the background in which it can be used. In an interview situation, this background can be assessed by looking at the opposite of the word. If a word has a meaning, it must also have an opposite that serves as a background against which this meaning becomes clear. Although this method was first applied in cultural anthropology, it can also be shown to be of relevance in consumer research. Consider the following example of a consumer's report from Thompson (1989):

I hate store A. You can never find what you are looking for. You can never find someone to help you look for what you are looking for. I like going to store B where there are people there to help me find what I want as soon as I walk in the door and they help me find it, I pay for it and I am on my way rather than wandering for twenty minutes and not being able to find anything afterward. (p. 544)

Here, the attributes of the liked store are understood against the attributes of the hated store and vice versa. A standardized method of asking the opposites of products and their attributes is proposed by Durgee (1985). Here, the most important attributes of a product are selected and the respondent is asked to give as many different opposites of each attribute as he or she can think of. It is through looking at this number of distinct opposites of attributes that we have a measure of the number of different contexts in which the attribute can acquire its meaning.

In Chapter 3, Proposition 5, we have proposed that abstract attributes are richer in context. Since we have argued that abstract attributes are established in verbal arguments, we assume that they will also be richer in verbal context. In operational terms, this means that respondents will list a larger number of opposites of abstract

⁵¹ Other ways in which attributes can be associated are reflective relations, capturing concrete consequences of abstract attributes, and vicarious relations, capturing a mere covariance among attributes (Johnson, 1989).

attributes than they will of concrete attributes. In this study, we will test this proposition with the following hypothesis.

Hypothesis 7.2

The more abstract an attribute, the more different opposites respondents can give for the attribute.

Below, we will try to test Hypotheses 7.1 and 7.2 in a combination of a laddering and symbolic analysis study on consumer judgements of telephones, clock radios and thermos flasks.

METHOD

Subjects

108 Members of the consumer household panel of Delft University of Technology were invited to our laboratory to be interviewed. The panel is a random sample of the inhabitants of Delft and the surrounding area (Tan, 1992).

Design

All respondents received three tasks: first, they were asked to name attributes of two products. On the basis of the attributes of one product, they were given a laddering interview, and on the basis of the attributes of the other product, they were given a symbolic analysis interview. The order of the last two tasks was varied in that half of the respondents received the laddering task first, and the other half received the symbolic analysis task first. Three different product categories were used: telephones, clock radios and thermos flasks, but each subject was asked questions about only two of these product categories. This means that for each product category 36 people received a laddering interview and another 36 people received a symbolic analysis interview. Three interviewers who had had extensive training in both interview techniques carried out the interviews. To rule out an interviewer effect, the interviewers were systematically varied over the three products and the two different orders.

Procedure

After a brief introduction, the subject was given a folder, containing advertising material about one of the three product categories (telephone, clock radio and thermos flask). The respondent was asked to look at the information for about a minute. After this minute, the interviewer asked the respondent to list those attributes to which the respondent would pay attention when buying a product of the category (respondents were specifically told not just to consider what they had seen in the advertising material, but also what they were thinking of themselves). The interviewer wrote down all attributes. This procedure was repeated for a second product category. In the second and third tasks, the respondent received the laddering and symbolic analysis task in the opposite order.

In the laddering task, the interviewer asked the respondent to describe each attribute in terms that were as concrete as possible (this was to make sure that abstract attributes were not derived from unnamed concrete attributes). If the respondent gave more than five attributes, they were asked to pick out those five that were most important to them. In addition, the respondent was asked to specify for each attribute whether they felt it was important that the attribute was present or absent in the product. Next, the respondent had the procedure of the laddering interview explained to them, and the actual laddering procedure began. For each attribute, the respondent was asked why the presence (or absence) of an attribute was important and why subsequent reasons were important, until the respondent could give no more answers. This procedure was repeated for all of the five attributes.

In the symbolic analysis task, the respondents first had the procedure of the task explained to him or her. The respondent then had to pick out the five most important attributes (unless the respondent had given five or less attributes, in which case all attributes were used). Next the respondent was asked four questions about each attribute. The first question was "kunt u kenmerken noemen van een (telefoon toestel, wekkerradio, thermoskan) die het tegenovergestelde zijn van een (telefoon toestel, wekkerradio, thermoskan) met (attribuut X)" [can you name characteristics of a (telephone, clock radio, thermos flask) that are the opposite of a (telephone, clock radio, thermos flask) with (attribute X)]. This question was used for further analysis⁵².

All answers were written down by the interviewers, and if the interviewer was unsure how to write down an answer, the respondent was asked to give the answer more precisely. In addition to the interviewer's records, all interviews were recorded on audio tape. All respondents were debriefed about the purpose of the experiment at the end of the year in a report that explained the purpose of all the research in which panel members had participated. Since the study was held in November 1992, this was only one or two months after taking part.

RESULTS AND DISCUSSION

Content analysis

A first pair of judges (who were trained interviewers themselves) compared all written down answers with the interview data on audio tape. The written down answers were

⁵² The last three questions that were asked in the symbolic analysis task dealt with how a product would be without the attribute (question 2), what one could do with a product without the attribute (question 3), and what someone who did not want the attribute would be like (question 4). Following Durgee (1985), these three questions can also be asked to get a better picture of the background of the attribute. However, in the present study, with its focus on attributes rather than whole products, many subjects did not understand these questions. In the case of question 2, many thought it was the same as question 1 and they did not answer it or gave the same answers as to question 1. In addition, most subjects' response to question 3 was simply that they would not buy the product if it did not have the attribute, so there was very little variation in it. With respect to question 4, a lot of subjects did not understand the question and because of that they did not give an answer to it.

corrected if they were different from the words or phrases used on the tape. Answers that were the result of leading questions were left out as well (this happened only a few times).

The respondents' answers were put on coding cards. For the laddering task, this resulted in 3719 coding cards: 1187 coding cards for telephone, 1223 coding cards for clock radio and 1309 coding cards for thermos flask. For the symbolic analysis task, there were 1565 coding cards: 442 coding cards for telephone, 553 for the clock radio, and 570 for the thermos flask (only counting the attributes and the answers to question 1). On each coding card, it was noted which attribute the answer referred to, and how it could be traced back to the original laddering and symbolic analysis data. This was done to aid the interpretation of the coding cards.

For each product, another two independent judges were asked to create answer categories which contained the same answers. Judges were asked to do this with precision, to avoid concrete and abstract words for roughly the same thing ending up in the same answer category. After each judge had individually categorized the answers, they discussed what to do with those answers that they had put in different answer categories. If one judge could not be persuaded to follow the solution of the other, a new answer category was made to accommodate the solution of both judges. This procedure was followed twice, once for the laddering data, the other time for the symbolic analysis data.

Most answers could be placed in a category. Still, a small group of purely idiosyncratic answers could not be placed in a category: for the laddering task, there were 95 such cards for telephone, 63 cards for clock radio, and 196 for thermos flask. For the symbolic analysis task this was 52 for telephone, 33 for clock radio, and 69 for thermos flask. Because these answers are purely idiosyncratic, we expected that there were many outliers among them. For this reason, we have not considered them in our main analyses. However, there are two instances where an omission of idiosyncratic answers could have an effect on the results. In these instances, we will consider the effect of the idiosyncratic answers separately.

Finally, for the laddering task, 92 answer categories were created for answers concerning the telephone, 144 categories were made for the clock radio, and 140 for the thermos flask. The answer categories of the three products in the laddering task are listed in Appendix 7.1. For the symbolic analysis task, 66 answer categories were created for the telephone, 92 for the clock radio, and 126 for the thermos flask. The answer categories for the three products in the symbolic analysis task are listed in Appendix 7.2.

Laddering

The rating of CAFPIT answer types

The answer categories that resulted from the content analysis were rated by another six judges as belonging to one of the six answer types that are proposed by Olson and Reynolds (1983): Concrete attributes, Abstract attributes, Functional consequences, Psycho-social consequences, Instrumental values, and Terminal values (for the remain-

der of this chapter we will refer to these as CAFPIT answer types). It was explained to the judges what these answer types meant. All judges were design engineering students and had received a small reward for their rating of the answer categories. The ratings were obtained by a Q-sort technique (Churchill, 1987), where cards containing the answer categories had to be placed on one of six piles representing the CAFPIT answer types. The rating task was carried out for each product separately.

The ratings of the six judges proved to be very unreliable. Their level of agreement, calculated by Cohen's kappa (Siegel & Castellan, 1988)⁵³ was .39 for telephone, .34 for the clock radio, and again .34 for the thermos flask. As a consequence, the CAFPIT answer types cannot reliably be assessed. However, since our focus is not so much on the answer types themselves, but on their position in laddering arguments, we can look at only those answer categories over which there was agreement among judges. This method of specific agreement assessment is proposed by Arisz (1994). The rationale behind this method is simple: if four or more out of six judges put an answer category into the same answer type, there is only 5.21% probability that this is a chance occurrence. From the ratings of judges, we can see that a fair number of answer categories meet this criterion: 62% for telephone, 58% for clock radio, and 56% for thermos flask. Those answer categories that are put into an answer type by less than four judges cannot be reliably assessed and are therefore excluded from further analysis. However, the answer categories that did pass the criterion over-represented concrete attributes for all products, and abstract attributes for thermos flask. So in general, attributes were more reliably assessed than were consequences and values. In addition, for telephone and clock radio, relatively more concrete attributes met the criterion than did abstract attributes. Note that this makes our test of whether or not abstract product attributes are derived from concrete attributes even more conservative, since relatively more links with concrete attributes will be made. The result of this selective CAFPIT answer type assessment is listed in Appendix 7.1.

A comparison of the CAFPIT answer types with level of abstraction

To make sure that at least the selected CAFPIT answer types are meaningfully interpretable, the answer types were compared to the classification proposed by Johnson (1989). In order to do this, the answer categories that were the result of the initial content analysis were again rated by another six judges. This time however, the answer categories were rated on a seven point scale ranging from "zeer concreet" (very concrete) to "zeer abstract" (very abstract). Again, the judges were design engineering students and again they received a small reward for their work.

As in an earlier study by Johnson and Fornell (1987), the concreteness scale turned out to be a reliable measure, in that the six judges showed a sufficient level of agreement amongst each other. Their level of agreement, calculated by Cronbach's α was .78 for telephone, .80 for clock radio, and .76 for thermos flasks. In addition, the concreteness scale correlates positively with the CAFPIT answer types that are propos-

⁵³ Kappa is a measure for agreement among k judges on their nominal classification of a list of objects.

ed by Olson and Reynolds (1983). Assuming that the sequence of the answer types corresponds with the concreteness scales at an ordinal level of measurement, Spearman's rank order correlation between the CAFPIT answers and the concreteness scale is for telephone .71 ($p < .000$), for clock radio .83 ($p < .000$), and for thermos flask .69 ($p < .000$). Thus the answer categories that were reliably assessed as belonging to one of the CAFPIT answer types correspond with the concreteness scale that can be reliably assessed for all answer categories. From this we can conclude that with laddering data the abstraction level of attributes is better described by CAFPIT answer types. This is because the concreteness scale does not make an explicit distinction between attributes, consequences and values. As a result, abstract product attributes will seem relatively concrete since they have to be rated alongside consequences and values.

The position of abstract attributes in laddering data

When considering the place of abstract attributes in laddering data, we can now look at the typical positions of the CAFPIT answer types in the ladders that respondents have come up with. This is done by the construction of a transformation matrix, which shows how many times in the individual ladders an answer of one type is linked to an answer of another type. Thus a transformation matrix provides the frequencies of linkages between answers of different answer types. Note that, by doing so, we cannot describe all linkages, since there will be a substantial number of linkages between two answers of which at least one answer could not be reliably identified as belonging to one of the CAFPIT answer types. This means that the conclusions that we can draw from this analysis will be tentative.

Table 7.1 shows the transformation matrices of the telephone, clock radio and thermos flask according to the CAFPIT answer types. For each product, two matrices are presented, a direct matrix, and an indirect matrix. The direct matrix only counts direct linkages between answer categories, while the indirect matrix counts both direct and indirect linkages between answer categories. Thus the indirect matrix allows for linkages between two answer categories that were made with one or more steps in between⁵⁴. The difference between counting the direct and indirect linkages is demonstrated in Figure 7.1. Following the example from Figure 7.1, the direct matrix only counts the three direct linkages, while the indirect matrix counts the three direct and also the two indirect linkages.

When looking at the position of abstract attributes in the direct transformation matrices we can see that abstract attributes are more often derived from other abstract attributes than they are from concrete attributes. For telephone, the ratio is 66 over 18, for clock radio, it is 35 over 12, and for thermos flask, it is 56 over 27 (shaded numbers in Table 7.1). By itself, this does not confirm our proposition that abstract attributes need not be derived from more concrete attributes. The reason for this is that

⁵⁴ For a more extensive explanation of this analysis technique for laddering data, see Reynolds and Gutman (1988).

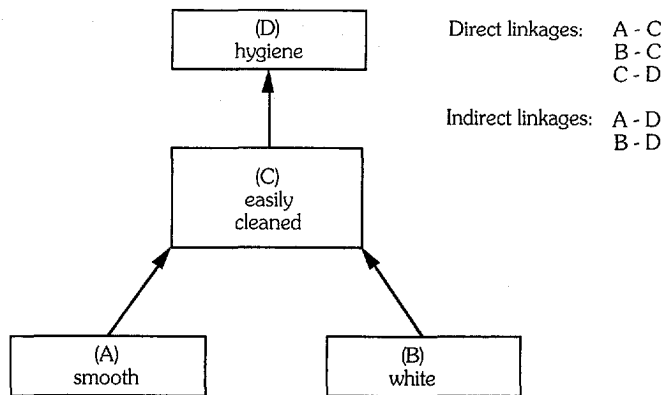


Figure 7.1 *The difference between direct and indirect linkages for a hypothetical product.*

indirectly, abstract attributes may still be derived from concrete attributes. So one can have the situation where respondents start by mentioning a concrete attribute, and then move on to a long list of abstract attributes. If we looked only at the direct transformation matrix, we would find that there are more direct linkages between abstract attributes, and only one linkage between the concrete attribute and the first mentioned abstract attribute. However, if we also counted the indirect linkages between the concrete attribute and all the abstract attributes in the ladder, we would expect that the number of linkages between concrete and abstract attributes would rise a lot more than the linkages among abstract attributes.

To see if this is true, and hypothesis 7.1 false, we turn to the indirect matrices. Here we see that abstract attributes are still derived more from other abstract attributes than they are from concrete attributes. In fact, the ratio of derivations from abstract attributes over concrete attributes does not increase markedly: for telephone 95 over 47, for clock radio 62 over 23, and for thermos flask 120 over 90. In addition, for both telephone and clock radio the number of direct abstract to abstract linkages is larger than the number of indirect concrete to abstract linkages. This means that for these two products it is impossible for all abstract attributes to be based on concrete attributes, in that at least $66-47=19$ abstract attributes of the telephone and $35-23=12$ abstract attributes of the clock radio cannot possibly be derived from more concrete attributes.

For thermos flask the equation is $56-90=-34$. Here, there are 34 more abstract attributes indirectly derived from concrete attributes than there are abstract attributes directly derived from other abstract attributes. This means that in principle, all abstract attributes can be derived from more concrete ones. However, there is little chance that this has happened for the thermos flask, since the ratio of abstract attributes derived from other abstract attributes over those derived from concrete attributes remains the same when comparing the direct and indirect transformation matrices. From this we

Table 7.1 *Direct and indirect transformation matrices of CAFPI answer types for telephone, clock radio, and thermos flask (each entry describes a linkage from the corresponding row to the corresponding column, shaded areas are compared in the text).*

TELEPHONE													
DIRECT							INDIRECT						
F/T	C	A	F	P	I	T	F/T	C	A	F	P	I	T
C	10	18	23	4	1	1	C	19	47	52	46	9	3
A	9	66	28	30	0	0	A	13	95	59	74	15	5
F	1	19	34	11	5	2	F	5	40	63	30	18	9
P	1	15	8	39	0	1	P	1	26	21	56	4	3
I	0	2	1	2	3	0	I	0	2	2	4	5	0
T	0	1	0	1	0	0	T	0	1	0	2	0	0

CLOCK RADIO													
DIRECT							INDIRECT						
F/T	C	A	F	P	I	T	F/T	C	A	F	P	I	T
C	15	12	6	8	2	1	C	23	23	28	45	25	9
A	4	35	13	16	9	1	A	10	62	41	60	40	14
F	0	6	25	11	11	4	F	1	17	51	42	34	23
P	1	4	7	22	5	11	P	1	10	12	45	18	18
I	1	2	4	8	16	1	I	1	4	8	24	32	8
T	0	0	1	2	1	4	T	0	1	1	7	2	7

THERMOS FLASK													
DIRECT							INDIRECT						
F/T	C	A	F	P	I	T	F/T	C	A	F	P	I	T
C	25	27	23	2	0	0	C	46	90	72	41	21	11
A	8	56	11	12	1	4	A	19	120	46	47	19	23
F	2	15	28	13	4	1	F	18	38	68	47	22	11
P	1	5	7	15	3	1	P	4	13	15	24	4	4
I	0	0	0	0	8	2	I	0	1	0	2	15	5
T	0	1	1	1	2	4	T	0	3	2	5	3	5

may conclude that, at least for those answer categories that can be reliably identified as abstract attributes, a substantial number of abstract attributes is not explained by concrete attributes.

One last observation can be made about these results. Table 7.1 shows that to some extent, abstract attributes are also derived from functional and psycho-social consequences. In addition, there are instances, though not many, where concrete attributes are derived from abstract attributes. So the order in which linkages are made, is not always as proposed by Olson and Reynolds (1983). This underlines what we have

said in the introduction of the second part of this chapter, namely that we cannot just look at the first thing that respondents say about a product and see how abstract or concrete it is. Instead, we need to look at where abstract attributes come up in the argument set up by respondents. In addition, the fact that consequences come before attributes casts some shadow on the instrumentality of the why-questions that are posed during the laddering interviews. Instead of getting a consequence that is instrumental for the initial attribute, we see that asking "why is that important for you" can also get us an attribute that is reflective of a consequence (this possibility has also been pointed out by Johnson, 1989).

The influence of idiosyncratic answers

The results of the laddering task are based on answers that were given by more than one respondent to avoid the results being based on purely idiosyncratic answers. However, it can be argued that the group of unexplained abstract attributes that we found above is really derived from idiosyncratic concrete attributes. Therefore, we need to check whether the idiosyncratic answers did not give an over-representation of concrete attributes, and if so, whether or not these concrete attributes can explain the remaining underived abstract attributes.

In order to investigate a possible effect of idiosyncratic answers, a random selection of 50 answers of each product was taken. Again, six judges (design engineering students) were asked to categorize the 150 answers in the six CAFPIT answer types. In total, for all three products, there are less concrete and abstract attributes named in the idiosyncratic answers than in the answer categories that were used. However, again in all three products, where in the used answer categories there were more abstract than concrete attributes, in the idiosyncratic answers there are more concrete than abstract answers. So there may be relatively fewer attributes in the idiosyncratic answers, but out of these there are more concrete than abstract attributes. To see to what extent these idiosyncratic answers would change the information in the transformation matrix we looked at the position of the idiosyncratic answers in the individual ladders. It turns out that for telephone, one extra direct and indirect concrete to abstract link is found and one indirect abstract to abstract link. Since in reality, there were 95 and not 50 idiosyncratic answers, we can expect that for the whole group, these numbers would double. In that case, the abstract telephone attributes could still not be derived from concrete attributes, because there would still be 66 direct abstract to abstract links that could not be accounted for by the 49 indirect concrete to abstract links. For clock radio, no extra links between concrete and abstract attributes or between abstract attributes were found, so here too, the conclusions remain the same, namely that there is a large proportion of abstract attributes that cannot be derived from concrete attributes. Finally for thermos flask, a different picture emerged. Here three extra direct concrete to abstract links were found, nine extra indirect concrete to abstract links, and seven extra indirect abstract to abstract links. Since in reality, there are 196 instead of 50 idiosyncratic answers, we should expect these numbers to quadruple. However, we still find that more abstract attributes of the thermos flask are derived from other abstract attributes, both when looking at the direct and indirect

links. From this it may be concluded that most probably, some abstract attributes are not derived from more concrete attributes, but that we cannot be absolutely sure because the 56 direct abstract to abstract linkages can fully be explained by the $90 + 36 = 126$ indirect links between concrete and abstract attributes.

These results mean that over all products, there are a substantial number of abstract attributes named by respondents that are not derived from concrete attributes. We first found that they could not be derived from the reliably assessed concrete attributes, nor from the unreliably assessed answers. Now we also find that for two of the three products, they can also not be derived from the idiosyncratic concrete attributes. For thermos flask the direct abstract to abstract attributes could in principle all be explained by the indirect concrete to abstract attributes. However, since the number of indirect abstract to abstract attributes is greater than the number of indirect concrete to abstract attributes, it is unlikely that this has happened. This means that the analysis remains inconclusive for the thermos flask.

Symbolic analysis

The concreteness ratings of the attributes

The attributes categories that respondents had given were rated by five judges on a seven point scale ranging from "zeer concreet" (very concrete) to "zeer abstract" (very abstract) (after Johnson, 1989). Although we have seen earlier that this measure is proposed as a measure of all sorts of consumer response (product, usage and user referent), here it will be applied to product referent attributes only (similar to Johnson's own use of the scale, see Johnson & Fornell, 1987).

Again, the judges were design engineering students and again they received a small reward for their work. The ratings of the five judges were very consistent and, as a consequence, showed high alpha levels: for telephone, $\alpha = .936$, for clock radio $\alpha = .875$ and for thermos flask $\alpha = .908$. This allowed us to consider the average scale values of the five judges as a measure of concreteness of the answer categories.

The effect of concreteness on the number of opposites

Two variables were created that varied over the attributes that were named in the symbolic analysis. First, the average concreteness ratings of each attribute were calculated. Second, the number of distinct answer categories that were given as an opposite to each attribute was calculated. This last number was divided by the number of people who had listed the attribute in the first place, to correct for the effect that if more people name the same attribute, more distinct opposites will occur because of this. The average concreteness ratings, the total number of different opposites per attribute and the number of people who named the attribute are listed in Appendix 7.2.

Next, the average concreteness of each attribute was correlated with the average number of opposites of each attribute. 31 Attributes were listed for telephone, 38 for clock radio and 45 for thermos flask. The correlation between concreteness and average number of opposites was, for telephone .250, p (one-sided) $< .088$, for clock

radio .487, p (one-sided) $< .001$, and for thermos flask .033, p (one-sided) $< .415$. So it turns out that there is a strong effect of concreteness on the number of opposites for telephone, in that the more abstract an attribute is, the greater number of distinct opposites it can have. For clock radio, the same trend exists and it verges on significance, while for thermos flask, a very small and non-significant correlation is found.

The lack of effect with thermos flasks was puzzling at first, but can be accounted for as follows. The first two judges who had created the answer categories for the thermos flask, had created a lot more concrete answer categories for the thermos flask. A reason for this could be that the two judges were a somewhat quarrelsome couple, whereas the judges for the other two products were unrelated students. In a later check it appeared that this couple had been nit-picking at all answers that could *possibly* mean something different (as opposed to answers that would *probably* mean something different). Since it is easier to disagree about how they possibly have a different meaning for concrete than for abstract words, the two judges may have come up with a disproportionate number of concrete attributes. This larger number of concrete answer categories can thus account for the lack of effect of concreteness on the number of opposites.

Given that this has been the case, we can conclude that we have found support for Hypothesis 7.2, where it was stated that the more abstract an attribute, the more different opposites an average respondent can give for the attribute. For all three products, the correlations were in the right (positive) direction, a clear trend existed for one product, and a very significant effect for another.

The effect of averaging the number of opposites

Looking at the average number of opposites instead of all opposites is better because some people can give more opposites than others and by averaging, we have given all respondents an equal weighting. However, it can be argued that each person in the experiment was given the chance to name all the opposites that he or she knew, and could thus have exhausted all possibilities in one go. In addition, if the concrete attributes are listed by more people than the abstract attributes, then the average number of opposites will downplay the real number of opposites that were given for concrete attributes and thus make our hypothesis test more liberal than it should be. For these reasons, two extra correlations were calculated. First the correlation between the concreteness of an attribute and the number of people who had given the attribute. For telephone the correlation was .124, $p < .507$, for clock radio, it was .151, $p < .366$ and for thermos flask it was .042, $p < .787$. These non-significant but positive correlations show that, if anything, more abstract attributes are given by more people than the more concrete attributes. So if there is an effect of taking the average instead of the real number of opposites, it must have made the test of a correlation between concreteness and number of opposites more conservative - not liberal.

To see if this has been the case, a second correlation was calculated, between the concreteness of an attribute and its absolute number of opposites (regardless of how many respondents it had taken to come up with that absolute number). These correlations turned out to be remarkably similar to the correlations that we found earlier: the

correlation for telephone was .220, p (one-sided) $< .118$, for clock radio .472, p (one-sided) $< .002$, and for thermos flask .087, p (one-sided) $< .284$. From this we must conclude that the procedure of averaging the number of opposites over respondents has had no effect on our test of hypothesis 7.2.

The effect of idiosyncratic answers

Finally, there is a risk that the results of the symbolic analysis task are affected by not considering an idiosyncratic answer category as a viable opposite. To control for this, the number of opposites were recalculated, now containing all idiosyncratic answer categories. This did not affect the results very much: the correlation between concreteness and average number of opposites for telephone are now .171, p (one-sided) $< .178$, for clock radio it is .496, p (one-sided) $< .001$, and for thermos flask it is .069, p (one-sided) $< .326$.

GENERAL DISCUSSION

The results in this chapter support our proposition that a substantial number of abstract attributes is not derived from concrete attributes. However, it does so only for those answer categories that can be reliably assessed as concrete or abstract attributes. In addition, when looking at the abstraction level of all laddering data (not just the attributes, but also the consequences and values), we can see that, in general, the more abstract answer types (like values and consequences) have been derived from the more concrete ones (attributes). Therefore we must conclude that within the framework that arguments are set up to derive values from the attributes of the product, we can see that both concrete and abstract attributes can perform the same role in such arguments. Namely, both types of attributes can be a first premise on which the argument is based.

In the previous chapter, we have already seen that abstract attributes can meaningfully distinguish one product from the other. Now with the additional findings in this chapter, we can conclude that for a substantial number of abstract attributes, this product reference is not derived from more concrete attributes. So we can reject the idea that abstract attributes are abstract because they are inclusive of more concrete attributes (after Johnson, 1984; Rosch, 1975). If that were the case, we could not have come up with such a large number of abstract attributes that have direct, unmediated reference to perceptual information. Note that, in Chapter 3, we have already theorized how this can be the case: if an abstract attribute does not describe the perception of a concrete product characteristic, it must describe the perception of a more complex, contextual aspect of the product. Therefore, we have argued that abstract attributes are more context dependent, and that it is this quality of abstract attributes that makes them understood as abstract.

The results of the symbolic analysis study have shown exactly this quality of abstract attributes. When looking at the position of abstract attributes in consumer arguments, we can see that these attributes can be understood against a more diverse

contextual background. So it is from this finding that we can understand how abstract attributes are subjective. This is because in the communication with other people it is much harder to assess to what situation the abstract attribute is referring to. Note, however, that in Chapter 3 we have said that this lack in communicative power is based on the idea that abstract attributes are more complex and more contextually perceived. Therefore, our theory about abstract attributes should not only predict an effect on context in consumer argumentation, but also in the consumer's perception of products. This last aspect, which we think that abstract attributes are all about, we will investigate in Chapter 8.

Finally, one small finding from this study is very illuminating. This is the finding that in the laddering data, there were more concrete attributes than abstract attributes that were idiosyncratic answers (i.e. answers that only one respondent had given). It shows that abstract attributes are not trivialities that some people sometimes say, but instead, they are attributes that tend to come up relatively often in a lot of people. This means that abstract attributes are as important to study in consumer research as concrete attributes.

THE INFLUENCE OF CONCRETENESS ON THE SITUATION-DEPENDENCE OF PRODUCT PERCEPTIONS

INTRODUCTION

Context availability theory

In the previous chapter we have demonstrated that abstract product attributes can meaningfully describe a visual aspect of the product, and that these attributes need not be derived from more concrete attributes. In addition, we have shown that abstract attributes are richer in verbal context, in that people can think of a greater number of different opposites for abstract attributes. In our discussion on the nature of abstract product attributes we have proposed that the richer context of abstract attributes has a perceptual basis (Chapter 3, Proposition 6). Thus, whether an attribute is abstract or not is not a matter of how we talk about the world, but rather, of how we perceive the world. This calls for an explanation of abstract attributes in terms of perception - are abstract attributes perceived in a different way than concrete attributes? In this chapter, we will try to demonstrate that abstract attributes refer to another kind of perceptual information than concrete attributes do. The question is how the two types of attributes differ, and for this we will need to look at how their reference to perceptual information differs.

The relation between concreteness and visual context

Theories on the difference between abstract and concrete attributes are dependent on how they both relate to someone's perceptual knowledge. In Paivio's dual coding theory (Paivio, 1975; 1978), it is assumed that the verbal knowledge that someone has of a product (the attributes) is stored in memory in a different way than the perceptual knowledge of the product, meaning the imagery that the product can evoke⁵⁵. From this, it is argued that when people need the aid of imagery to get to the meaning of a word, they can do this more easily with concrete words, being the attributes of things, than with abstract words, being the attributes of language (Paivio, 1991, p.

⁵⁵ Although research into dual coding theory has dealt exclusively with the relation between words and visual imagery, it is generally assumed that it applies in much the same way to other modes of perception (hearing, tasting, feeling and smelling).

232). In dual coding theory, concrete words are thought to be closer to imagery than abstract words.

In more recent years, a competing theory on the difference between concrete and abstract attributes has come up. This context availability theory (after Kieras, 1978; Schwanenflugel & Shoben, 1983) states that abstract attributes are not more removed from imagery, but instead they are only more context dependent. This means that the information from prior knowledge that is associated with an abstract word is cued to a more variable context (i.e. a more variable situation of use). According to this theory, it is not a lack of imagery, but a lack of availability of an association with a proper usage situation that causes the concreteness effects found in Paivio's studies. In Chapter 3 we have seen that context availability theory outperforms dual coding theory on a list of findings. These findings show that, when placed in their proper context, abstract words are as easy to understand as concrete words.

To resume, context availability effects should be understood in terms of a greater dependence of abstract attributes on their situation of use. So instead of being easily localized as a product part, the abstract attribute may be more dependent on the situation in which the product is portrayed. Hence, we need to test this idea and so a number of hypotheses are proposed. In line with Murphy and Wisniewski (1989) we propose that without a situational background, the identification of abstract attributes in a product will be slower than the identification of concrete attributes.

Hypothesis 8.1

Without a situational background, concrete attributes are identified faster than abstract attributes

However, the identification of abstract attributes will be aided more than the identification of concrete attributes by situating the product in a scene. This leads us to consider the following hypothesis.

Hypothesis 8.2

Compared to concrete attributes, abstract attributes are identified faster in situated products than in unsituated products.

In addition, we have argued that the kind of situation that is portrayed will influence the kind of abstract attributes that can be identified in a picture. Thus, the identification times of abstract attributes in a product will also vary over the situated products, depending on whether or not people find that the product fits in the situation in which it is portrayed.

Hypothesis 8.3

Compared to concrete attributes, abstract attributes are identified faster when the product is portrayed in a fitting situation than in a non-fitting situation.

Note, that this need not imply that the product itself will have no influence over the identification of abstract attributes. What we have argued here is that abstract attributes are attributes of a situated product, not of the situation by itself. Therefore, the identification of abstract attributes will vary both over the product and the situation in which the product is portrayed. On the other hand, the identification of concrete attributes will only vary over the products that are portrayed:

Hypothesis 8.4

When a picture portrays a product in a situation, the identification of both concrete and abstract product attributes will depend on the product.

Hypothesis 8.5

The identification of an abstract product attribute in a picture will, more than concrete attributes, depend on the situation in which the product is portrayed.

These hypotheses are tested in an experiment where subjects are presented pictures of products on a computer, accompanied by sentences stating that the product in the picture has a certain attribute. Subjects are asked to press a 'yes' or 'no' button, according to whether they agree with the sentence or not. The identification of attributes are these 'yes' and 'no' responses, the identification time is the time that the computer records before the 'yes' or 'no' button is pressed.

METHOD

Materials

36 Computer pictures that had been scanned from photo's were used: 18 pictures portraying a telephone and 18 portraying a thermos flask. In the first group, three different telephones were portrayed in six different situations, one of them being a neutral even blue background (for the no-situation condition). The situations were chosen to reflect typical environments for the telephones. The same procedure was followed for the thermos flasks. The photo's were made in such a way that the products on the photo's looked exactly the same in all the different situations, both in terms of light and colour. Note that in reality, this means that the actual pixel information of the products in the computer images varied a lot over the different situations in which the product was portrayed, since different backgrounds have a different effect on the light and colour perception of the products. The original photo's of the 2 x 3 products and the 2 x 6 backgrounds are presented in Appendix 8.1.

For each product, six attribute statements were used: six statements describing the attributes of the telephone and another six describing the attributes of the thermos flask. The attributes of both the telephone and the thermos flask consisted of three concrete and three abstract attributes. The attributes were selected from a group of 26 attributes (14 for telephone and 12 for thermos flask) that were mentioned frequently by consumers in the laddering study reported earlier (Chapter 7). In a pilot study, these

attributes had been rated by a convenience sample of students ($N=23$ for telephone, $N=24$ for thermos flask) on a seven point semantic differential, ranging from 'zeer concreet' (very concrete) to 'zeer abstract' (very abstract). For both telephone and thermos flask, the four most concrete and the four most abstract attributes were selected (concrete attributes had an average score of three or less and abstract attributes of more than four). In a follow-up study, some of the same group of students ($N=17$ for telephone, $N=16$ for thermos flask) were asked to assess the presence or absence of the eight attributes in pictures of four telephones, and of the other eight attributes in pictures of four thermos flasks. The telephones and thermos flasks were chosen because of their expected variation in the eight selected attributes. The students were asked to state (yes or no) whether the attributes were or were not present in pictures of the thermos flasks or telephones. The students were also asked to state (yes or no) whether they thought that the picture portrayed the presence or absence of the attribute clearly and unambiguously. For each product category, three concrete and three abstract attributes and three products (three thermos flasks and three telephones) were selected, in such a way that: 1) the number of people saying that a product has an attribute varied over the three products; and 2) the presence or absence of the attributes was clearly visible in the stimulus material.

The results of the two pilot studies are shown in Table 8.1. The table shows that for each product there are three concrete attributes and three abstract attributes. In addition, the extent to which the attributes are thought to be present varies over the three products. Finally, all attributes are clearly visible in the stimulus material, with one exception, which is the attribute 'een beker als dop' (the lid is a mug) on the white thermos flask. Although none of the respondents in the pilot study thought the attribute was present in the white thermos flask, only 50% of the respondents thought that this was clearly visible in the picture. Since this may affect the reaction times later in the experiment, we will check for an effect of the visibility of this attribute in the product on reaction times.

Apparatus

The experiment was conducted on two Acorn Archimedes A5000 computers, programmed in BBC-Basic. They were programmed to run the experimental procedures described below. One aspect of this is to measure the reaction times of subjects, for which these computers are equipped with real time clocks to measure precise centiseconds (1/100 of a second), as opposed to unprecise intervals of processor frequency. Both computers had the same screens (Eiso flexscan 9080i) with the same colour settings. The computers were positioned in two separate cubicles in an empty room, perpendicular to the main light sources. This meant that the light fell on both screens in exactly the same way.

Subjects

182 Members of the household panel of the Delft University of Technology were invited to the laboratory. The panel is an a-select sample of inhabitants of Delft and

Table 8.1 Results of a pilot study on stimulus material:

- ^a Average ratings of the attributes used in the study on a seven point concreteness scale (1 = very concrete, 7 = very abstract, N=23 for telephone, N=24 for thermosflask).
- ^b Percentage of people rating that the products that are portrayed on the stimulus material have an attribute (presence)
- ^c Percentage of people rating that the attribute is clearly visible in the stimulus material (visibility) (N=17 for telephone, N=16 for thermos flask).

TELEPHONE			
Attributes / concreteness ^a	Grey pres ^b /visibil. ^c	Beige pres./visibil.	Green pres./visibil.
Deze telefoon heeft een horizontale hoorn (This telephone has a horizontal receiver) / 2.04	88.2 / 94.1	100 / 100	29.4 / 94.1
Deze telefoon heeft een wit snoer (This telephone has a white cable) / 1.65	0 / 94.1	100 / 100	0 / 94.1
Deze telefoon heeft cijfers op de toetsen (This telephone has numbers on the keys) / 1.13	11.8 / 100	100 / 100	100 / 100
Deze telefoon is mooi (This telephone looks good) / 5.91	11.8 / 82.4	0 / 100	64.7 / 88.2
Deze telefoon is eenvoudig (This telephone is simple) / 4.26	76.5 / 70.6	58.0 / 100	100 / 94.1
Deze telefoon heeft een moderne vorm (This telephone has a modern form) / 5.30	35.3 / 70.6	17.6 / 94.1	94.1 / 100
THERMOS FLASK			
Attributes / concreteness	Metal pres./visibil.	White pres./visibil.	Black pres./visibil.
Deze thermoskan heeft een bolle vorm (This thermos flask has a spherical shape) / 1.83	0 / 100	100 / 100	100 / 100
Deze thermoskan heeft een beker als dop (This thermos flask has a mug as a lid) / 2.88	100 / 87.5	0 / 50.0	0 / 87.5
Deze thermoskan is wit (This thermos flask is white) / 1.75	0 / 100	100 / 93.8	0 / 100
Deze thermoskan heeft een gezellig model (This thermos flask has a cosy look) / 5.75	12.5 / 81.3	81.3 / 81.3	75.0 / 81.3
Deze thermoskan is opvallend (This thermos flask is eye-catching) / 4.58	93.8 / 75.0	62.5 / 68.8	31.3 / 81.3
Deze thermoskan heeft een modern uiterlijk (This thermos flask has a modern appearance) / 4.58	68.8 / 87.5	87.5 / 93.8	75.0 / 100

the surrounding area (Tan, 1992). Subjects were naive about the purpose of the experiment, and were debriefed after the last subject had taken part in the experiment.

The data from two subjects were not used; one subject was deaf, had severe language problems, and had taken very long at the task, the other had a specific eye-sight disorder that gave him tunnelvision (so there was a risk that he has only focused

on the centre of the picture, i.e. the product - not the surrounding context). This leaves us with 180 subjects whose data are used here.

Design

For both telephones and thermos flask, two variables were systematically varied in the experiment. First the attributes. Three abstract and three concrete attributes for three telephones and another three abstract and three concrete attributes for three thermos flasks were presented to each subject. The order in which the attributes and products were presented was randomized for each new subject. The second variable that was manipulated in the experiment was the situational background in which the three telephones and the three thermos flasks were presented (situations and a neutral blue background). This was a between subjects variable, meaning that each subject only came to see the three telephones in one particular situational background and the three thermos flasks in one other situational background. Situational background was a between subjects variable to avoid subjects being given the same attribute statement for the same product in different situational backgrounds. This would have drawn attention to the situational background which could have caused a testing effect in the subjects. Making it a between subjects variable ensures that this does not happen.

In an adjoining questionnaire, each subject was asked to what extent he or she thought the three telephones and the three thermos flasks fitted in the situation in which they were portrayed. This was done for all backgrounds except for the neutral blue background, which did not portray a situation. The subjective fit of the product in its situation constituted an extra control variable.

There are two dependent variables mentioned in the hypotheses. The first is how fast attributes are identified in the pictures that are portrayed. This was assessed by the reaction time of the subject on the presentation of the picture with an accompanying attribute statement on the computer screen. The amount of time that passed between the presentation of the attribute statement and the response on a response box (pressing a 'yes' or a 'no' button) was the reaction time. The second dependent variable is the actual response of the subject, the positive or negative identification. This tells us whether the subjects thought that the attribute was present or absent in the picture.

Procedure

Subjects were telephoned and asked to come to the laboratory (a few days later they received a written reminder). When entering the laboratory, they were received by the experimenter. They were sat behind their computer and asked to follow the instructions on the screen, but to ask if anything was unclear to them.

The instructions on the screen informed subjects about the task. They were asked to look at products in the picture and read the accompanying sentences. If they felt that the sentence corresponded with what was displayed in the picture, they should press a 'yes' button on the response box. If they felt that the sentence did not correspond with the picture, they should press the 'no' button. Subjects were told that we were interested in the first answer that came to their mind, and that they had to answer as quickly as possible. Each person first received 12 practice trials, with pictures of two

different clock-radios in one situation, each with three concrete and three abstract attribute statements. The practice trials were followed by 36 experimental trials. In the experimental trials, pictures were shown of a product in a situation or a neutral blue background. After two seconds, a sentence would appear under the picture, stating that the product had a certain attribute. For both telephone and thermos flask there were three products and six attribute statements which created $2 \times 3 \times 6 = 36$ trials. Each subject received the trials in a different random order. In each trial, the subject's answer (yes/no) and his or her reaction time (measured from the appearance of the attribute statement) were recorded by the computer. At the end of the experiment, the subjects were asked to fill in a short questionnaire, containing Likert-like seven point scales for how well each product in the picture had fitted in the situation. Interested subjects were debriefed straight after the experiment, but all were debriefed at the end of the year in a report describing the purpose of the research.

RESULTS AND DISCUSSION

Reaction times

When looked at in real time, reaction times are usually skewed towards the high end of the scale. This is because there is a limit to how low reaction times can be, because it takes a certain time to read the words and press the yes/no buttons. Another problem with reaction times is that of outliers. If subjects are reconsidering their answer, or if they are not concentrated, it can happen that their answer takes a few seconds extra. Since the effects that we are looking for exist in terms of centiseconds, outliers with a score of a few seconds more can distort the results drastically. For these two reasons, the reaction times were transformed with a natural logarithm (which gives the data a normal distribution) and extreme positions that fell out of the normal distribution were left out of the analysis⁵⁶. This had the result that in later analyses on reaction times, no violations were reported against the normal distribution of the data.

A more specific problem for this study was that for the telephone the three concrete attribute statements had longer word lengths than the three abstract attributes: the three concrete attribute statements consisted of $36 + 28 + 34 = 98$ letters, while the three abstract statements consisted of $18 + 23 + 31 = 72$ letters. For the attribute statements about the thermos flask, these differences are smaller: $31 + 33 + 19 = 83$ letters for the concrete attribute statements and $35 + 25 + 36 = 96$ letters for the abstract attribute statements. A possible solution is to compensate for the word length of the attribute statements. However, even the least error prone compensation method, which is adding 30 msecs (milliseconds) per letter (Seymour, 1987), will be a

⁵⁶ Since the attribute statements had different lengths, the limit for outliers was different for each attribute statement. For the shortest attribute statement, 'deze thermoskan is wit' one was considered an outlier when the reaction time was longer than 3 seconds. For the longest statement, 'deze thermoskan heeft een modern uiterlijk' the limit was 7.1 seconds.

crude measure in that it may vary over the words in which the letters appear (Rainer & Pollatsek, 1989). Therefore, in order to minimize the effect of compensating per letter, we will make the telephone attribute statements more equal to each other by not considering the reaction times of the longest concrete attribute ('deze telefoon heeft een horizontale hoorn' / this telephone has a horizontal receiver) and the shortest abstract attribute ('deze telefoon is mooi' / this telephone looks nice). In this case, there are $28 + 34 = 62$ letters for the concrete attribute statements, and $23 + 31 = 54$ letters for the abstract attribute statements; a difference of only 8. So, this omission of the longest concrete attribute and the shortest abstract attribute makes a possible effect of word length a lot smaller. This means that we can now test our hypotheses first without compensating for word length, and a later compensation of 30 msec per letter will be a lot less crude as it is done for a smaller number of letters.

The attribute 'beker als dop'

In the pilot study, the attribute 'beker als dop' (lid as mug) was rated by half of the subjects as not clearly visible in the picture of the white thermos flask. This may have distorted the reaction times and identifications for the white thermos flask and here we check whether this has been the case. First the reaction times. Compared with the reaction times of the same attribute for the other two thermos flasks, the times for the white thermos flask were not much higher on average: the mean reaction times (natural logarithms, see below) for the metal thermos flask (where the attribute was present) was 5.28, for the white and black thermos flask (where the attribute was absent) it was almost the same: 5.495 and 5.459. Standard deviations were .343, .305 and .315, respectively, so there was no effect on the variation in reaction times. The variation in identification of the attribute is also unaffected. Table 8.7 (below) shows that over all the different situations, only one person felt the attribute was present in the white thermos flask. This level of variation over the situation is not larger than the variation of the same attribute in the two other thermos flasks. As a result, we can conclude that the visibility of the attribute 'beker als dop' in the white thermos flask did not lead to higher levels or variances in reaction times and identification, when compared with the other two thermos flasks that were used.

The effects of concreteness and situational background on reaction times

Hypothesis 8.1 states that, without a situational background, concrete attributes are identified faster than abstract attributes. This is tested by comparing the average reaction times of concrete attributes with those of abstract attributes, but only for the condition where the product is portrayed in a neutral (blue) situational background. Table 8.2 lists the results of these comparisons, for telephone and thermos flask. The t-tests show that for telephone as for thermos flask, there is a significant difference in reaction times between concrete and abstract attributes (for telephone, $t = 3.98$, 24 df, $p < .001$, for thermos flask, $t = 7.46$, 23 df, $p < .000$). In both instances, these differences are in the expected direction: the concrete attributes are identified faster than the abstract attributes.

Table 8.2 *Average transformed reaction times for concrete and abstract of telephone and thermos flask. The original reaction times (in seconds) are listed between brackets.*

	TELEPHONE					
	mean		sd	n	t	p (two-tailed)
Concrete	5.324	(2.215)	.190	25	- 3.98	.001
Abstract	5.458	(2.538)	.226	25		

	THERMOS FLASK					
	mean		sd	n	t	p (two-tailed)
Concrete	5.218	(1.980)	.197	24	- 7.46	.000
Abstract	5.487	(2.663)	.250	24		

Compensating for the word lengths of the concrete and abstract attribute statements is done as follows. For each attribute statement, the deviation from the average word length of an attribute statement is calculated. For each letter that it deviates, 30 msecs are added (or subtracted) to the reaction times for that attribute. Next, the natural logarithm of the reaction times is calculated and the first hypothesis is tested again with two t-tests. The results nicely duplicate the findings of the initial t-tests: for both products there is a significant difference between the reaction times for concrete and abstract attributes, and the difference is in the expected direction. For telephone, $t = 4.46$, 24 df, $p < .000$, for thermos flask, $t = 6.72$, 23 df, $p < .000$. Note that the t-value for thermos flask is somewhat lower than the initial t-value and the t-value for telephone is somewhat higher than the initial t-value. Since abstract attributes were longer than concrete attributes for thermos flask but not for telephone, we can see that there has been a small effect of word length on reaction times, but too small by far to make the effect for thermos flask disappear.

Hypothesis 8.2 states that, compared to concrete attributes, abstract attributes are identified faster in situated products than in unsituated products. This is tested by looking at an interaction effect on the reaction times of the subjects (averaged over the three different product types that were presented). The interaction is between situatedness and concreteness, or in other words, between the presence (or absence) of a situational background in the picture and the type of accompanying attribute statements (abstract or concrete). The presence of a situational background is thought to make the time needed to identify an abstract product attribute in the picture shorter, and this is not the case with concrete attributes. Two anova's were carried out on a 2 within (concreteness: average concrete attributes vs. average abstract attributes) \times 6 between (situational background: no situation and five situations) design⁵⁷; one anova for telephone and one for thermos flask. A contrast effect was calculated that stated that the difference in reaction times between the no-situation condition and the five

⁵⁷ Because the design includes a within subjects factor, the analyses were carried out under the univariate repeated measurements procedures of the MANOVA module in SPSS.

Table 8.3 *The average transformed reaction times of concrete and abstract attributes (within subjects factor) for five types of situational backgrounds and a neutral (between subjects factor). The original reaction times (in seconds) are listed between brackets.*

TELEPHONE	Couch (n = 20)	Computer (n = 28)	Photo (n = 23)	Table (n = 22)	Bed (n = 21)	Neutral (n = 25)
Concrete	5.382 (2.333)	5.330 (2.212)	5.382 (2.348)	5.335 (2.218)	5.423 (2.449)	5.324 (2.215)
Abstract	5.453 (2.503)	5.428 (2.483)	5.408 (2.419)	5.511 (2.706)	5.451 (2.522)	5.458 (2.538)

THERMOS FLASK	Canteen (n = 23)	Shortbread (n = 18)	Breakfast (n = 25)	Picnic (n = 23)	Grandma (n = 23)	Neutral (n = 24)
Concrete	5.217 (2.017)	5.251 (2.049)	5.207 (1.936)	5.254 (2.032)	5.200 (1.957)	5.218 (1.980)
Abstract	5.445 (2.535)	5.437 (2.472)	5.408 (2.430)	5.448 (2.494)	5.442 (2.475)	5.487 (2.663)

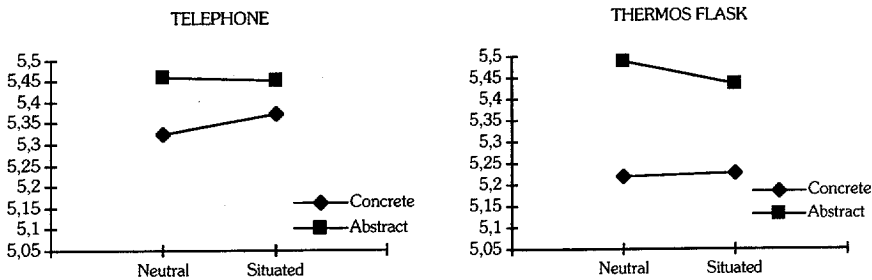


Figure 8.1 *The interaction effect between concreteness and situatedness on transformed reaction times.*

situation conditions would be different at the two different levels of the concreteness (the contrast had weights -5 +1 +1 +1 +1 +1 +5 -1 -1 -1 -1). The average reaction times for concrete and abstract attributes in each type of situation are shown in Table 8.3. The interaction effect between concreteness and situatedness is shown in Figure 8.1. The results of the anova are shown in Table 8.4.

When looking at the results in Table 8.3 and the anova solution in Table 8.4, we can discern three things. First, we can see that there is no main effect of situational background on reaction times: For telephone, $F_{(5,133)} = .30$, $p < .915$, for thermos flask $F_{(5,130)} = .24$, $p < .945$. Second, higher reaction times for abstract attributes exist not

Table 8.4 ANOVA Table for reaction times with main effects of one between subjects factor (background: 5 situated backgrounds and 1 neutral background), one within subjects factor (concreteness: abstract and concrete), and one contrast of the interaction between situatedness (5 situated backgrounds versus 1 neutral background) and concreteness (abstract versus concrete).

TELEPHONE						
Main Effects		SS	df	MS	F-value	p
Between subjects:	Within cells	10.52	133	.08		
	Background	.12	5	.02	.30	.915
Within subjects:	Within cells	2.67	133	.02		
	Concreteness	.54	1	.54	26.95	.000
Contrast Coefficient		Coefficient		df	F-value	p
Interaction situatedness x concreteness			.075	1	3.201	.076
THERMOS FLASK						
Main Effects		SS	df	MS	F-value	p
Between subjects:	Within cells	8.33	130	.06		
	Background	.08	5	.02	.24	.945
Within subjects:	Within cells	1.86	130	.01		
	Concreteness	3.25	1	3.25	227.65	.000
Contrast Coefficient		Coefficient		df	F-value	p
Interaction situatedness x concreteness			.019	1	.293	.589

only for the neutral situation, but for all the situated conditions. Table 8.4 shows a significant main effect of concreteness: for telephone $F_{(1,133)} = 26.95$, $p < .000$, for thermos flask $F_{(1,130)} = 227.65$, $p < .000$. This effect shows that concreteness is not only a main determinant of attribute identification times in unsituated products (Hypothesis 8.1), but also in situated ones. Now for the test of Hypothesis 8.2, the interaction between concreteness and situatedness. When looking at this effect in Figure 8.1, we can see that the difference in reaction time between abstract and concrete attributes is smaller in the situated conditions than in the neutral condition. This interaction effect is in the expected direction, but Table 8.4 shows that this result is only a trend for telephone (contrast effect $\psi = .075$, $F_{(1,133)} = 3.201$, $p < .076$), while for thermos flask this result is not statistically significant (contrast effect $\psi = .019$, $F_{(1,130)} = .293$, $p < .589$)⁵⁸. Before drawing our conclusions from this, one thing must be

⁵⁸ For Hypotheses 8.2 and 8.3, we do not need to compensate our findings for word length. This is because there cannot be a mediating effect of word length on the effects here, since the hypothesised effects are interaction effects, not main effects, and these are not affected by the absolute levels of reaction times of concrete and abstract attributes.

noted. It may well be that reaction times for situated products were equally long because the products did not fit in their situation and thus their portrayal in the situation did not lead to lower reaction times for abstract attributes. This we will test in Hypothesis 8.3.

Hypothesis 8.3 states that, compared to concrete attributes, abstract attributes are identified faster when the product is portrayed in a fitting situation than in a non-fitting situation. This is tested by again looking at the reaction times, but by now considering an interaction effect of concreteness with how well the product fits in the situation (only the five situation conditions are considered here). Here we make use of the ratings that all subjects gave about how well the three products fitted in its situation. Since a subject can give high ratings of product fit for one product and low for another, separate anova's are carried out for each of the three telephones and the three thermos flasks. How well the product fits in the situation was measured by a seven point scale. Subjects with a score of 1 and 2, who felt the product did not fit in the situation at all were compared with subjects with a score of 6 or 7, who felt that the product fitted really well in the situation. This means that subjects who fell in the middle were left out of the analysis (this ranged from 19% of subjects left out for the metal thermos flask to 50% for the beige telephone). The average reaction times of concrete and abstract attributes for fitting and non fitting situations are shown in Figure 8.2. From this figure it can be seen that for most products, the reaction times are lower when there is a fit of the product in the situation. However, this effect is the same for concrete and abstract attributes, which means that there is no interaction between concreteness and product fit. The exact means are presented in Table 8.5, and the findings are confirmed in the anova's reported in Table 8.6. In Table 8.6 it is shown again that most main effects of concreteness are significant. However, none of the main effects of product fit on reaction times are significant, nor are the interaction effects between concreteness and product fit. Thus abstract attributes are not identified faster in fitting situations than concrete attributes.

Identification of attributes

The second dependent variable in this study is the positive or negative identification of attributes in the picture. The number of positive identifications of the attribute in the picture are shown in Table 8.7. The same table also shows the variances in attribute identification over the five situational backgrounds. On first sight, two major deviations can be found in the identifications of the telephone. First, the attribute "cijfers op de toetsen" (numbers on the keys) varies very strongly for the grey telephone. A reason for this is that in spite of the students' ratings in the pilot study (who all considered this clearly visible) it was in fact not very visible on the smaller computer screen (students had rated the attributes on a larger screen in a lecture room). So this accounts for the above normal variance in the ratings of this attribute in the grey telephone. Second, there is a disproportionately large number of subjects who found that the green telephone had a "horizontale hoorn" (horizontal receiver) in the situation where the telephone was put in the bedroom. A reason for this is that, accidentally, the telephone

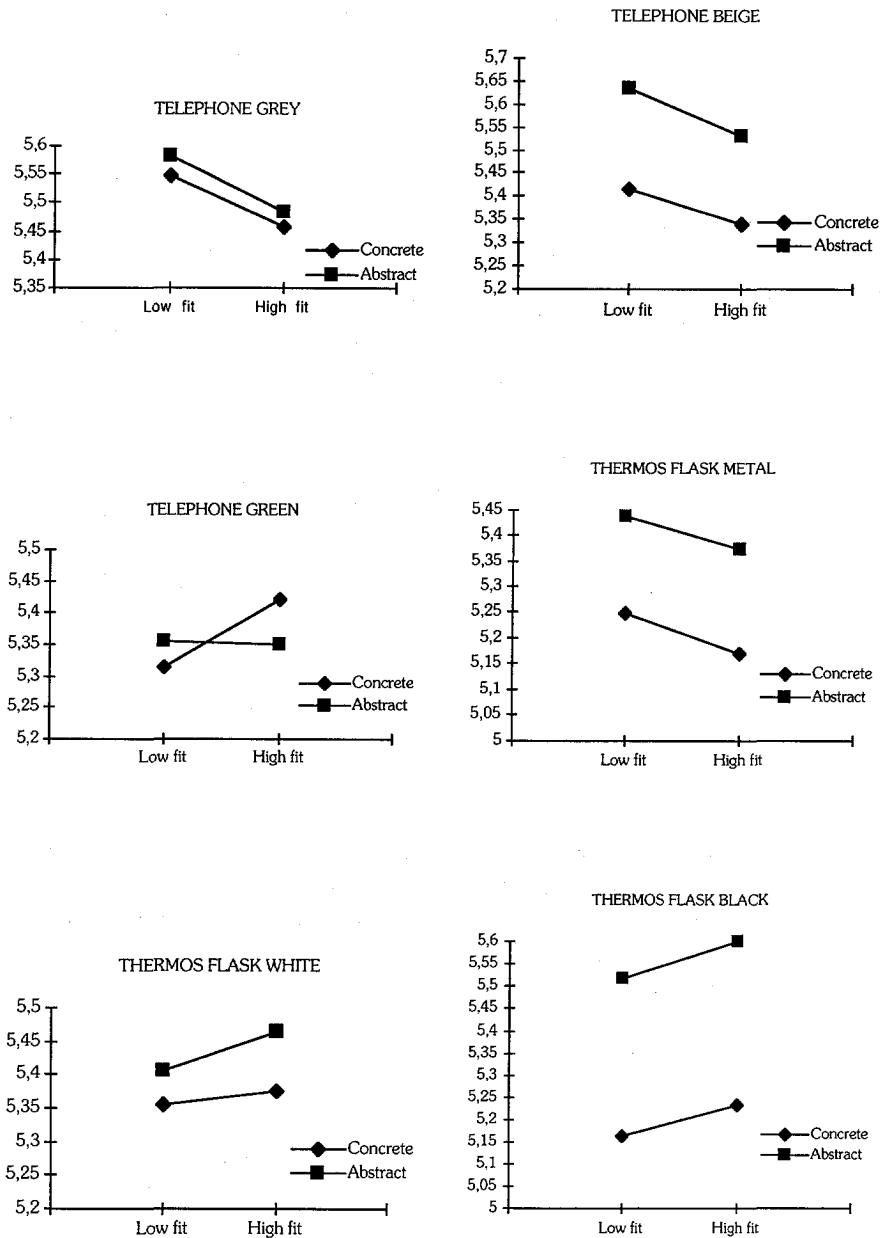


Figure 8.2 The interaction effect of concreteness and product fit on transformed reaction times..

Table 8.5 *The average transformed reaction times of concrete and abstract attributes (within subjects factor) for high and low product fit (between subjects factor, with subjects nested in product fit. The original reaction times (in seconds) are listed between brackets.*

	TELEPHONE					
	Grey		Beige		Green	
	Low fit n = 25	High fit n = 44	Low fit n = 11	High fit n = 56	Low fit n = 54	High fit n = 34
Concrete attributes	5.549 (2.794)	5.458 (2.550)	5.416 (2.343)	5.339 (2.243)	5.315 (2.189)	5.422 (2.426)
Abstract attributes	5.583 (2.842)	5.484 (2.568)	5.634 (2.982)	5.530 (2.739)	5.356 (2.336)	5.349 (2.263)

	THERMOS FLASK					
	Metal		White		Black	
	Low fit n = 71	High fit n = 35	Low fit n = 39	High fit n = 42	Low fit n = 22	High fit n = 55
Concrete attributes	5.249 (2.019)	5.169 (1.872)	5.355 (2.301)	5.376 (2.365)	5.161 (1.853)	5.233 (2.005)
Abstract attributes	5.436 (2.483)	5.374 (2.393)	5.406 (2.395)	5.464 (2.560)	5.517 (2.703)	5.600 (2.919)

Table 8.6 *ANOVA Tables for each telephone (Grey, Beige, Green) and thermos flask (Metal, White, Black) on transformed reaction times with main effects of one between subjects factor (product fit: low fit and high fit), one within subjects factor (concreteness: abstract and concrete), and an interaction effect product fit and concreteness.*

TELEPHONE : Grey						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	7.49	67	.11		
	Product fit	.29	1	.29	2.58	.113
Within subjects:						
	Within cells	2.97	67	.04		
	Concreteness	.03	1	.03	.65	.424
product fit X concreteness		.00	1	.00	.01	.909

continues

Table 8.6, continued

TELEPHONE : Beige						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	7.32	65	.11		
	Product fit	.15	1	.15	1.33	.253
Within subjects:						
	Within cells	3.34	65	.05		
	Concreteness	.77	1	.77	14.89	.000
product fit x concreteness		.00	1	.00	.06	.800
TELEPHONE : Green						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	10.59	86	.12		
	Product fit	.10	1	.10	.85	.359
Within subjects:						
	Within cells	4.37	86	.05		
	Concreteness	.01	1	.01	.21	.652
product fit x concreteness		.14	1	.14	2.68	.105
THERMOS FLASK: Metal						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	10.09	104	.10		
	Product fit	.23	1	.23	2.42	.123
Within subjects:						
	Within cells	3.77	104	.04		
	Concreteness	1.80	1	1.80	49.67	.000
product fit x concreteness		.00	1	.00	.11	.736
THERMOS FLASK: White						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	8.34	79	.11		
	Product fit	.06	1	.06	.59	.444
Within subjects:						
	Within cells	2.69	79	.03		
	Concreteness	.19	1	.19	5.72	.019
product fit x concreteness		.01	1	.01	.42	.518
THERMOS FLASK: Black						
Source		SS	df	MS	F-value	p
Between subjects:						
	Within cells	5.59	75	.07		
	Product fit	.19	1	.19	2.55	.114
Within subjects:						
	Within cells	3.38	75	.05		
	Concreteness	4.11	1	4.11	91.21	.000
product fit x concreteness		.00	1	.00	.02	.885

Table 8.7 *Number of positive identifications for each attribute in each situational background for the three telephones and three thermos flasks (in each situational background, n = 30).*

TELEPHONE						Grey Beige Green
Concrete Attributes	Couch	Situation Computer	Photo	Table	Bed	pooled s ² s ²
Horizontale hoorn (Horizontal receiver)	24	26	27	24	26	1.8
	29	29	29	29	30	.2
	10	9	9	10	19	18.3
Wit snoer (White cable)	2	1	1	0	0	.7
	30	30	30	29	30	.2
	0	0	0	0	0	0
Cijfers op de toetsen (Numbers on keys)	10	10	19	25	20	43.7
	30	30	30	29	29	.3
	30	30	30	29	29	.3
Abstract Attributes						
Mooi (Pretty)	17	16	16	16	17	3
	9	8	6	9	8	1.5
	28	23	21	23	24	6.7
Eenvoudig (Simple)	27	28	30	26	23	6.7
	28	30	29	26	28	2.2
Moderne vorm (Modern form)	28	28	26	28	27	.8
	10	13	10	9	11	2.3
	28	29	30	27	30	1.7
THERMOS FLASK					Metal White Black	
Concrete Attributes	Canteen	Situation Short- bread	Break- fast	Picnic	Grand ma	pooled s ² s ²
Bolle vorm (Spherical shape)	1	1	0	3	2	1.3
	28	24	27	25	27	2.7
	30	30	30	30	30	0
Beker als dop (a mug as a lid)	28	30	30	30	29	.8
	0	1	0	0	0	.2
	3	1	0	0	0	1.7
Wit (White)	0	0	0	0	0	0
	28	30	30	30	30	.8
	0	0	0	1	0	.2

continues

Table 8.7 Continued

Abstract Attributes	Canteen	Situation		Picnic	Grand ma	s ²	pooled s ²
		Short- bread	Break- fast				
Gezellig model (Cosy look)	1	2	4	4	2	1.8	
	27	24	23	26	18	12.3	
	21	22	19	22	22	1.7	
Opvallend (Eye-catching)	10	11	13	18	14	9.7	7.278
	27	29	27	27	28	.8	
	12	8	12	7	7	6.7	
Modern uiterlijk (Modern appearance)	9	8	15	18	14	17.7	
	30	28	29	29	26	2.3	
	19	14	17	16	10	11.7	

was put in a more oblique position in that situation, so that it was less clear for subjects to determine how the phone was lying or standing.

The effects of concreteness and situational background on identification of attributes

Hypothesis 8.4 states that the identification of both concrete and abstract attributes will depend on the product. This is tested by looking at two sets of correlations, both for telephone and thermos flask. The first set of correlations is between the five different situations of the number of positive identifications of the three concrete attributes in the three products. The second set of correlations is between the five situations of the number of positive identifications of the three abstract attributes in the three products. If correlations in a set are generally high, it shows that the identification of attributes in the products varies in pretty much the same way over different situations. Table 8.8 list the two sets of correlations for telephone and thermos flask. For both telephone and thermos flask, both sets of correlation are statistically significant, and all correlations are on average over .90. Thus there is a significant variation in the identification of concrete and abstract attributes over different products. Note, however, that these correlations are so high that most of the variation in the identification data is explained by variation over the attributes. Hence it will be difficult to find support for the next hypothesis, which deals with variation over the situations. Namely, there is very little variation left to be explained by it.

Hypothesis 8.5 states that the identification of an abstract product attribute in a picture will, more than concrete attributes, depend on the situation in which the product is portrayed. This hypothesis is tested by looking at the extent to which attribute identifications vary over the different situations. It is expected that abstract attributes show larger variances over the different situations than do concrete attributes. There are two ways of looking at this, both based on a different assumption.

The first way of testing that the identification of abstract attributes is more dependent on the situation is to look at the variances of the attributes over the different

Table 8.8 *Correlations over concrete and abstract attributes between the five different situations, for telephone and thermos flask (all correlations are significant at $p < .000$).*

TELEPHONE					
CONCRETE	Couch	Computer	Photo	Table	Bed
Couch	-				
Computer	.998	-			
Photo	.968	.973	-		
Table	.914	.916	.981	-	
Bed	.938	.937	.962	.958	-
ABSTRACT	Couch	Computer	Photo	Table	Bed
Couch	-				
Computer	.962	-			
Photo	.945	.988	-		
Table	.985	.976	.967	-	
Bed	.967	.970	.953	.970	-
THERMOS FLASK					
CONCRETE	Canteen	Shortbread	Breakfast	Picnic	Grandma
Canteen	-				
Shortbread	.992	-			
Breakfast	.996	.998	-		
Picnic	.991	.998	.997	-	
Grandma	.996	.997	.999	.998	-
ABSTRACT	Canteen	Shortbread	Breakfast	Picnic	Grandma
Canteen	-				
Shortbread	.967	-			
Breakfast	.964	.961	-		
Picnic	.879	.920	.940	-	
Grandma	.847	.933	.925	.941	-

situations. These are shown in Table 8.7. From this table it can be seen that in general, the variances over the situations of abstract attributes are higher than those of concrete attributes. F-tests on the pooled variances, however, show that the pooled variance of abstract attributes is higher only for the thermos flasks. For telephone, it is the concrete attributes that have a higher variance over situational backgrounds. When we place the variance of abstract attributes in the numerator and the variance of concrete attributes in the denominator (after Hays, 1981, p. 316), we get the following F-values: for telephone $F_{(36,36)} = .359$, $p(\text{two-tailed}) < .003$, for thermos flasks $F_{(36,36)} = 8.403$, $p(\text{two-tailed}) < .000$. The higher variance of concrete attributes for telephone, however, can easily be accounted for by the disproportionately high variances of the attribute 'cijfers op de toetsen' (numbers on keys) in the grey telephone and the attribute 'hoorn horizontaal' (horizontal receiver) for the green telephone. As we have seen earlier, the cause of the higher variance in these attributes can be explained by a lack clarity in some of the pictures that were presented. When we leave out these two

cases and recalculate the F-value for telephone, we find that abstract attributes do vary significantly more over situational backgrounds: $F_{(36,28)} = 5.222$, p (two-tailed) $< .000$.

So at first sight one would say that Hypothesis 8.5 is accepted, were it not that these results depend on a particular assumption. The assumption is that the identification of abstract attributes is as reliable as the identification of concrete attributes. If their identification is less reliable then the higher variances for abstract attributes may be due to a higher error in the identification of abstract attributes. Two things can be said about this assumption, however. First, if abstract attributes were more unreliable, then they would also have to show lower correlations over the attributes between the situations, and they don't (see Table 8.8). Second, many theories about reliability assume that error in measurement is synonymous with a higher dependence on the situation in which the measurement has taken place (for a review, see Krulanski & Ajzen, 1983). So this means that the higher variances for abstract attributes could well mean both that they are more situation dependent and less reliable.

Still, there is a way in which we can see whether the variation over situations in the abstract attributes is systematic. That is by checking whether the variances of the attributes over situations for one telephone (thermos flask) are similar to those of the other two telephones (thermos flasks). So, if many people felt that, relative to the other situations, the grey telephone was 'eenvoudig' (simple) in the situation with the computer, then this would also be the case for the same attribute for the other two telephones. Of course, the assumption on which this test depends is that the situation dependent information in the abstract attribute can be fully separated from the product that is portrayed. This would be information that is separable from the product, not part of an interaction of the product with its situation. So different telephones would all become more 'modern' when they were put in a specific situation, independent of what the telephone looked like. Note that this is not what we have argued, since we have proposed that abstract attributes are more complex invariants of the situated product - not an independent aspect of the situation that bears some meaning in itself. So, in a sense, we hope that this is not the way in which our fifth hypothesis will find support.

Each attribute of each of the three telephones and thermos flasks was first standardized over the five situations. This was done so that attributes would correlate between two products regardless of whether the attribute was mostly rated as absent in one product and as present in the other. Next, all standardized scores of the three concrete attributes of the first telephone (grey) were put in a string. This constituted the variable 'concrete attributes of the grey telephone', with three concrete attributes, each standardized over five situations, which equals 15 cases. The same was done with the abstract attributes of the grey telephone, and again for the other telephones and for the three thermos flasks. For both telephones and thermos flasks, the three concrete attribute variables were intercorrelated and the same was done for the abstract attributes. If abstract attributes are more situation dependent, and this influence is independent of the product, the abstract attributes should have higher intercorrelations than the concrete attributes. The correlations are shown in Table 8.9, and we can see that this is not the case. Two correlations are statistically significant, but only one of

Table 8.9 *Correlations between the three different telephones (and the same for thermos flasks) over the standardised scores of identification of concrete attributes, and between the three different telephones over the standardised scores of identification of abstract attributes.*

TELEPHONE			
CONCRETE	Grey	Beige	Green
Grey	-		
Beige	-.052	-	
Green	-.264	.678**	-
ABSTRACT	Grey	Beige	Green
Grey	-		
Beige	.330	-	
Green	.153	.467	-
** p (two-tailed) < .01			
THERMOS FLASK			
CONCRETE	Metal	White	Black
Metal	-		
White	.022	-	
Black	-.386	.132	-
ABSTRACT	Metal	White	Black
Metal	-		
White	-.138	-	
Black	-.362	.136	-

them is between the abstract attributes of two products (beige and green telephone: $r = .467$ ($n = 15$), p (two-tailed) < .040), while the other is between the concrete attributes of the same two products ($r = .678$ ($n = 15$), p (two-tailed) < .006). So much as we hoped, we did not find support for Hypothesis 8.5 under the assumption of an independent situational influence.

GENERAL DISCUSSION

Proposition 6 states that abstract attributes are richer in visual context than concrete attributes. In the present chapter, we have translated this proposition into the following question. Is the perception of abstract attributes in a product more dependent on their situation of use? When we look at the overall results we must answer with a conditional yes. We found that concrete attributes were faster identified in the no situation condition (Hypothesis 8.1), and this was also the case in the situation conditions. One reason to explain this is that concrete attributes describe less complex patterns in the pictures, which means that they will be identified faster. However, we also found an interaction effect in that the difference in identification times between concrete and

abstract attributes was smaller in the situated conditions than in the no situation condition (Hypothesis 8.2). Still, this effect was not significant for thermos flask, but there was a clear trend for telephone⁵⁹. We also looked at whether these effects were mediated by the extent to which subjects felt that the product fitted in its situation (Hypothesis 8.3). This did not appear to be the case.

When looking at the yes/no answers, we can find more support for the proposition that abstract attributes are more dependent on situation of use. Both concrete and abstract attribute identification was seen to vary systematically over products, in that correlations between different groups of subjects who had rated the product in different situations were really extremely high for both concrete and abstract attributes (Hypothesis 8.4). However, abstract attribute identification did vary more over situations than concrete attribute identification did, and this variance could not be attributed to a main effect of situational background (Hypothesis 8.5). This points to an interaction effect of situation and product that is stronger for abstract attributes than for concrete attributes.

These results point to the conclusion that the perception of abstract attributes is more dependent on its situation of use. However, there are some problems that mean that we can only conclude this under a number of conditions. First, we only found a very weak interaction effect between concreteness and situatedness in the identification times. A reason for this may be found in the stimulus material. In the present study products were shown on photographs in very natural situational backgrounds. It may well be that drawings (as used by Murphy & Wisniewski, 1989) are more appropriate than photographs because they can focus the perception of subjects more directly, and colours and light can be held more constant. In addition, the quality of the computer images was not as good as anticipated, and lower than the slides that are used with tachistoscopes. This may have led to higher identification times, and, in the case of the attribute 'cijfers op de toetsen' (numbers on keys) of the grey telephone, even to uncertainty about the presence of the attribute in the picture.

A second problem for the validity of our conclusion can be found in the yes/no answers themselves. As we have already noted, the comparison of the pooled variances of concrete and abstract attributes is based on the assumption that abstract attributes can be assessed by subjects as reliably as concrete attributes (in terms of pure measurement error). But note that this means that we also assume that this situational influence is the same for most subjects, because if we did not do so, we would no longer be able to make the distinction between reliability and subjectivity, and we could not get an answer to our question using inferential statistics (which itself has to assume measurement error). Having only yes/no answers, and a between subjects design for the different situational backgrounds, we cannot give an answer to this here. But it would be interesting to see in another research, whether the higher situational variance for abstract attributes between groups is due to a systematic interaction of abstract attributes with the situational background, or to a higher within group variation (i.e.

⁵⁹ As one statistician noted about this result: "God loves the .07 just as much as the .05".

error)⁶⁰. For now, however, we must be satisfied with the finding that abstract attributes are more variable over situations.

Finally, when combined with our findings from Chapter 7, we have now established that abstract product attributes: 1) describe perceptual product qualities; 2) are not fully derived from concrete attributes; 3) have a richer associative context; 4) to some degree, are perceived less as isolated product characteristics, but more in conjunction with the situation in which the product is placed. It is in the last two points that we can also understand how abstract attributes are more subjective: in their communication there will be less certainty about the context in which the abstract attribute should be understood. So if, for example, a consumer says that a product is modern, the consumer researcher may not understand how (i.e. in what context) modernness is established for the product.

Before we can conclude anything from this, however, we must first look at the link between abstract attributes and the other source of subjectivity, which is emotionality. As we have speculated in Chapter 3, abstract attributes are more easily used when consumers are in a more emotional state. This will be investigated in Chapter 9. Finally, in Chapter 10 we will discuss the implications of these findings for consumer research.

⁶⁰ There is an option here to call this interaction effect pure error in the judgement. However, since it is an effect that we can predict on the basis of a theory about abstract attributes, this would not be a good name for it. Pure error suggests that there is no reason why judgements are vague, other than inaccurate measurement procedures. Instead, a theory about abstract attributes gives an explanation for the effect in terms of the adequacy of the measure. Error may result from inadequate measurement, but our theory of abstract attributes suggests that it is not the measurement procedures that are inaccurate (i.e. lacking reliability), but that it is the measure itself that is inadequate (i.e. lacking internal validity). This is a shady line to draw and we want to stay away from a fruitless discussion of why and how reliability is different from internal validity. For this reason, throughout the thesis, we have not touched upon it.

THE EFFECT OF RATIONALITY AND EMOTIONALITY ON THE CONCRETENESS OF PRODUCT ATTRIBUTES

INTRODUCTION: THE RELATION BETWEEN EMOTIONALITY AND ABSTRACT PRODUCT ATTRIBUTES

In the previous chapters, we have investigated the distinction between consumer emotionality and rationality, and the distinction between concrete and abstract attributes. We have dealt with the two distinctions separately, and no link was made between the two. The reason for this is that, when looking at the theory that is behind the two distinctions and at our research, there are no evident links to make between the two. Emotional judgements are found to be different from rational judgements because they are based more on direct forms than on logically inferred function, while abstract product attributes are found to have a richer context than concrete attributes, in that more situational information is included in the abstract attribute.

Yet, in the literature, we can find many instances where emotionality and the use of abstract product attributes are associated with each other. In Chapter 2 we have localised this in a romantic school of thought, which started in the nineteenth century (Campbell, 1987), which found its way to consumer research this century in the writings of motivational and interpretive consumer researchers (e.g. Dichter, 1967; Gardner & Levy, 1955; Hirschman & Holbrook, 1982). Here it stressed that the link between emotionality and abstract attributes is a necessary one, based on deeper and unknown psychological laws. We can also find some support for this position by the findings of Claeys, Swinnen and Vanden Abeele (1990) and Schoormans, Van der Meer and Kessener (1991). The first shows that abstract attributes are more frequently mentioned for 'feel' products (for which most consumers state that they make more emotional judgements), and the second shows that abstract attributes are more important in the evaluation of these products.

These findings have forced us to find an explanation for it, and in Chapter 3 we have speculated about how a relation between emotionality and abstract attributes can exist. The link between emotionality and abstract product attributes can exist under a certain assumption. This is that no strictly defined distinction need to be made between figures and backgrounds when only form information is regarded and that, instead, the distinction between figures and background is a functional matter, only created for consequent action. If we accept this speculation, it may well be that rational decisions are linked to the use of concrete attributes (strictly defined figures from a background)

because these can much more easily operate the logical functions that are needed in rational decisions. For emotional decisions such restrictions do not exist, so perhaps they can be based on much more complex form information, described by abstract attributes.

Here we will not look more deeply into this speculation, but instead just test the proposition that emotional judgements will probably be made on the basis of more abstract attributes and that rational judgements will probably be made more on the basis of concrete attributes (Chapter 3, Proposition 7). In this chapter we will look at the attributes that are named in Chapter 7 and we will see whether these attributes are more abstract when respondents stated they made an emotional decision, and whether they are more concrete when respondents stated they made a more rational decision. The following hypotheses will be tested:

Hypothesis 9.1

People scoring high on the feel scale will name more abstract attributes than people scoring low on the feel scale

Hypothesis 9.2

People scoring high on the think scale will name more concrete attributes than people scoring low on the think scale

Note that these predictions about the frequency of named attributes are only expected on the basis of the findings of Claeys et al. (1990), and not from the results of Schoormans et al. (1991). Namely, the latter study does not say that emotional (rational) people name more abstract (concrete) attributes, but instead, that these attributes are more important in the evaluation of people. This calls for two additional hypotheses:

Hypothesis 9.3

People scoring high on the feel scale will give more importance to abstract attributes than people scoring low on the feel scale.

Hypothesis 9.4

People scoring high on the think scale will give more importance to concrete attributes than people scoring low on the think scale.

These four hypotheses will be tested in this chapter.

METHOD

For the large part, data are used that were collected in studies that were described in previous chapters. People's feel and think scores were obtained in a questionnaire study (Study 2 of Chapter 4). A subset of these people took part in the laddering and

symbolic analysis interviews, and from these people the abstract and concrete product attributes were gathered (Chapter 7). Therefore, in this chapter, we will only give a small summary of how these data were obtained.

In the questionnaire study described in Chapter 4, 624 respondents returned a questionnaire in which they had answered to the items that make up the feel and think scales. They did this for five products, amongst which were telephone, clock radio and thermos flask. The questionnaire was carried out in June 1992. In October 1992, 108 of these respondents were asked to take part in an interview study, where they received the laddering and symbolic analysis tasks (Chapter 7). The interviews were again about the telephone, clock radio and thermos flask, in such a way that each respondent received two interviews about two of the three products. This means that 72 interviews were carried out for each of the three products; 36 laddering interviews and 36 symbolic analysis interviews. In this chapter, we will only look at the attribute lists that people had to give before the actual laddering or symbolic analysis interviews took place. Therefore, it does not matter whether the attributes were later used in the laddering task or the symbolic analysis task; all attributes had been gathered prior to the two interviews in exactly the same way. Just like all the other answers given by the respondents, the attributes were later put into answer categories by two judges and these answer categories were then rated by a group of six other judges on their concreteness, ranging from 1 (very concrete) to 7 (very abstract).

Note that during the interviews, we had not asked the respondents to rate the importance of the attributes. This was done in a supplementary questionnaire, that was sent to them one month later. Each respondent received a unique, personalised questionnaire, in which he or she was asked to rate the attributes that he or she had given earlier in the interview on their importance. This was done using seven point scales, ranging from 'zeer onbelangrijk' (very unimportant) to 'zeer belangrijk' (very important). All except five respondents returned the questionnaire.

RESULTS AND DISCUSSION

103 Respondents returned the questionnaire. Each respondent had rated two products: 70 of them had rated a total of 258 attributes of the telephone, 70 had rated 243 attributes of the clock radio, and 66 had rated 224 attributes of the thermos flask.

The hypotheses in this chapter state that the number and importance of abstract and concrete attributes are dependent on the person's position on the feel and think scale. Before we can actually test this we must decide whether to look at all the attributes separately or at the average abstraction level of the attributes for each respondent⁶¹. In order to decide this we look at the correlation between the abstraction

⁶¹ If we relate the abstraction level of each separate attribute to the feel/think score of the person who listed the attribute, we have a more powerful test of significance (larger N) than if we average the abstraction level of the attributes that each respondent gave and relate this average score to the respondent's feel/think score.

level of the attribute and the number of attributes that each respondent has named. As it turns out the two are heavily correlated: $r = .712$, $N=70$, p (two tailed) $< .000$ for telephone, $r = .893$, $N=70$, p (two tailed) $< .000$ for clock radio, and $r = .868$, $N=66$, p (two tailed) $< .000$ for thermos flask. This means that the more attributes that one person names, the more abstract the attributes are. Therefore, we cannot look at all the attributes separately, because respondents who gave a few attributes would be under-represented in the tests. This would mean that concrete attributes would be under-represented, since respondent who give a few attributes tend to give more concrete attributes. For this reason we will not look at the abstraction level of each individual attribute, but instead, at the average abstraction level for each respondent. This averaging procedure means that the abstraction level per respondent is independent of the number of attributes given by that respondent.

Hypothesis 9.1 states that there will be a positive correlation between someone's feel score and the level of abstraction of the attributes. These correlations are not found: for telephone, $r = -.030$, $N=70$, p (two tailed) $< .808$, for clock radio, $r = -.219$, $N=70$, p (two tailed) $< .068$, for thermos flask $r = .067$, $N=66$, p (two tailed) $< .590$. For all three products the correlations are close to zero. This means that the feel score of someone has no relation to the average abstraction level of the attributes he or she names.

Hypothesis 9.2 states that there will be a negative correlation between someone's think score and the level of abstraction of the attributes. Again, no significant correlations are found that support the second hypothesis: for telephone, $r = -.148$, $N=70$, p (two tailed) $< .222$, for clock radio, $r = .058$, $N=70$, p (two tailed) $< .638$, and for thermos flask, $r = .081$, $N=66$, p (two tailed) $< .520$. Again, all correlations are close to zero for all three products. So the think score of someone has no relation to the average abstraction level of the attributes he names.

The lack of support for the first two hypotheses may well have occurred because the attributes that were named were not all equally relevant for the respondent. In order to test this, we will look at the relation between the importance of abstract and concrete attributes and someone's position on the feel and think scale. Therefore, the importance scores are now used as weights for the concreteness scores and these weighted concreteness scores are averaged for each respondent.

As it turned out, the importance scores were heavily skewed towards the high end of the 7-point importance scale, meaning that most respondents had rated most of the attributes they had named before as very important. For telephone, 60% of the attributes received a score of six and higher, for clock radio 67%, and for thermos flask 67% of the attributes were given a score of six or more. This should not come as a surprise, since most attributes that the respondents had named during the interview were named because they were important to them. An additional finding is that more important attributes do not tend to be more abstract or concrete: the correlation between importance and concreteness are, for telephone, $r = -.064$, $N=253$, p (two tailed) $< .308$, for clock radio, $r = -.028$, $N=243$, p (two tailed) $< .666$, and for thermos flask, $r = -.077$, $N=224$, p (two tailed) $< .254$. Thus, since there is not much variation in the importance scores, and because the importance scores are practically

unrelated to the concreteness scores, we cannot expect that the averaged weighted concreteness scores will lead to very different results than the averaged unweighted concreteness scores.

Hypothesis 9.3 states that people scoring high on the feel scale will give more importance to abstract attributes than people scoring low on the feel scale. Much as we expected, the results are not much different from those for Hypothesis 9.1. The correlations between the feel score and the averaged weighted concreteness score are, for telephone, $r = -.006$, $N=70$, p (two tailed) $< .962$, for clock radio, $r = -.131$, $N=70$, p (two tailed) $< .278$, and for thermos flask, $r = .186$, $N=66$, p (two tailed) $< .136$. Except for thermos flask, where there is a small trend, the correlations are close to zero. Note however that this correlation is one of the six that are calculated for the relation between the feel score and concreteness so this may well be due to chance. So we conclude that there is no relation between someone's position on the feel scale and the importance he or she gives to abstract attributes.

Hypothesis 9.4 states that people scoring high on the think scale will name more concrete attributes than people scoring low on the think scale. Again, this is not translated into correlations between the think score and the averaged weighted concreteness scores: for telephone, $r = -.023$, $N=70$, p (two tailed) $< .850$, for clock radio, $r = .055$, $N=70$, p (two tailed) $< .656$, and for thermos flask, $r = .071$, $N=66$, p (two tailed) $< .548$. So there is no relationship between someone's position on the think scale and the importance he or she gives to abstract attributes.

GENERAL DISCUSSION

All the results that are reported in this chapter lead to the conclusion that the number and importance of abstract and concrete attributes are independent of the person's position on the feel and think scale. However, since this is in contradiction both to the results of Claeys et al. (1990) and Schoormans et al. (1991), we will have to consider the possible reasons for not finding the same result here.

When looking at what sets this study apart from both Claeys et al. and Schoormans et al. we can find two possible reasons for not finding the same result as in the previous studies. First, it could be that the data that were gathered here are less reliable than those of Claeys et al. and Schoormans et al.. There is a reason why this could be the case. In our study, the feel and think scales were administered to the respondents four months before they were interviewed and the questionnaire where the importances were asked was sent to them again one month later. Clearly this is a source of unreliability in the data. However, we can wonder whether this delay was so protracted that it could completely hide the effects that we were looking for. If someone says in June that in general, he or she buys a product for emotional reasons, then there must be some carry over effect of that statement in October. The products that were used here are products that are not ones that are bought on a weekly basis. Therefore, we can expect respondents to have a long-lasting involvement with these products because most of them have a telephone, a clock radio and a thermos flask,

which they use on a regular basis. In addition, the time delay is used here to avoid making it too obvious to respondents that we were testing the relationship between emotionality / rationality and the use of abstract / concrete attributes. Still, the time delay could well be a good reason for less reliable data, and it would have been better to choose another way of separating the task of filling in the feel and think scales and the task of naming important attributes. However, by itself, less reliability means that we would find weaker or non-significant correlations - it cannot explain these correlations vanishing totally. In our study, the problem is not that we find weak correlations, but that we find zero correlations. For this reason, we consider another, more plausible reason for not finding an effect.

In the present study, the products used all had averages in the middle of the feel and think scales. In the studies of Claeys et al. and Schoormans et al., products were used that had their averages at the extremes of a composite feel/think scale. In addition, the studies of both Claeys et al. and Schoormans et al. used a within subjects design, where the same respondent had to give responses to products that varied significantly over the feel / think dimensions. In the present study, each respondent had to name the attributes of two products, but it was not obvious that the products varied over the feel / think dimensions: it was the person-product interactions, not the products that varied over the feel / think dimensions. From one point of view, ours must certainly be a weaker measure: the variation of emotionality / rationality in how people look at one product must certainly be smaller than the variation of emotionality / rationality in how people look at two products that are very different on these dimensions. The other side of the coin, however, is that presenting respondents with two products that differ heavily on the two dimensions induces them to use a 'figure of speech' in which abstract and concrete product attributes both have their place. Abstract attributes are used for the 'emotional product', concrete attributes for the 'rational product'. In this case, the subject's use of abstract and concrete attributes can be seen as a *comment* on the experimental procedure that was used, not as an example of how emotionality and rationality *cause* people to take notice of other aspects in the product. In itself, such an effect would not be uninteresting, since it shows how different vocabularies apply to different types of product presentation. But as a test of a deeper psychological link between emotionality and the use of abstract product attributes, it would not do.

So what can we conclude from this? We would suggest nothing. The present findings are inconclusive: we did not find a relation between emotionality / rationality and the use of abstract / concrete product attributes, while previous studies did find it. All three studies have their drawbacks which makes it difficult to reach a conclusion. Still, it is not altogether necessary that we reach a conclusion at this point. This last study was meant as a safeguard against the situation where only emotionality or abstract product attributes could explain why a consumer response was subjective. In that case we would have needed this link between emotions and abstract product attributes to explain how in the literature, both are connected to subjectivity in consumer response. In the next chapter, however, we will argue that both emotionality and abstract attributes can explain how consumer responses are subjective in their own

right. The link that we have made between the two explanations for subjectivity was speculative from the start, and at the end of the empirical part of this thesis it may be wiser to leave a conclusion on this point to a subsequent thesis-writer.

Finally we would like to focus the reader's attention on an additional finding in this chapter. This is that the level of abstraction of an attribute is heavily correlated with the number of attributes that someone has named. If a consumer mentions just a few attributes, they are more likely to be concrete, than when he or she mentions a lot of attributes. This finding means that some consumers name more attributes than others, and when they do they are also more likely to name abstract attributes. Note that in Chapter 7, we have seen that this does not mean that the abstract attributes are more idiosyncratic, in the sense that they are things that are named only by one consumer. The conclusion we must draw from it is that the mentioning of a lot of attributes is apparently a person characteristic, and this person characteristic favours abstract rather than concrete attributes. In other words, abstract attributes are named more by the verbally blessed

SUBJECTIVITY IN CONSUMER JUDGEMENTS: THE RELEVANCE FOR DESIGN ENGINEERING

INTRODUCTION

In Chapter 1, we have dealt with subjectivity in consumer judgements as a problem in new product development. We have argued that it is necessary for companies to have an idea of what consumers want, even if it is just a vague idea. We have shown how consumer judgements are normally interpreted in consumer research and also that problems arise when these judgements are subjective. This is because it is not clear how to interpret a subjective judgement. This is especially problematic for design engineers, since it means that they do not know how to create an actual product form on the basis of such a judgement.

A closer look into the nature of subjectivity (Chapter 2 and 3) shows why it is so difficult to interpret subjective judgements. First, subjective judgements are given when people are led by their emotions, and this makes them focus on the more direct aspects of a product. This means that the direct appearance of the product will become more important, while the expected possibilities of the product will become less important. Second, judgements are subjective when they are based on abstract attributes, which means that they are more complex and less tied to some distinct parts of the product. In the empirical chapters of the thesis (Chapter 4 to 9), we have demonstrated these two aspects of subjectivity. In Chapter 4 we have seen that consumers can consistently make a distinction between an emotional and a rational involvement with products. However, self rated emotionality appeared to be independent form, and not the opposite to self rated rationality. This means that emotionality and rationality must be considered as two different aspects of product involvement. In other words, the level of emotionality in a judgement does not say anything about the level of rationality in a judgement.

Another finding is that if consumers see their judgement as emotional, they will give more importance to the form of the product (Chapter 5). Note that this finding is only dependent on the level of emotionality (high or low), not on the level of rationality. An example of this finding would be a judgement of a printer for a personal computer. A printer can be judged from an emotional perspective, in which case the form of the printer is relatively more important than its functions. In that case, what the printer is, how it looks at that actual moment, is more important than what it can do.

The second half of the empirical chapters deal with the position of abstract attributes. It is shown that the abstract attribute describes an aspect of the product (Chapter 6), but not one that can be reduced to any concrete part of the product

(Chapter 7). For example, the printer can be described by an abstract attribute, like 'cool'. Here it is found that the attribute describes an aspect of the product that cannot be captured by any particular part of the printer. It is not the top cover that is cool, nor the in-tray, the out-tray, the paper length adjuster, or any of the other parts one can find in the manual.

Since the abstract attribute is not fully determined by the presence of particular product parts, it can be applied more widely over different situations of use (Chapter 7). This allows the coolness of a printer to have many counterparts, like 'dull', 'old fashioned', 'warm' or 'extravagant'. All of these could be counterparts of 'cool' and not one of them is the most logical one. It is dependent on the situation in which the printer is encountered. The situatedness of abstract attributes is finally demonstrated by the findings of Chapter 8. Here it is shown that abstract attributes describe aspects of products that interact with the situation that the product is in. For example, the coolness of a printer can be made more salient by displaying it in a situation with other cool products (or contrasting it with obviously uncool products). This can lead to the unwanted conclusion that the printer looked cool in the shop, but just silly in the office.

Finally, in Chapter 9 we have looked at the relation between emotional judgements and the use of abstract attributes. Although there is no theory that explains this link, it has often been put forward in the literature and was found in two previous studies. However, when we look at the results of our study, we can find no such link. So, when a printer is evaluated in a more emotional way, there is no bigger likelihood that the judgement is based on abstract attributes.

Already, these findings have been discussed and the theoretical implications can be found at the end of each empirical chapter. However, what we have not yet done is to look at how these findings can be of help to design engineering, where subjective consumer judgements must be interpreted. This will be the focus in the present chapter. The chapter is laid out as follows. We will first discuss the theoretical implications of our findings. Next, we will give some suggestions for further research. Finally, we will look at practical implications: how can our findings be of help in the new product development process?

THEORETICAL IMPLICATIONS

Our findings are about two aspects of subjectivity, emotionality and abstract product attributes. First, emotional judgements were distinct from rational judgements because they were more focused on direct outcomes (i.e. the form) and not on the inferred consequences (i.e. the function) of the product. This leads to more importance given to the actual form and less to the functions of the product. Secondly, abstract attributes were shown to be similar to concrete attributes in that they too have a direct reference to perceptual information. However, they differ from concrete attributes because they are more contextual: they can be used within a larger variety of conceptual backgrounds, and they describe aspects of situated products, whereas concrete attributes describe aspects of products that are less dependent on the situation. A last finding was

that, contrary to our expectations, emotionality and abstract attributes are not necessarily linked. As a result, will have to look again at the relation of both with subjectivity.

At the beginning of the thesis emotionality was seen as a possible cause of why people use abstract product attributes, and because of it, emotional judgements were considered to be subjective. However, considering that we have not found a relation between self-reported emotionality and the use of abstract attributes, we must look again at how emotionality plays a role in subjectivity. In Chapter 2 we have defined subjectivity as an aspect of a judgement that means that it is not immediately clear how to interpret the judgement. A judgement is subjective if we do not know how it relates to concrete product attributes over which no controversy exists. So the question of whether emotionality is a sufficient cause for subjectivity arises. Now that we have seen that there is not necessarily a link between emotionality and the use of abstract attributes, how is it then that emotional judgements are often marked subjective?

When looking at our findings we can see that an emotional judgement is based on the direct appraisal of the product's form - not on an instrumental appraisal of the product's functions. Now, although we can say that such direct appraisals are based on very concrete aspects of the product (what could be more concrete than the actual form?), at the same time they may not be very clear when they are communicated to other people. This is because an emotional judgement will not give functional guidelines to another person, but instead will only tell that an aspect of form is important as such. Hence the emotional judgement is nothing but a denominator, it is about an aspect of the product that is valued for what it is, not what it can do. Such a judgement can only be interpreted at a nominal level of measurement, the product is 'A' or 'B', and we do not know how it could be more 'A' or how 'A' is different from 'B'. As a result, there is no physical parameter that can be related to the judgement, on which the judgement can be made more or less favourable. It is this aspect of emotional judgement that may be called subjective, in that the judgement cannot be explained in terms of physical parameters that can be changed by the product developer. A judgement on the basis of form is a direct appraisal; there is no ideal point to which the judgement refers. In the communication of an emotional judgement, the result will be a lack of clarity, since the listener knows what the other person sees and that it is important for him or her, but he or she will not know why the form has importance, and in the why find a clue about the cause of the answer.

However, this lack of clarity is independent of the use of concrete or abstract terminology in the judgement, and in this sense emotional judgements are not subjective in the way that we had initially thought. In Chapter 1 we started by saying that the objectivity and subjectivity of a judgement were determined by the agreement among those who had to interpret the judgement. Then, in Chapter 2 we made it clear that this agreement depended on the extent to which the judgement could be traced back to concrete attributes, over which no controversy exists. So where we had initially made our definition dependent on abstract and concrete words, we now see that emotional judgements can make judgements subjective, independent of the words that are used. By describing forms, instead of functions, no direct translation can be made to the physical parameters over which the form varies. This means that it is unclear

how to interpret what the form is about, what value there is in the form for the consumer, and a lack of agreement on how to interpret emotional judgements will be the result⁶².

Coming to the relation between abstract product attributes and subjectivity, we can see from our results, that abstract attributes are easily identified as a component of subjectivity, much as we predicted in the second chapter. First, we have demonstrated that abstract attributes can have their own perceptual base, and need not be derived from concrete attributes. This is an important finding, because it shows that attributes are not abstract because they are inclusive of more concrete attributes. This means that we cannot fully understand abstract attributes in terms of more concrete ones. Note that this finding, in itself, means that a judgement based on abstract attributes is subjective. This is because a judgement based on abstract attributes cannot always be rewritten as a combination of concrete attributes. A second finding is that abstract attributes are not localised in specific parts of an isolated product, but instead, they exist as more complex patterns in situated products. This again provides a good ground for saying that a judgement based on abstract attributes is subjective, because it means that the attribute is more complex, and thus easily misunderstood by those who have to interpret the attribute. On the basis of these two reasons, we can conclude that abstract attributes make a judgement subjective, in that the judgement cannot be understood in terms of concrete attributes of the product over which no disagreement exists.

In all, both emotionality and abstract product attributes can make a judgement subjective in the sense that it is not directly clear how to interpret the judgement. Emotionality can do this because of the larger importance of actual form of the product, and abstract attributes can do this because they describe an interaction of the product with its situation. Though the reasons are quite distinct, both are sufficient reasons for subjectivity to arise, in the sense that there will be disagreement about how to interpret the consumer's judgement. Because of this, emotionality and abstract product attributes both form a sufficient condition for subjectivity in consumer judgements.

SUGGESTIONS FOR FURTHER RESEARCH

Emotionality

The findings of Chapter 4 have shown that emotional judgements can be distinguished from rational judgements, in that the two can be seen as two independent aspects of a consumer's involvement with a product. In Chapter 5 we have looked at the way in

⁶²This lack of agreement on how to interpret actual forms is demonstrated by Schön (1984, 1992). In the 1984 paper, designers are found to disagree with each other on how to interpret specific form instructions. In the 1992 paper, one group of designers were asked to create half finished forms, and another group was asked to finish the form without knowing why the first designer had made the form. Here too there was little agreement between the first and second group on what the forms were about.

which both emotionality and rationality have an effect on a preference for the form of a product, and found an effect only for emotionality, not for rationality. Before looking at the research implications for emotionality, we will first consider the implications for rationality.

Self-reported rationality did not have an effect on the extent to which conceptual information was important in the judgement. After a reconsideration of our theory of rationality, it can be explained by pointing out that a rational decision is not just one where the inferred outcomes of the product's functions are important, but moreover, where the inference process is consistently applied to achieve the inferred outcome. Thus it may well be that a consumer gives importance to a certain product function, but that does not mean that they will automatically choose the product that will best fulfil that function. For this, the consumer would have to make a logical inference from attributes to function fulfilment, and as a consequence, act on the basis of this when buying the product. As we have argued in Chapter 2, it is that aspect that makes the consumer judgement rational, and further research would need to show that rational consumers are more consistent in the evaluation of inferred outcomes. Some preliminary findings from a pilot study by Van Asten and Snelders (1995) show that more rational and less rational groups (assessed by a combined feel / think scale) do indeed differ in the extent to which attribute importances are predictive of later choice. More rational groups are found to be significantly better at deciding which attributes are important for their later decisions. Note, however, that a lack of consistency would not so much make the interpretation of the attributes subjective, since it would not create disagreement among judges as to how to interpret an attribute. However, less rationality could well allow people to be more impulsive in their decision about which attributes are important (see Rook, 1987). In this case, the degree of self-reported rationality will be one of the factors influencing the stability of attribute importances over time. Although attribute importances can in general be shown to be quite stable over time (see De Bont, 1992, for a review), they can also be variable (e.g. Leigh, MacKay & Summers, 1981), and rationality may well have an influence here.

A last aspect of rationality that would be interesting to study is the consistency in the judgement that makes it rational. In most studies carried out so far, consistency is seen as a correlation between two preferences at two different points in time, or alternatively, as a correlation between a preference and a later buying decision (De Bont, 1992). However, it is unclear what makes such a correlation high or low. Is the level of consistency based on the stability of the weighting that the consumer gives to the attributes of the product? Or is consistency based on the stability of the perception of attributes in the product? In the first case, consistency is based on stable consumer values, in the second case, consistency is based on a stable frame in which the product is perceived. An answer to this question would point to the way in which preference research is invalidated by inconsistent answers.

We now turn to the results found for emotionality in consumer judgements. The findings reported in Chapter 5 clearly suggest that more attention should be given to the effect of self reported emotionality on the preference for form versus function. In first place, more attention should be given to the question of whether perceptual infor-

mation is the necessary format to communicate form information. In the research described in Chapter 5 no distinction was made between form and perceptual information, since all form information was presented pictorially. Further research, however, will need to address this distinction. Hence, a first suggestion for further research would be to duplicate the procedures laid out in Chapter 5, and introduce an additional variable, 'preference explained by form or function'. This would mean another conjoint analysis study, but now with four conditions, pictures describing forms, pictures describing functions, text describing forms, and text describing functions. We could then see whether self-reported emotionality varies more with changing formats (pictures vs. text) or with changing contents (form vs. function). The most likely result, however, will be that the two interact, since form will most easily be described pictorially, while function will most easily be described textually.

A second suggestion is that more research should be conducted on how consumers have a direct experience of form. The aim here is to have a better understanding of form appraisal, and more specifically, to find form parameters on which the appraisal varies. A classic example of such a parameter is the golden section, which states that people in general will prefer forms with a specific composition, and that deviation from this composition will lead to a depreciation of the form. Although an interesting example to demonstrate that such parameters exist, what we would look for in consumer research is a method for arriving at such parameters: how can we find an aspect of form over which the appraisal of the form will vary systematically?⁶³

There are already some attempts to find form parameters that influence appraisal. The research in Chapter 6, but also research done earlier by Holbrook and Moore (1981), and Loosschilder (1994), have shown how different forms can be placed on perceptual dimensions. Such dimensions can be regarded as a way of describing a form parameter and we can interpret these dimensions by looking at the attributes that correlate with these dimensions. From this, we can find how these dimensions influence the preference for certain forms. Note, however, that here the perceptual dimensions are dependent on attributes for their interpretation, which means that we get an idea of underlying form parameters by looking at the attributes by which the parameter is described. Here we encounter a problem: form parameters that are not well described by concrete attributes would not help much in the interpretation. The judgement would still remain subjective and design engineers and designers would still not know what to change in the form.

There are two solutions to the problem that form parameters are not well described by concrete attributes. The first is to discard the attribute information all together, and to directly manipulate form parameters to see how this affects appraisal.

⁶³ Note that there are many studies where the effect of form on appraisal is measured. Here, different forms of the product are presented to consumers, and the effect of this variation on appraisal can be assessed. This can be done qualitatively, with the help of interviews, or quantitatively, with the help of a questionnaire, or by letting consumers carry out a conjoint analysis task (see Crawford, 1987, for an overview). However, the problem arises here that the product forms are varied according to the designer's specifications - not according to the consumer's appraisal of the form. This method will not directly lead to form parameters over which consumer appraisal varies systematically.

Such research is already carried out under the name of 'experimental aesthetics', where the factors that affect aesthetic (i.e. form) preference are investigated (see Hekkert, 1995, for a review). Traditionally, this approach has focused on simple form parameters like hue and size of the aesthetic object. Later, it has been suggested that more complex aspects of form affect appraisal. Inspired by gestalt psychology, these have been uniformity and complexity of form (Berlyne, 1971). Inspired by theories of concept formation, it has been prototypicality of form (Hekkert & Snelders, 1995). An other approach has been adopted outside experimental aesthetics, by a number of cognitive psychologists. Here, the effect of complex form aspects on appraisal is studied as the 'wholistic' property of form (Kemler, 1983, Regehr & Brooks, 1993). Here, form aspects are studied that describe a "coherence of the features into an individual whole" (Regehr & Brooks, 1993, p. 95). Attention is given here to global form aspects, and not to form details that can easily be described by concrete attributes.

Within consumer research, this aspect of form appraisal has been given some attention (notably by Creusen, 1995; Veryzer, 1993). However, considering that the form of the product is often a very important aspect for consumers (see Chapter 5), it may well be advisable for consumer researchers to pay more attention to this field of study. As we will see later, this will be of great help for product developers who want to know which global forms are most appreciated and why.

Finally, there is a second solution to the problem that form parameters are not well described by concrete attributes. This is when form appraisal is dependent on abstract attributes that cannot be redefined into a list of concrete attributes. As this is often the case (see Chapter 6, and also Veryzer, 1993), it may be worthwhile to find out how abstract attributes themselves are grounded in form parameters? This will be discussed in next section.

Abstract product attributes

Strong evidence has been found for the theory that abstract attributes are not fully derived from more concrete attributes. In this sense, abstract attributes have the same status as concrete attributes, which means that they have something substantive to say about the product, apart from concrete attributes. This conclusion has a number of implications for research on the attributes underlying perception and preference judgements. Similarity and preference judgements are found to have different underlying attributes (Creusen & Schoormans, 1995; Derbaix & Sjöberg, 1994; Lefkoff-Hagius & Mason, 1993). Where preference (attitude) judgements are thought to be based more on abstract attributes, perception (similarity) judgements are thought to be based more on concrete attributes⁶⁴. However, it has remained unclear whether this

⁶⁴ In two studies, abstract attributes are named 'beneficial and imagery attributes' and concrete attributes are named 'characteristic attributes' (Creusen & Schoormans, 1995; Lefkoff-Hagius & Mason, 1993). In another study, abstract attributes are named 'subjective attributes' and concrete attributes are named objective attributes (Derbaix & Sjöberg, 1994). However, all studies acknowledge that the terms they use to distinguish attributes are not unique and that the distinctions are very similar to those between abstract and concrete attributes (after Finn, 1985; Myers & Shocker, 1981).

difference in used attributes between preference and perception judgements is product or task related. Do concrete and abstract attributes really describe different aspects of the product, or do the different tasks (preference or similarity judgements) just make consumers use different words for the same product aspects? In this thesis we have found considerable evidence for the first case, that abstract and concrete attributes describe different aspects of the product. The conclusion is then that perception and preference judgements should be considered as two separate types of judgement, describing different aspects of the product. As such, it would be better to regard preference and perception judgements separately, possibly being two independent indicators of later choice behaviour of consumers (see Decrop, 1995).

We now turn to the evidence that abstract attributes describe more situation dependent product characteristics. The evidence has been strong when looking at the number of conceptual backgrounds (Chapter 7), but somewhat weaker when looking at the relation with perceptual backgrounds (Chapter 8). Further research in this direction is called for to clarify this relation between the abstraction level of an attribute (or concreteness) and the effect on situational background. One way to do this is to look at this relation by considering more than just static pictures of backgrounds. Filming products in different types of households, with different types of people introducing the product may well give a fuller impression of the situation, and the identification of abstract product attributes may then become more situation dependent. Furthermore, it would also be interesting to see if the link between concreteness and situation dependence holds for importance ratings of the attributes. For example, situational background could be entered as an attribute in a conjoint analysis study, in which case it would need to display more interaction with abstract attributes than with concrete attributes. Such research could further strengthen the evidence for the proposition that abstract attributes are richer in perceptual context than concrete attributes.

We now come back to the problem stated earlier of grounding abstract attributes in form parameters. Some attention should be given to the location of abstract attributes in the product. Although we have seen that the identification of abstract product attributes is situation dependent, we have also seen that, in first instance, abstract attributes are located in the product (Chapter 8). The question then becomes, where is it that they are located? What aspect of the product do they describe? Now, since we have argued that abstract attributes describe complex patterns in sensory input, research into this will need a procedure that generates complex patterns and, through some iterative process, finds out which patterns most accurately describe an abstract attribute. One approach is to generate complex patterns in product form using the principles of gestalt psychology, as is often done in experimental aesthetics. Instead of varying the patterns and looking at an effect on appraisal, we could now look at an effect on the identification of abstract product attributes. Another approach is to create more or less random forms and see which abstract attributes are identified with it. There could even be the possibility of an automated form generator that optimises the identification of abstract attributes. This would lead to a connectionist machine that optimises the identification of an abstract attribute by testing different form parameters. In theory, such a machine is a feasible option (see Harnad, 1990).

If it turns out to be also practically feasible, such research could demonstrate the bigger complexity of abstract attributes in consumer perception (although the underlying form parameters that the machine would come up with may prove to be too complex to understand, and too idiosyncratic to be of much help).

A final research implication is about the status of abstract attributes in consumer judgements. We have seen that abstract attributes are mentioned more frequently by consumers who can list a lot, instead of just a few attributes (Chapter 9). This finding is accompanied by another finding, namely that an abstract attribute is on average named by more different people than a concrete attribute (Chapter 7). Apparently, concrete attributes are listed by more consumers, although so many different concrete attributes are named that a concrete attribute is mentioned by fewer consumers on average. Abstract attributes on the other hand, are listed only by a portion of the consumers, but then they are mentioned by more than just one consumer. So the finding is that abstract attributes are only named by some, even though each separate attribute is usually named by more than one. The question is then why only some people name abstract attributes. If these people are just generally more talkative, why then does this make them name more abstract attributes? Do some people think it inappropriate to talk about abstract attributes in an interview situation, or are abstract attributes just valued by some, and not by all? Clearly, these are questions worth investigating, because it tells us either to change our interview techniques when doing consumer research or to segment our market into those groups who want a product to have certain abstract attributes and others who do not want this.

The relation between emotionality and abstract product attributes

The present thesis did not find a relationship between emotionality and abstract product attributes where two other researches did. This means that the reason that we gave for it should be put to the test. As we said, a relationship between emotionality and abstract attributes may exist if there is a temporal proximity in measurement. In that case, a link between self-reported emotionality and the use of abstract attributes may be the result of suggestion. As consumers have learned that there is a relationship, they may find it more appropriate to describe emotional decisions with an abstract vocabulary and more rational decisions with a more concrete vocabulary. If further research confirmed this, it would then be interesting to see why everybody thinks that there is a link in the first place. It is often suggested that emotionality and the use of abstract attributes go hand in hand (e.g. Hirschman & Holbrook, 1982; Zajonc, 1980), although it is never said why this should be so. If there are no psychological reasons for this link to exist, we could then perhaps consider it as a social construct that exists only in certain cultures. In fact, there are good reasons for doing so. As shown in Chapter 2, our ideas about how we experience pleasure can change drastically over time. The link between emotionality and abstract attributes is found to be connected to a modern pleasure principle, upholding a romantic ethic about consumption (Bowie, 1990; Campbell, 1987).

PRACTICAL IMPLICATIONS

As we have explained in Chapter 1, the thesis is concerned with practical implications for the development of new products. In what way are the more subjective consumer judgements helpful in new product development? As the thesis has clearly shown, subjective judgements of the consumer cannot be discarded as unsubstantive or idiosyncratic. Subjective judgements do have something substantial to say about the product that the company should make. They may describe desired qualities of the product that cannot be fully translated into objective terms. In addition, there may be a substantial market for products that have such qualities, since subjective judgements are made on a lot of occasions by many consumers.

Thus we need to make a case for the inclusion of subjective judgements in the design requirements of a product. It is a case worth making: as shown by Thölke (forthcoming), in the decision process of new product development, objective consumer judgements are often considered as more substantive than subjective consumer judgements. Here, we argue that this is not necessarily the case, and that we need to look for ways in which subjective consumer judgements can be made helpful in the design process. Note that such a quest is two-pronged. In the first place, we want to know how the procedures used in consumer research can be adapted to make subjective judgements more informative for the design process in new product development. In the second place, we want to know how subjective judgements are to be interpreted by designers and industrial design engineers, who have to translate the judgements into a product. These are the two questions that we will deal with in the coming paragraphs.

When judgements are emotional

When product judgements are more emotional, it means that aspects of the actual form of the product are more important than when the judgement is less emotional. Already in Chapter 1 have we adopted a definition of design as "a representation of a thing to be built" (Schön, 1988, p. 182). Such a definition leaves more space for the actual form of a product and we can now see that there are good reasons for doing so. The practical implication for consumer research is then that more attention should be paid to the form of the product. For the most part, research into product form has been product ergonomics, which focuses on the functional aspects of form (e.g. Murrell, 1965; Proctor & Van Zandt, 1994; Sanders & McCormick, 1993). Here, the form of a product should "enhance human abilities", "overcome human limitations" and "foster user acceptance" (Rouse, 1991, p. 4). However, our results suggest that we should also be interested in some kind of 'affective ergonomics', where the focus is on the consumer who is actively seeking a direct, hedonic experience of the product's form (for an example of such an approach, see Kemp & Van Gelderen, 1993). In the practice of consumer research, this means that more attention should be paid to asking consumers questions about their direct experience of the form of a product.

The conclusion must therefore be that the actual form of a product should be rated more directly by consumers. This can be done in a number of ways: one can have consumers describe, draw or work clay of desired product forms (see Origlia & Origlia, 1995). Note however, that if we let consumers create desired forms, we may well lose the directness of judgement in that the forms need to be constructed by the consumer and this will take time and effort. In addition, the form construction will require some pre-trained skills and this will undoubtedly favour the creation of the most easily described, drawn or clay-worked forms, which are not necessarily the best. For these reasons, the consumer's doodles should not dictate what the product should look like, although the designers could still learn from them by borrowing certain style elements or characteristic solutions from them.

Another way of researching the form of products does not involve the consumer being creative. This is by letting consumers directly rate different product forms on how much they are valued. Such a measure will give the consumer researcher a better idea of what preferred and non-preferred forms look like⁶⁵. However, these measures will do no more than that: they will not provide a better insight in optimal product forms, forms that consumers will like even better than the ones they previously had to rate. The reason for this is found in the nature of emotional judgements. The evaluation of actual product forms is direct, and there are no obvious and explicit reasons that have determined what the judgement will be. For optimisation procedures to be possible, we must find some characteristics of the actual form of the product that can predict the consumer's judgement. Since there need not be a conscious rationale for the judgement, these characteristics must exist regardless of whether the consumer can verbalise what they are. Therefore, ideally, we would need a procedure that:

1. Lets consumers rate a lot of actual product forms that have more or less the same functionality.
2. Leaves variation in product forms fully implicit, so that it will be up to the consumer to take notice of it.
3. Tries to learn from the consumer judgement what characteristics of the form have an impact on the subjective judgement of the form. This learning process would require the procedure to be an iterative one, in which we can learn how the judgement changes as the form changes.

⁶⁵ To make this comparison between different product forms more insightful, several elaborate methods have been developed (e.g. Green, Carmone, & Scott, 1989; Holbrook & Moore, 1981; Loosschilder, 1994). Here, several product forms are compared with each other and on the basis of these comparisons, underlying perceptual dimensions are calculated that explain the variance in the comparisons. Next, these perceptual dimensions can be regressed on product preference, and by doing so the relative importance of each perceptual dimension on preference can be assessed. Applied to actual product forms, this procedure would provide a number of independent dimensions on the basis of which we can compare the different product forms. Some of these two-step procedures (especially PREFMAP, by Green, Carmone & Scott, 1989) however, have been criticised because the comparisons between the products depend on different information than the preference for each product (see also Derbaix & Sjöberg, 1994; Lefkoff-Hagius & Mason, 1993).

The most likely procedure that meets these criteria is some sort of interactive concept testing, where a designer makes a number of product forms, lets the consumer rate them, interprets the ratings into new designs and lets the consumer rate them again. This procedure could be repeated until the forms reach a certain quality benchmark. In addition, the procedure could be made more efficient by letting consumers select new designs from a library of possibilities, which would reduce the number of necessary iterations (for a more elaborate discussion, see Loosschilder, 1995). Of course, the designer could be helped by asking the consumer why he or she likes one design better than the other, but the directions that come from the consumer should only be considered as half-truths. Since the preference is direct, it need not be the case that the consumer knows why he or she likes a certain design, and asking for a reason may well lead him or her to consider other aspects of the product than he or she would normally do (an effect demonstrated by Creusen, Schoormans & Snelders, 1994). This means that consumer judgements would have the status of inspiration: it will tell them which forms are preferred and which are not, and it can give feedback on how much better subsequent forms are. However, it will not tell designers what an optimal form looks like, and how to create the product with the best form. Attribute information that describes an optimal form are only to be used as rough guidelines, since it is not certain that they reflect on the most important aspects of an optimal form.

When judgements are based on abstract product attributes

When judgements are based on abstract attributes there are a few things to take into consideration. First, it is possible that the abstract attribute describes some aspect of the product that can also be verbalised in a more concrete way. For example, if someone wants a modern chair, it may well be that really all he or she wants is a chair with a metal frame, and, as suggested by Myers and Shocker (1981), the consumer researcher should check this. If, on the other hand, the person cannot say more concretely what is meant by modern, we have a practical problem.

Secondly, we have noted that abstract attributes are different from more concrete attributes because there are more possible contexts in which the abstract attribute can have a meaning. This, then, points to where we should look when dealing with abstract attributes: the context in which the attribute is given. To go back to our example of the modern chair, let us now suppose that the consumer does not know how to put what he or she wants more concretely. What would be the context of modern in this case? As we have seen above, attributes are contextual in that their meaning depends on an instrumental relationship (why is it important that the chair is modern), a conceptual background (what is associated with modern, and what is the opposite of a modern chair), or a real situation of use (in what typical situations do we find modern chairs). In a qualitative research setting all these questions could be posed to consumers to make it clearer what is meant by the attribute and why it is important. We could even design standard questioning procedures, which would start by asking for important product attributes, making them as concrete as possible (without forcing the consumer to be concrete to a reductive extent), and then asking for instrumentality,

conceptual background, and situations of use in a standard manner. In all, this would lead to a set of questioning techniques, based on the distinction between questions that ask for an inductive reason (what specific concrete attributes have led to the more general abstract one), a deductive reason (how is the abstract attribute instrumental for even more general values) and an associative reason (what conceptual backgrounds and situations of use are associated with the abstract attribute)⁶⁶.

However, our findings on abstract attributes do not only reflect on the questions that are posed in an interview, they also reflect on the interview situation itself. Considering that an abstract attribute describes an aspect of a situated product, it can be thought of as more appropriate to carry out the research in a situated setting. For example, consumers can be asked questions about products that are displayed on supermarket shelves, or in the actual shop where they buy the product. To make the setting even more natural for the consumer, the interview setting may even be replaced by a less reactive data gathering technique like observation (see Elliot & Christopher, 1973, for a review on non-reactive techniques of data collection). Especially participant observation is thought to make the data less contrived and more 'ethnographic' (see Banister, Burman, Parker, Taylor & Tindall, 1994, and Fielding, 1993 for reviews).

There also exist implications for more quantitative research settings. Now that we have seen that abstract attributes are more contextual, it may well be worthwhile to pay more attention to context when the research of consumer judgements is more systematic. For example, if it is found that abstract attributes must have a place in the research, then the same abstract attribute may be placed in different contexts to find out in what way the abstract attribute is important. This can be done by situating the product in different settings and only then asking questions about the salience or importance of the abstract product attributes. For example, consumers may feel that a certain chair would not be modern at a fancy dinner party, while it would in the kitchen. Likewise they may give different importances to modern according to the situation in which it is placed.

In compositional research practices, where product attributes are directly rated by the consumer, the rating of abstract attributes could easily be situated. However, the presentation of a detailed setting can become too lengthy, especially in large scale questionnaires, where such repetition of questions could come with higher costs and lower response rates. Here, situatedness has to be at least minimally present, which could lead to using the same abstract attributes in more than one semantic differential. For example, we could make a semantic differential 'modern - old fashioned', another 'modern - classic', and a third 'modern - post-modern'. Although a situation is only im-

⁶⁶ The three questioning techniques can also be shown to trigger three distinct forms of human reasoning. According to Aristotle, these three types of reasoning; inductive, deductive, and associative, are the building blocks of judgement (Lloyd, 1968). In a review of the psychological literature on the status of attributes in categorisation, Johnson (1989) reaches a very similar conclusion. Finally, in a discussion of standardised interview techniques by Durgee (1985), these very three questioning techniques are being discussed and praised for their supplementary value, although it fails to give a reason for it.

plicitly present here, it would still tell the researcher in what sense the modernness of a chair should be understood and in what way it is important for the consumer.

In decompositional research practices, where the presence of attributes is only implicit, the practical implications would be somewhat different. Namely, since only complete product concepts are rated by consumers, we may want to make the product more complete in the sense of placing it in a situation. In this sense, situation would just be one of the variables that are systematically varied over the different concepts that consumers have to rate. Now, when using the appropriate conjoint analysis design (i.e. full factorial or compromise designs), we can estimate the importance of abstract product attributes in different situations. Such a procedure should increase the applicability of abstract attributes in conjoint analysis.

Finally, we must consider the consequences for the designers and design engineers. If abstract product attributes are desired by consumers and it is shown that they cannot be reduced to a fixed set of concrete attributes, what then should a designer or design engineer do? Obviously, he or she should try to incorporate the abstract attributes into the design of the product. This can be done by paying more attention to the usage situation of the product and all accompanying associations in which the abstract attribute acquires its meaning. A safe conclusion would be that the designer or design engineer designs a product with an optimal fit with a specific environment, so that the abstract attribute can optimally perform its function. For example, on the basis of consumer research the designer can learn that a chair has to be modern in the sense that it has to be a show piece in the living room, have good ergonomics, and be recognisable as a chair of the modernist era, as opposed to more classical chairs. A study of typical living rooms that feature modern chairs can show that they are either office-like, messy and full of books, or serene and empty, with some paintings on the wall. The typical modern chair for a messy room would have warm colours, and be more robust, the typical modern chair for the serene room would have cool colours and be more fragile. The designer or design engineer can then design a modern chair for serene rooms, and sell it to his or her newly established clientele. To be sure of the specific modernness of the chair, he or she can assess later whether the clientele is indeed of the serene living room type, and whether the chair is indeed being used as show piece. In this way, the abstract product attribute will have entered in the design of the product, without having been reduced to a set of concrete criteria.

Still, with our theory of abstract product attributes, we can also reach a more radical conclusion. Up until now, we have assumed that designers and design engineers design products, and that products are things or ideas that are separate from the way they are used. However, if abstract attributes are important for a product, we can also come to the conclusion that the product is not such an independent entity after all. The product's identity can also be seen as contextual, something that is dependent on how it is used. When we start from this angle, the conclusion for designers and design engineers is somewhat different. When consumers want a product to have an abstract attribute, the design should now be of a situated product, which includes aspects of the situation of use. So instead of creating an object and hoping

that it will fulfil its proper function in a situation, the designer and design engineers would now also be asked to create a situation in which the product can be used. It should not just create modern chairs for serene living rooms, but also say what a serene living room could look like. In practice, this would mean that designers and design engineers should create both the products and the situations in which these products can acquire their meaning. Collages should be made around the first raw sketches, CAD pictures should be placed in their proper situational background, packaging should vary in colour to better match the company colours of different retail chains. And it does not end here. Companies should then not only promote the product, but also the situation in which it would optimally flourish. It would say to consumers, throw away your old life, and in your new and better life, our product will serve you best: it is the choice of a new generation. The chair will be optimally modern in your serene room, but even more so if you did something about that wallpaper.

Of course, both the safe and radical conclusions have strengths and weaknesses. Assuming that a new abstract product attribute can be created in a product, without changing its situation may be less realistic, but it will also involve less risk. If an abstract attribute is wanted, it will be difficult enough to incorporate it in the product, let alone to create an optimal situation for it. On the other hand, if consumers want an abstract attribute, they will want a solution that deals with a specific situation of use. This may well call for designers and design engineers to create products and give suggestions for optimal use. In some instances, this may even lead to an active involvement of the company to create this new situation of use (like creating a whole furniture and room decoration line to better position your idea of a modern chairs). However, here we do not want to propose such grand schemes. The reason is that if abstract attributes point to new usage situations for consumers, then it means that these new usage situations have not yet been experienced by the consumer. As we have seen in Chapter 1, it will be very difficult then for a consumer to make a good prediction of his or her future experiences. Hence, companies would be wiser to interpret the abstract attribute gradually, step by step, using test markets to create the first experiences, and allowing other companies to add to the experience of consumers. It would then gradually become clearer how modern chairs should be made, and how the rest of society provides the right wallpaper to go with them.

SUMMARY

When consumers are asked for a judgement about a product, it is often found that their answers are subjective: controversy exists about the meaning of the answer because we do not know how the judgement relates to the concrete attributes of the product. Subjectivity in consumer judgements is especially a problem in new product development, where the judgements of consumers need to be translated into the design specifications of a new product (Chapter 1). If subjective judgements cannot be translated into a number of concrete attributes, what then should be the status of subjective judgements for the design specifications of a new product?

A review of the literature shows that subjective judgements are mainly thought of as having two different aspects: 1) subjective judgements are given when consumers give in to their current emotional experiences, and 2) subjective judgements are based on abstract attributes (Chapter 2). Literature suggests that these two aspects are related, in that more emotional answers will lead to the use of more abstract attributes. However, since there is no theory to explain this relation, and because there is very little evidence for it, we will first look at these two aspects separately, and only later try to find evidence for a relation between the two.

When consumers give in to their emotional state, it is theorised that this lets them focus on aspects of the product that have direct value for them (as opposed to instrumental value). These aspects that have direct value are thought to be mainly communicated through pictorial information about the product, and less through textual information about the product (Chapter 3). Two studies are carried out to demonstrate this. The first study is carried out to establish a measure of self-reported emotionality in the consumer's choice for certain products. With the help of two questionnaires ($N_1 = 405$, $N_2 = 624$), it is shown that self-reported emotionality can be measured reliably over different products and consumers. In addition, it is found that emotionality is an aspect of a general involvement with products, and that it is independent of a rational aspect of involvement (Chapter 4).

The second study consists of two experiments ($N_1 = 87$, $N_2 = 124$), where the effect of self-reported emotionality on the importance of pictorial product information is tested. This is done with the help of conjoint analysis, on the basis of which the importance of pictorial and textual information is calculated for each respondent. Groups of respondents are formed who report a low, middle, and high influence of emotionality. These groups are compared on how important perceptual and textual information is for them. For two of the three products that are tested, a positive effect of emotionality on the importance of pictorial product information is found. For the third product tested, no effect is found. This is attributed to the fact that the pictorial information that is used for the third product portrays many functions of the product. Hence, the effect of emotionality on the importance of pictorial information is only

found if the information only describes form aspects of the product - not functional aspects (Chapter 5).

A second aspect of subjective judgements is that they are based on abstract attributes. It is proposed that abstract attributes are different from concrete attributes in that they describe a more complex aspect of the product, one that is not tied to specific, distinct parts of the product. Since no specific product part needs to present for identification, abstract attributes can be applied more widely over different situations of use. This means that the situation to which the abstract attribute is referring is less clear: there are more possible situations in which the abstract attribute could be present than there are for a concrete attribute. Hence abstract attributes refer to a wider range of contexts than concrete attributes (Chapter 3).

Four studies are carried out to demonstrate this. The first two studies are to show that abstract attributes can be directly perceived in a product (i.e. they do not need to be derived from a combination of concrete attributes). In the first study ($N = 43$), a perceptual map of seven products is made on the basis of a natural grouping task. It is shown that abstract attributes are named as frequently as concrete attributes, and they discriminate between different products just as well as concrete attributes (Chapter 6). The second study ($N = 108$) is made to show that abstract attributes are perceived directly - not first derived from concrete attributes. Respondents are given a laddering task, where they are asked to name five attributes of three products and say why these attributes and subsequent reasons are important to them (respondents are asked to describe the named attributes as concretely as possible). Following this procedure, we find that there is a substantial number of abstract attributes in the answers of respondents that are not derived from concrete attributes (Chapter 7).

A third and fourth study are carried out on abstract attributes, to show that abstract attributes are richer in the context to which they can refer. The third study ($N = 108$) is to show that abstract attributes are richer in associative context. Respondents are asked to list the attributes of three products that are important to them. Next, they are asked to list the opposites of these attributes. These opposites are taken as the associative contexts of these attributes. Abstract attributes are found to have more opposites, and can thus be regarded as being richer in associative context (Chapter 7).

The fourth study ($N = 180$) is to show that abstract attributes are richer in perceptual context. Respondents are asked to identify a number of concrete and abstract attributes in pictures of two products. The products are portrayed in a neutral situation and in five meaningful situations. The reaction times and the identifications themselves are recorded. For the reaction times, a context effect is found for one product only: for abstract attributes, the reaction times are aided more by portraying the product in a meaningful situation than for concrete attributes. For identification, context effects for abstract attributes are found for both products: the identification of abstract attributes varies more than that of concrete attributes over five different situations in which the products are portrayed (Chapter 8).

A last study ($N = 108$) investigates the speculated positive relationship between self-reported emotionality and the use of abstract attributes. No relationship is found between the two. This finding is contrary to two previous studies where a relationship

was found. The reason for not finding a relation in this study is found in the relatively isolated way in which emotionality and the use of abstract attributes are measured. It is concluded that the relationship between emotionality and the use of abstract attributes is thought of as appropriate by respondents and, as a result, they will make the relation when it is called for. However, the relationship disappears when the measurement of emotionality and abstract attributes are two isolated events and respondents are not aware that the relation can be made (Chapter 9).

The conclusion of the thesis is that emotionality and the use of abstract attributes are not two necessary conditions for subjectivity in consumer judgements, although both may be considered to be sufficient conditions. Thus, both emotionality and the use of abstract attributes can make a consumer judgement subjective, although they can do so in different ways. The conclusion for new product development is as follows. The status of subjectivity in the design specifications of new products should be considered separately for emotionality and the use of abstract attributes (Chapter 10). Emotionality may cause a judgement to be subjective in that the judgement only gives a direct appraisal of the product's form, it is only a nominal classification. Because of this, the judgement does not carry information about a design parameter on which the product can be improved. A solution to this problem is to make consumer research much more interactive with the design process; to see how the judgement changes as a function of changes in the design. The use of abstract product attributes may also cause a judgement to be subjective in that the attribute describes a complex aspect of the product that interacts with the situation in which the product is placed. A first conclusion is that abstract attributes will be better incorporated in the design of the product when it is clear in what context they are thought important by consumers. A more tentative conclusion is that the incorporation of abstract attributes in the design of a product should lead companies not only to design an isolated product but also a situation in which the product has the abstract attribute.

SAMENVATTING

Wanneer aan consumenten gevraagd wordt om een produkt te beoordelen, vindt men vaak dat hun oordeel subjectief van aard is: er bestaat geen eenstemmigheid over de betekenis van het oordeel omdat onduidelijk is hoe het oordeel gebonden is aan de concrete attributen van het produkt. Subjectiviteit in het consumentenoordeel is vooral een probleem bij de ontwikkeling van nieuwe produkten, waar het oordeel van de consument vertaald moeten worden naar de ontwerpspecificaties voor een nieuw produkt (Hoofdstuk 1). Als subjectieve oordelen niet vertaald kunnen worden naar een aantal concrete attributen van het produkt, wat is dan de status van het subjectieve oordeel voor de ontwerpspecificaties van een nieuw produkt?

Uit een overzicht van de literatuur blijkt dat subjectieve oordelen gekarakteriseerd worden door twee aspecten: 1) subjectieve oordelen worden gegeven wanneer consumenten toegeven aan hun directe emotionele ervaringen en 2) subjectieve oordelen zijn gebaseerd op abstracte attributen (Hoofdstuk 2). In de literatuur over subjectieve oordelen wordt verder gesuggereerd dat deze twee aspecten van subjectiviteit gerelateerd zijn: hoe emotioneler het produktoordeel, hoe meer het oordeel gebaseerd zal zijn op abstracte produktattributen. Er bestaat echter geen theorie die deze relatie verklaart en deze relatie is weinig onderbouwd. Daarom worden deze twee aspecten eerste apart onderzocht, daarna zullen we de relatie zelf onderzoeken.

Wanneer consumenten toegeven aan hun emoties wordt verondersteld dat daarmee hun aandacht wordt gericht op die aspecten van het produkt die een directe waarde voor hen hebben (in tegenstelling tot een instrumentele waarde). De hypothese is dat deze aspecten met directe waarde vooral gecommuniceerd worden door pictoriële informatie over het produkt en minder door tekstuele informatie over het produkt (Hoofdstuk 3).

Twee onderzoeken zijn verricht om dit aan te tonen. Het eerste onderzoek is uitgevoerd om een maat te verkrijgen voor zelf-gerapporteerde emotionaliteit in de produktkeuze van consumenten. Door middel van twee vragenlijsten ($N_1 = 405$, $N_2 = 624$) wordt aangetoond dat zelf-gerapporteerde emotionaliteit betrouwbaar gemeten kan worden over verschillende produkten en consumenten. Daarnaast wordt vastgesteld dat emotionaliteit een aspect is van een meer algemene betrokkenheid bij produkten en onafhankelijk is van een rationeel aspect (Hoofdstuk 4).

Het tweede onderzoek omvat twee experimenten ($N_1 = 87$, $N_2 = 124$) die het effect testen van zelf-gerapporteerde emotionaliteit op de belangrijkheid van pictoriële produktinformatie. Dit wordt vastgesteld met behulp van een conjuncte analyse. Met deze methode wordt voor elke respondent de belangrijkheid van pictoriële en tekstuele informatie berekend. Drie groepen respondenten worden samengesteld, namelijk met een lage, gemiddelde en hoge mate van gerapporteerde emotionaliteit. Deze groepen worden vergeleken op de belangrijkheid van pictoriële en tekstuele informatie. Voor

twee van de drie produkten die worden getest wordt een positief effect gevonden van emotionaliteit op de belangrijkheid van pictoriële produktinformatie. Voor het derde geteste produkt wordt geen effect gevonden. Dit wordt toegeschreven aan het feit dat de pictoriële informatie die gebruikt is voor het derde produkt veel informatie bevat over de functie van het produkt. Dus het effect van emotionaliteit op belangrijkheid van pictoriële informatie wordt alleen gevonden wanneer deze informatie de vorm van het produkt beschrijft en niet de functie (Hoofdstuk 5).

Een tweede aspect van subjectieve oordelen is dat deze gebaseerd zijn op abstracte produktattributen. Gesteld wordt dat abstracte attributen verschillen van concrete attributen doordat ze een complexe eigenschap van het produkt beschrijven, die niet gebonden is aan specifieke, goed te onderscheiden onderdelen van het produkt. Omdat ze niet geïdentificeerd worden aan de hand van specifieke produkt-onderdelen, kunnen abstracte produktattributen over meer verschillende gebruikssituaties worden toegepast. Dit betekent dat het minder duidelijk is naar welke situatie het attribuut verwijst: in vergelijking met concrete attributen zijn er meer verschillende situaties mogelijk waarin het abstracte attribuut aanwezig kan zijn. Het is dus minder duidelijk wat de context is waarbinnen het abstracte attribuut zijn betekenis krijgt (Hoofdstuk 3).

Er zijn vier onderzoeken uitgevoerd om dit aan te tonen. De eerste twee onderzoeken moeten aantonen dat abstracte attributen direct worden waargenomen in het produkt. Dat betekent dat ze niet noodzakelijkerwijs zijn afgeleid van een combinatie van concrete attributen. In het eerste onderzoek ($N = 43$) wordt een perceptuele ruimte gecreëerd waarin zeven produkten en vijftig attributen op basis van 'natural grouping' een plaats krijgen. Aangetoond wordt dat abstracte produktattributen even vaak genoemd worden als concrete attributen en dat de abstracte attributen een even goed onderscheid maken tussen de produkten als concrete attributen (Hoofdstuk 6).

Het tweede onderzoek ($N = 108$) laat zien dat de waarneming van abstracte attributen direct gaat en niet wordt afgeleid van concrete attributen. Respondenten krijgen een 'laddering' taak waarin hen gevraagd wordt de vijf meest belangrijke attributen van drie produkten te noemen en aan te geven waarom deze attributen, en de daaropvolgende redenen, belangrijk voor hen zijn. De respondenten moeten de genoemde attributen zo concreet mogelijk omschrijven. Een substantieel aantal abstracte attributen in de antwoorden van de respondenten wordt niet afgeleid van meer concrete attributen (Hoofdstuk 7).

Een derde en vierde onderzoek naar abstracte produktattributen is uitgevoerd, waarin wordt geprobeerd aan te tonen dat abstracte produktattributen naar een bredere context verwijzen dan concrete attributen. Het derde onderzoek ($N = 108$) toont aan dat abstracte produktattributen een bredere associatieve context kennen. Respondenten worden gevraagd welke attributen van drie produkten belangrijk voor hen zijn. Vervolgens wordt hen gevraagd om een aantal dingen te noemen die tegenovergesteld zijn aan het genoemde attribuut. Deze tegenovergestelden worden gezien als de associatieve context van de attributen. Gevonden wordt dat abstracte attributen meer verschillende tegenovergestelden hebben, waardoor men kan stellen dat zij een bredere associatieve context hebben (Hoofdstuk 7).

Het vierde onderzoek ($N = 180$) dient om aan te tonen dat abstracte produktattributen ook in een bredere context worden waargenomen. Respondenten worden gevraagd om een aantal abstracte en concrete attributen te identificeren in een aantal afbeeldingen van twee verschillende produkten. De produkten worden afgebeeld in een neutrale situatie en vijf betekenisvolle situaties. De reactietijden van identificatie en de identificatie zelf worden geregistreerd. Bij de reactietijden wordt een context effect aangetroffen voor slechts één produkt: bij abstracte attributen worden de reactietijden sterker gereduceerd door het produkt in een betekenisvolle situatie af te beelden dan bij concrete attributen. Bij de identificaties zelf wordt een context effect aangetroffen voor beide produkten: de identificatie van abstracte attributen varieert meer dan concrete attributen over vijf verschillende situaties waarin het produkt wordt afgebeeld (Hoofdstuk 8).

In een laatste onderzoek ($N = 108$) wordt gekeken naar de relatie tussen zelfgerapporteerde emotionaliteit en het gebruik van abstracte produktattributen. In het onderzoek wordt dit verband niet gevonden, dit in tegenstelling tot twee eerdere onderzoeken naar dit verband. De reden hiervoor wordt gevonden in het geïsoleerde karakter waarin emotionaliteit en het gebruik van abstracte produktattributen hier zijn gemeten. Geconcludeerd wordt dat respondenten de relatie tussen emotionaliteit en abstracte attributen zien als toepasselijk, waardoor zij deze relatie creëren wanneer daarvoor de gelegenheid bestaat. De relatie verdwijnt echter wanneer de meting van emotionaliteit en abstracte attributen twee geïsoleerde gebeurtenissen zijn en respondenten zich er niet van bewust zijn dat de relatie gemaakt kan worden (Hoofdstuk 9).

De conclusie van het proefschrift is dat emotionaliteit en het gebruik van abstracte produktattributen niet twee noodzakelijke voorwaarden zijn voor subjectiviteit in het consumentenoordeel. Beiden kunnen echter worden gezien als voldoende voorwaarden. Met andere woorden, zowel emotionaliteit als abstracte attributen kunnen leiden tot subjectiviteit in het consumentenoordeel, maar de manier waarop dit gebeurt is anders. De conclusie voor de ontwikkeling van nieuwe produkten is als volgt. De manier waarop subjectieve oordelen vertaald kunnen worden in ontwerpspecificaties voor een nieuw produkt is verschillend voor emotionaliteit en abstracte attributen (Hoofdstuk 10).

Emotionaliteit kan tot subjectiviteit in het consumentenoordeel leiden omdat het oordeel slechts een directe uiting van waardering is voor het de vorm van het produkt, het is niet meer dan een nominale classificatie. Daarom geeft het oordeel geen informatie over mogelijke 'ontwerp-parameters' waarop het produkt verbeterd kan worden. Een oplossing voor dit probleem is dat men het consumentenonderzoek interactief met het ontwerpproces maakt. Hierbij onderzoekt men hoe het oordeel over een produktontwerp afhankelijk is van veranderingen aan het ontwerp van het produkt.

Ook het gebruik van abstracte attributen kan leiden tot subjectiviteit in het oordeel van de consument. Dat komt omdat het abstracte attribuut een complexe eigenschap van het produkt beschrijft die afhankelijk is van de context waarin het produkt geplaatst is. Een eerste conclusie is dan dat abstracte attributen beter in het ontwerp kunnen worden opgenomen wanneer duidelijk is in welke context zij belang-

rijk zijn voor de consument. Een meer risicovolle conclusie is dat het meenemen van abstracte attributen in het ontwerp van een produkt bedrijven ertoe brengt om niet alleen geïsoleerde produkten te ontwerpen, maar ook de situatie waarin het produkt het abstracte attribuut verkrijgt.

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APPENDIX 5.1

Characteristics of clock radios and thermos flasks, named in telephone interviews (Dutch / English).

CLOCK RADIO	
Characteristics (Dutch / English)	Frequency
Tijdsaanduiding / time display	27
Vorm, uiterlijk / form, appearance	22
Kleur / colour	11
Prijs / price	13
Geluid radio / sound radio	17
Geluid wekker / sound alarm	16
Makkelijke bediening / easy to handle	21
Instelling zender / tuning of channels	7
Instelling tijd / ease to set time	6
Duidelijke handleiding / comprehensible manual	2
Grootte, compact / size, compact	15
Herhaaltoets-functie / repeat function	8
Overige functies / other functions	5
Batterij, stroomtoevoer / battery, power supply	8
Technisch goed, betrouwbaar / good engineering, reliable	10
Garantie / guarantee	2
Schoonhouden / easy to clean	2
Snoerlengte / length of power cable	2

continued

Appendix 5.1, continued

THERMOS FLASK	
Characteristics (Dutch / English)	Frequency
Isolatie / isolation	31
Vorm, uiterlijk / form, appearance	25
Kleur / colour	20
Prijs / price	15
Bediening van schenken, tuit / ease of pouring, spout	23
Makkelijk afsluitbare dop / ease of closing lid	7
Goed afsluitbare dop / tightly closing lid	18
Hanteerbaarheid / ease of handling	16
Grootte, inhoud / size, content	19
Schoonhouden / easy to clean	13
Goed materiaal / good material	10
Meeneembaar / easy to take with you	5
Binnenfles / glass liner	4

APPENDIX 7.1

Answer categories for telephone, clock radio, and thermosflask in the laddering task (number, label, cafpit type according to six judges, reliable cafpit type, mean concreteness rating). For cafpit ratings, 1 = concrete attribute, 2 = abstract attribute, 3 = functional consequence, 4 = psycho-social consequence, 5 = instrumental value, 6 = terminal value. For the mean concreteness ratings, 1 = very concrete, 7 = very abstract.

Answer categories telephone

1	ik vind het niet belangrijk	554656		3.83
2	ik bel vrij vaak	453635		3.83
3	hij moet op het telefoonnet passen	111111	1	2.17
4	geeft ontspanning	444464	4	4.67
5	misverstanden voorkomen	344323		3.50
6	alle mogelijkheden goed gebruiken	233361		2.50
7	dat is de functie van de telefoon	221115		2.83
8	lang snoer	111111	1	1.50
9	geen miskoop gedaan hebben	434434	4	4.00
10	tijd over voor andere dingen	435353		5.17
11	gaat sneller	232333	3	3.67
12	geluidskwaliteit van de hoorn	122121		3.83
13	schoon kunnen maken	122132		2.67
14	anders gaat hij stuk	332333	3	2.33
15	miskoop gedaan hebben	434434	4	4.67
16	hoorn op schouder kunnen klemmen	111131	1	2.00
17	draadloos toestel	111111	1	1.67
18	anders gebruik je hem niet meer	333344	3	5.50
19	moderne vormgeving	222222	2	2.83
20	druktoetsen	111111	1	1.33
21	ik wil bereikbaar zijn	333556		3.67
22	gewicht van de hoorn	111111	1	1.50
23	volume kunnen regelen	111111	1	1.83
24	met een telefoonbeantwoorder	111111	1	2.17
25	voor milieu	434266		5.17
26	wandtelefoon	111111	1	1.83
27	ik heb moeite mijn aandacht bij het gesprek te houden	445444	4	5.67
28	om werk vol te houden	344452		5.33
29	slecht geluid	222142	2	3.17
30	dan kan je je aandacht bij het gesprek houden	243335		4.67
31	ik wil mijn inkomen behouden	463656		5.83
32	grote druktoetsen	111121	1	1.67
33	middenklasse prijs	122112		3.33
34	niet te zwaar/groot	122121		2.00
35	het hoort, past bij mij, is mijn smaak	265566		4.83
36	voor noodgevallen belangrijk	223225	2	3.50
37	omgangsvormen	565554	5	5.33
38	geen inspanning hoeven doen	333445		3.50
39	prijs	111111	1	3.33
40	niet te duur	122121		4.17

41	geluidskwaliteit	122111	1	3.50
42	het moet wel nut hebben	134535		4.00
43	geeft bewegingsvrijheid	435444	4	2.67
44	hoorn goed op het apparaat	122121		2.00
45	telefoon voor contact, gezelligheid	355556	5	5.00
46	oriënteren op wat er op de markt is	352455		4.50
47	passen in interieur	222222	2	3.17
48	toegankelijkheid van het toestel	222251	2	5.00
49	niet mooi	222222	2	5.00
50	met garantie, keurmerk	212122	2	3.33
51	niet steeds een andere hoeven kopen	334235		4.67
52	hanteerbaarheid hoorn met de hand	222231	2	2.17
53	dat vind ik leuk, aardig	255655		5.67
54	mooi geld	222242	2	6.33
55	levensinstelling, levenshouding	666656	6	5.83
56	dan moet ik weer een nieuwe kopen	334335	3	5.33
57	hand-free mogelijkheid	111111	1	2.17
58	voor een goed verloop van het gesprek	344243		5.83
59	onhandig	222242	2	2.67
60	zo min mogelijk mogelijkheden	222145		2.83
61	tijdgebrek	334335	3	5.50
62	met geheugen	111111	1	2.50
63	met goede gebruiksaanwijzing	222131		1.67
64	vervelend, storend	444244	4	4.00
65	zonde van het geld	234435		5.17
66	zodat je geen fouten maakt	344344	4	3.50
67	niet veel ruimte over hebben voor de telefoon	212255		3.50
68	repeattoets	111111	1	1.33
69	goede kwaliteit	222126	2	2.67
70	toetsen in de hoorn	111111	1	1.50
71	telefoon als gebruiksvoorwerp	313215		3.00
72	hoorn klemt niet goed	132141		3.33
73	anders kan je je gaan vergissen	443443	4	4.67
74	kleur	112111	1	4.67
75	ik ben nieuwsgierig	555645	5	5.00
76	mensen kunnen bereiken	313333	3	4.00
77	geeft stress	444444	4	5.17
78	geen ergernis geven	444234	4	4.50
79	geeft kramp	333332	3	3.83
80	moet groot zwaar robuust zijn	122122	2	1.67
81	anders kan ik niet bereikt worden	333335	3	3.50
82	beter begrijpen	345434		4.00
83	geeft zekerheid	444444	4	5.33
84	vormgeving	222221	2	3.50
85	veel geheugen	122121		3.00
86	kost geld	133115		4.33
87	dan hoeft je niet de nummers te onthouden	333344	3	3.67
88	dan hoeft je maar een knop in te drukken	131233		2.33
89	dan hoeft ik geen nummers op te zoeken	333333	3	3.00
90	andere mogelijkheden op de telefoon	211111	1	3.67
91	bedienbaarheid	222212	2	3.00
92	prettig, aangenaam gevoel	624424		4.83
93	(niet indeelbaar)			

Answer categories clock radio

1	geeft me zelfvertrouwen	445444	4	5.83
2	daar wordt ik sjagrijnig van	445544	4	4.83
3	levensvreugde, levensplezier	666665	6	6.50
4	het moet wel duidelijk zijn	222223	2	3.33
5	goed humeur hebben en houden	554665		5.33
6	dat is onhandig	242254		4.00
7	prijs	111111	1	3.50
8	het is onzin er veel geld aan uit te geven	552251		4.33
9	ik kan mijn geld beter aan andere dingen besteden	555453	5	4.50
10	garantie, merk	222222	2	3.50
11	dat is persoonlijk	555556	5	6.17
12	ik wil me niet laten beperken	555666		4.83
13	geeft ergeis	3445444	4	3.33
14	moet degelijk produkt zijn energiegebruik	222216	2	2.83
15	dan gaat hij snel stuk	132233		2.83
16	prettig gevoel	245644		5.00
17	anders heb je minder plezier in het gebruik	445324		
18	vervelend	445244	4	4.50
19	geluidsniveau moet verstelbaar zijn	111111	1	1.67
20	goed, helder, duidelijk geluid	122213		2.83
21	goede prijs/kwaliteit verhouding	122211		2.50
22	prijs, niet de allergeodkoopste	122111	1	2.67
23	met merk	222122	2	2.67
24	niet te duur	222121	2	3.50
25	met onduidelijke gebruiksaanwijzing	222113		3.17
26	bedieningsgemak	222113		2.67
27	moeilijk in te stellen	222112	2	2.83
28	inkomstenverlies	333333	3	5.17
29	voldoen aan verwachtingen	555256	5	4.17
30	dat ben ik verplicht aan mijn baas en mijn werk	554565	5	4.67
31	dan is hij bijvoorbeeld gejat	232554		5.50
32	anders moet je steeds zoeken naar de knoppen	332324		2.50
33	extra features	111121	1	2.17
34	met cassettemogelijkheid	111111	1	1.83
35	daar heb je hem voor gekocht	335353	3	4.17
36	dat is voor mij belangrijk	554656		5.67
37	lang snoer	111111	1	1.83
38	belangrijk voor je gezondheid	546425		5.50
39	dan kun je meteen zien hoe laat het is	133153		2.00
40	anders krijg je schade, ongelukken	333344	3	5.17
41	het licht van de cijfers kunnen temperen	111114	1	1.83
42	veel licht is storend bij in slaap vallen	223254		2.83
43	graag en snel naar werk gaan	55365	5	5.00
44	ik heb een goede nachtrust nodig	554666		5.17
45	slecht begin van de dag	445444	4	5.17
46	wij hebben verschillende tijden van opstaan	153454		3.50
47	het is een luxe-produkt	225254		4.33
48	dat kost de minste moeite	143443		3.83
49	naar muziek luisteren in bed	353355		2.33
50	dan hoeft je de tijd niet opnieuw in te stellen	333333	3	2.50
51	goede contacten met anderen	554565	5	5.33
52	dan hoeft je er niet meer bij na te denken	232434		4.50
53	ik ben er te ongeduldig voor	555454	5	5.50
54	geeft verwarring geld	445444	4	6.50
55	ori%ontatie in de tijd, dat je weet hoe laat het is	323351		3.00
56	geeft lawaai houden	332231		4.17

57	geen lawaai maken	122224	2	3.33
58	dat is makkelijk	242423		3.50
59	ik wil zelf bepalen welke mogelijkheden ik wil gebruiken	554624		2.67
60	duidelijk, goed leesbare cijfers	112112	1	1.67
61	dan hoe ik mijn hoofd niet op te lichten	333333	3	3.33
62	in het donker de tijd kunnen lezen	133134		1.67
63	tijd nuttig besteden	555356	5	5.17
64	dat maakt het gebruik moeilijk	242323		3.17
65	ik wil die functies gebruiken	254655		3.50
66	het meot wel nuttig zijn	242251		4.50
67	dat zijn onnodige dingen die ik niet gebruik	522252	2	4.67
68	geen storing door nevenzenders	131114	1	3.67
69	kleur moet passen bij het interieu	122222	2	4.17
70	dan kun je hem meenemen op reis	132131		2.17
71	anders is het zonde	445454	4	5.33
72	rustig wakker worden en opstaan	443466		4.83
73	dat geeft de zekerheid dat je nog een keer wordt gewekt	443332		2.50
74	verantwoordelijkheidsgevoel	664666	6	5.33
75	dat doe je voor het gezin, de familie	556554	5	5.33
76	dan gebeuren er dingen die niet goed gaan	245444	4	5.00
77	repeteerfunctie	111111	1	1.67
78	dat hij binnen handbereik staat	132222	2	3.00
79	op tijd wakker worden	333366	3	3.17
80	hij moet passen op de plek waar hij staat	222222	2	4.17
81	geen miskoop doen	233453		4.50
82	gemakszucht	564555	5	4.17
83	niet schrikken	443221		2.83
84	geeft sfeer	225444		5.00
85	verpest de sfeer	244444	4	4.17
86	anderen naar de zin maken	554556	5	5.83
87	dan kan ik nog even blijven liggen	333344	3	4.00
88	anders zou ik me kunnen verslapen	333336	3	3.67
89	dat wil ik zelf kunnen regelen	554626		2.67
90	dan weet je hoeveel tijd je nog hebt	333133	3	2.50
91	duidelijk weksignaal	122113		2.33
92	weer fit voelen	645446		5.00
93	een goed, aangenaam weksignaal	222224	2	3.67
94	(niet gebruikt nummer antwoordcategorie)			
95	makkelijk uit te zetten	139114		2.17
96	innerlijke rust	664666	6	5.33
97	maakt me onrustig	445444	4	4.67
98	beter in slaap vallen	433444	4	5.33
99	wekkerradio moet je dienen	225225	2	3.50
100	anders stoor je anderen	444344	4	4.83
101	anders blijf je wakker	333344	3	4.33
102	op de wekker kunnen vertrouwen	245456		2.67
103	geeft onzeker gevoel	445444	4	4.50
104	goede radio ontvangst	121111	1	2.83
105	met batterijen	111111	1	1.17
106	geld goed uitgeven open of dicht is	555453	5	6.00
107	passen in interieur	122251		4.67
108	mooie vormgeving	222221	2	4.00
109	vormgeving	222221	2	3.67
110	ik moet er tegen aan kijken	135321		3.83
111	hij moet niet al te groot zijn	222121	2	2.17
112	vanzelf afslaan na een paar minuten	111112	1	2.00
113	goed functioneren	222221	2	2.00
114	dan functioneert hij niet	333233	3	3.67

115	laag model	112111	1	3.33
116	slecht voor milieu	134326		3.67
117	dat kost tijd	333344	3	4.33
118	anders heb je er niets aan	333242		5.17
119	hij moet eenvoudig zijn	222221	2	3.00
120	werken op lichtnet	111113	1	1.83
121	digitaal	111111	1	1.50
122	aan afspraak, belofte houden	554365		4.33
123	afschatten van de markt	262456		5.33
124	ik wil geen fouten maken	554666		4.67
125	ik wil een goede indruk maken	554565	5	5.00
126	morele norm	564566		6.33
127	(niet indeelbaar)			
128	moeilijk te zien	122221	2	2.33
129	dan kan ik ook andere dingen doen	434436		4.83
130	moet duidelijk de tijd aangeven	122113		1.67
131	fijne dag hebben	544666		5.17
132	's nachts licht niet aan hoeven doen	133334	3	1.83
133	verticale display	111111	1	2.00
134	met duidelijke handleiding	222111		2.17
135	hard weksignaal	112212		2.00
136	geeft blikkerig geluid	122224	2	2.67
137	aangenaam geluid	222222	2	4.00
138	kleur	112122		3.83
139	rustige kleur	222222	2	3.00
140	dag goed uitgeslapen beginnen	455455	5	5.67
141	op elkaar aankunnen, vertrouwen	554566		5.67
142	dat is de functie van de wekkerradio	221153		3.83
143	functie is belangrijk	252253		3.33
144	moet sneller kunnen	225225	2	3.17
145	ik heb er de tijd niet voor over	453655		5.17

Answer categories thermos flask

1	om met plezier te gebruiken	444224	4	4.33
2	doel van het bedrijf verwezenlijken, daar ben je voor aangenomen	545455	5	5.17
3	daar heb ik geen zin in	444656		5.00
4	heb ik nodig, behoefte bevredigd zien	554656		5.00
5	tijd tekort	233354		5.00
6	/dat is zonde	444654	4	5.33
7	niet knoeien, morsen	332333	3	2.67
8	vies	222234	2	3.17
9	nette omgeving, moet er netjes uitzien	122555		3.00
10	lekker	222225	2	4.00
11	niet lekker	232224	2	4.00
12	dan moet ik een nieuwe kopen	334334	3	3.17
13	stimuleert tot kopen	334222		4.00
14	minder energiegebruik	123363		3.33
15	moeilijk schoon te maken	32214		2.00
16	rommel, slordig	332224		3.67
17	onhygiënisch	122124		2.83
18	hekel aan schoonmaken	554655	5	4.50
19	bron van bacteriën, schimmels	132124		2.50
20	gevaar van hete vloeistof, veiligheid	232136		2.50
21	past in tas, neemt geen ruimte	112113	1	2.33

22	vanwege het milieu	444266		4.17
23	teveel betaald, opgelicht zijn	334453		5.17
24	niet hoeven nadenken	534353		4.00
25	weggooien	331313	3	4.00
26	mooi uiterlijk	222222	2	3.00
27	leuk om te zien	222224	2	3.33
28	prettig gevoel	445545		5.00
29	lekker, hard werken	554465		5.33
30	sociaal voelend, omgang met mensen	655565	5	5.50
31	lastig, onhandig	222224	2	3.17
32	goedkoop, zo laag mogelijke prijs	122211		3.67
33	ergernis, irritatie	445244	4	4.33
34	andere kan zoeken	333333	3	4.50
35	smaak (van de vloestof)	232223	2	3.50
36	smaak vies, slootwater	232224	2	3.67
37	langer doorwerken	333346	3	5.00
38	dat geeft vlekken	333334	3	3.83
39	genieten	445444	4	5.83
40	vervelende vlekken in kleren	332331	3	3.67
41	aroma, aangename geur	232225	2	3.50
42	gezelligheid	455266		5.50
43	ik hou van rust	556666	6	5.17
44	(rust) pauze	443455		4.17
45	eigen karakter, persoonlijkheid, instelling	655666	6	4.33
46	pepmiddel, opkikker	334223		3.67
47	gevoelskwestie, voor eigen gevoel	255226		5.50
48	anders zou ik hem niet kopen	244454	4	4.83
49	er schoon uitzien	322254		2.67
50	overbodige dingen, niet nodig	324262		3.00
51	schoonmaken	332333	3	2.67
52	makkelijk schoon te maken	132114		2.17
53	geestelijke ontwikkeling	666465	6	6.00
54	miskoop, weggegooid geld	234423		4.50
55	stevig staan, niet omvallen	122111	1	1.33
56	isolatie, goed warm houden	123111	1	1.67
57	passen bij het interieur, harmoniëren	222222	2	4.00
58	vormgeving	222212	2	3.33
59	mee kunnen nemen	122113		2.17
60	niet teveel ruimte innemen	122114		2.17
61	niet gauw kapot, stuk gaan	332111		2.33
62	niet mooi	222222	2	4.67
63	niet te zwaar	122112		2.83
64	wederzijdse beleefdheid	555555	5	5.67
65	mag geen rotzooi worden	332354		3.33
66	anders niet gebruiken, niet nodig hebben	334353	3	4.83
67	tijdwinst	243343		3.67
68	gezellig model	222222	2	4.33
69	rustig	552254		4.00
70	kijkglasje	111111	1	2.17
71	uiterlijk, aanzien	222222	2	3.33
72	ontspannen gevoel, op je gemak	544645		4.83
73	koffie of water tussen binnen- en buitenkan	331113		1.83
74	daar word je moe van	444424	4	4.50
75	niet te zeer in het oog springen	222224	2	3.33
76	dat staat warmer	242212		4.00
77	anderen beïnvloeden dat	445554		6.00
78	voor mijzelf	455666		4.00
79	gezondheid, niet ziek worden	666365	6	4.50

80	dan gaat het sneller, opschieten	333323	3	3.83
81	tillen, sjouwen	332333	3	2.67
82	verse koffie	332336	3	2.50
83	goede indruk op anderen maken	545546		5.17
84	gastvrijheid	555566	5	5.00
85	meenemen, transporteren	332111		2.33
86	inhoud	111111	1	2.50
87	niet te groot	122112		2.17
88	waar voor je geld, daar koop je hem voor	444463	4	4.00
89	makkelijk schenken, makkelijke schenktuit	132112		2.00
90	zuinig zijn geen verspillen	554251		3.17
91	geld aan andere dingen besteden	333336	3	4.67
92	kwaliteit, moet gewoon goed zijn	222251	2	3.00
93	ongeveer 1 liter inhoud	111111	1	1.50
94	(niet gebruikt nummer antwoordcategorie)			
95	duurdere klasse	222252	2	3.67
96	warme, hete koffie (geen koude, lauwe)	332126		2.50
97	het kost geld	113111	1	4.00
98	financiële situatie, beperkt budget	353331	3	3.83
99	brood op de plank	525366		4.67
100	huiselijke gezelligheid	255246		4.67
101	kwestie van smaak	225222	2	4.17
102	bijsmaak (door materiaal binnenkant)	332123		2.00
103	geen decoraties	111112	1	2.83
104	kleur	112112	1	4.00
105	duidelijk pijltje dat schenken aangeeft	111111	1	2.17
106	meteen kunnen zien of de deksel open of dicht is	111111	1	1.33
107	vorm en kleur	112112	1	3.50
108	bij keuken passen	222252	2	4.50
109	prijs (in verhouding tot voorwerp)	112111	1	3.83
110	contact met winkel of fabrikant	332535		4.17
111	het kopje valt om	132113		2.17
112	niet lekken	331111	1	2.17
113	praktisch	242223	2	3.33
114	goede greep	112111	1	2.00
115	materiaal	111111	1	2.83
116	handzaam	222212	2	2.67
117	functionele vorm	122211		2.83
118	makkelijk	141135		3.67
119	maar één keer koffie hoeven zetten	333335	3	2.50
120	heel modern, niet ouderwets	222125	2	3.50
121	koffie over de tafel	332334	3	2.67
122	daar hou ik niet van	454662		5.33
123	minder kracht gebruiken, heb niet veel kracht	332312		
124	daar draait het om in het leven	556666	6	6.83
125	met visite	433255		3.83
126	mooi vormgeving	222222	2	3.83
127	het is een gebruiksvoorwerp	114223		2.50
128	functioneel ding, basisfunctie	222221	2	3.00
129	dat is het doel van de thermoskan	322431		3.33
130	daar schaf je hem voor aan	332453		4.33
131	moet voldoen	332223		4.67
132	gaat stinken, onfris ruiken	232124		3.00
133	anders niet gebruiken	334353	3	5.00
134	goed afsluitbaar	121111	1	2.33
135	anders heb je geen eten	323346		4.67
136	brengt extra werk	333333	3	4.00
137	dop als drinkbeke	111111	1	1.33

138	binnen handbereik	332133	3	4.00
139	essentieel	224223	2	5.17
140	duurzaam	222113		3.00
141	(niet indeelbaar)			

APPENDIX 7.2

Answer categories for telephone, clock radio, and thermosflask in the symbolic analysis task (number, labels of attributes and opposites, mean concreteness rating of the attributes, total number of different opposites per attribute, number of subjects that named the attribute). For the mean concreteness ratings, 1 = very concrete, 7 = very abstract. Only those categories that subjects gave as attributes have concreteness scores attached, the other categories are opposites. Missing categorie numbers are of answers to questions 2-4 in symbolic analysis task.

Answer categories telephone

2	saai, lelijk, niet mooi			
3	vies, vies ding			
4	verstoppen, wegstoppen			
5	vormgeving exterieur			
6	kleur zeer fel	3.20	2	2
7	toetsen niet te klein	4.20	6	3
8	aansluitbaarheid van andere apparaten	2.80	1	1
10	niet of moeilijk bereikbaar	5.20	10	6
12	moet passen in interieur qua kleur	3.60	6	9
13	zou niet passend in interieur zijn			
14	opvallend, apart	5.20	6	3
15	mooi	6.60	6	3
16	met een hoekige vormgeving	4.20	2	1
17	met een ronde vormgeving			
18	strak, zakelijk, functioneel	3.80	13	5
19	met extra mogelijkheden	3.00	8	6
20	modern, modieus	6.00	2	1
22	met keuring of keurmerk	2.20	1	1
24	met te kleine druktoetsen			
25	de onderlinge afstand tussen			
	de toetsen is klein	2.40	7	4
26	met druktoetsen	2.00	13	6
27	knoppen in de hoorn			
28	fouten maken door de druktoetsen			
29	met een draaischijf			
30	met herhaaltoets	1.80	7	5
31	hangtelefoon			
32	met onduidelijke toetsen			
33	zou slecht zijn			
34	fouten maken			
35	duidelijk geluid	2.80	6	9
36	soorten geluid (zoem, gong)			
37	de verstelbaarheid van het geluid	2.60	4	3
38	onduidelijk, slecht geluid			
39	hoorn goed op de haak	3.40	5	3
40	hoorn slecht op de haak			
44	de hoorn is niet prettig			
45	te druk, teveel tierelantijnen			

46	groot, zwaar, lomp	2.60	5	3
47	klein, compact, licht	2.20	2	2
48	ouderwets			
49	hoorn goed in de hand	4.60	10	12
50	draagbaar, draadloos	1.80	3	3
52	tijdverlies en tijdverspilling			
54	wel gehaaste mensen			
56	kleur sober, wit of grijs	1.60	4	3
57	prijs, niet te duur	4.60	7	3
58	hogere prijsklasse			
59	redelijk betaalbare prijs	4.60	2	2
60	prijs in verhouding tot produkt/prestatie	5.20	3	2
61	te duur, geldverspilling			
64	wat er ontbreekt aan mogelijkheden			
65	bedieningsongemak			
66	onhandig, onpraktisch			
67	vervelend, niet prettig			
68	makkelijk, praktisch	5.80	16	10
69	met een redelijk aantal geheugens	1.80	8	6
71	diverse toestellen	1.80	3	1
72	dat kan ieder telefoontoestel zijn			
75	gehandicapten			
76	kleur donker, zwart	1.80	1	1
77	met een te kort snoer			
78	negatief over snoer			
83	kopen	4.00	2	1
86	niet kopen			
90	(niet ingedeeld)			

Answer categories clock radio

1	trekt stof aan			
2	met minder of geen garantie			
5	vreemd gevormd			
6	iemand die goed wakker wil worden			
7	blikvanger			
9	kleur algemeen, rood, paars, zwart, wit, grijs en dergelijke	1.20	6	6
10	felgekleurd			
11	met een gekke kleur			
12	dan zou ik hem alleen als radio gebruiken	2.60	2	1
14	een erg lui iemand			
18	die heeft dan geen lichtgevende cijfers			
19	een kleine wekkerradio			
20	dan zou hij snel kapot gaan			
21	waardeloos apparaat			
22	met een nachtlampje erop	3.00	1	1
23	met lichtgevende cijfers	1.80	3	5
24	licht automatisch kunnen dimmen	3.60	2	1
26	met een ronde vormgeving	3.60	6	3
27	met een vierkant model	3.00	7	3
28	met een plat model			
29	een lichtgevend apparaat			
30	dan valt hij snel om, niet stabiel			
32	dat zou niet veilig zijn			

35	kleine cijfers			
36	heel groot, log apparaat			
37	waarbij de tijdsaanduiding bovenop zit			
38	de tijd moet duidelijk afleesbaar zijn	2.40	6	8
39	makkelijk instelbaar	4.00	18	22
40	met herhalingsfunctie	2.00	4	4
42	met kleine cijfers			
43	met een mooi uiterlijk	6.00	7	3
44	met kleine knopjes	3.40	1	1
45	met grote knoppen	3.20	5	3
46	met een schuifregelaar			
47	onduidelijke aanduiding op de knoppen			
48	zou onhandig zijn			
49	als de stroom uitvalt moet hij doorlopen	1.20	4	3
51	iemand die alleen de wekker gebruikt			
52	een eenvoudige, simpele wekkerradio	4.40	11	4
53	met veel tierelantijntjes			
54	makkelijk leesbare, grote cijfers	2.00	3	4
55	dan kun je hem niet gemakkelijk aflezen			
56	dat zou niet zo mooi zijn			
57	met extra's, bijvoorbeeld cassette, telefoon			
59	dan past hij niet in het interieur			
60	uiterlijk passen in interieur	5.80	6	3
61	instellen is moeilijk			
63	dan is hij lelijk			
64	dan moet hij niet te groot zijn	6.00	7	4
66	dan zou hij te duur zijn	2.60	6	2
67	tijd moet goed lopen	1.80	1	1
68	slecht, onbekend, merkloos			
69	met een goed merk	2.80	6	3
70	met een slechte antenne			
71	goed geluid qua radio	4.00	9	15
72	het geluid zou te zacht zijn	4.40	1	1
73	storend, krakend geluid			
74	slecht, irritant geluid			
76	redelijke, middenklasse prijs	4.40	15	7
78	een goedkoop model			
79	ik zou hem niet kopen			
80	zou slecht zijn, slechte kwaliteit			
82	zonder batterijen			
84	voor mij slecht, niet goed			
86	ouderwets model			
89	dan voldoet hij niet aan de eisen			
90	ik zou een nieuwe kopen			
93	met veel meer functies			
94	tijdsaflezing naar je toe gericht	2.20	3	1
95	ik zou hem niet op mijn nachtkastje zetten			
97	geeft ergernis			
98	snoer tekort, onstevig, lelijk			
99	moeilijk in te stellen zender			
101	makkelijk in te stellen zenders	4.20	1	1
102	met omklap-display			
104	goede kwaliteit	4.60	14	4
107	digitale cijfers	2.40	1	1
108	niet-functioneel			
109	zonder uitgang voor oortelefoon	2.00	1	1
110	met een moderne vormgeving	5.20	8	2
112	het bandbereik, AM of FM	2.00	3	3

115	met de radio gewekt kunnen worden	2.80	1	2
117	prijs/kwaliteit verhouding	4.20	11	7
119	(niet ingedeeld)			
120	vormgeving, strak, onopvallend	5.00	19	9
121	met vrij veel knoppen			
122	duidelijke knoppen	4.20	6	2
123	knoppen op gekke plaatsen			
124	knoppen verborgen in het design			
125	knoppen algemeen	3.20	6	3
126	veiligheid	3.80	1	1
127	hard zoemgeluid	3.60	4	2

Answer categories thermos flask

1	miskoop			
3	goedkoop is duurkoop			
11	stabiel staan	2.40	3	3
14	koud			
21	hanteren positief	5.00	7	4
23	goed handvat	4.20	7	3
24	te klein handvat			
25	kwetsbare binnenkant			
26	scherp			
27	voorzichtig			
28	vaste binnenkan			
30	slecht hanteren			
31	geen handvat			
32	handvat op verkeerde plek			
33	slechte bevestiging binnenkan			
34	voldoende inhoud	4.60	1	1
36	stevige binnenkan	4.60	6	2
37	glazen binnenkan			
38	schroefdop	1.40	2	1
40	strakke vorm	5.20	6	4
41	vorm taps			
42	zuinig			
43	slijtage			
44	in de kast kunnen	3.80	3	2
45	dunne binnenwand			
46	klep			
48	pyramide vorm			
49	kitsch			
51	verwisselbare binnenfles	2.20	3	2
52	prijs/kwaliteit verhouding	1.60	1	1
53	slecht deksel			
57	niet kopen			
60	onhandig			
62	moeilijk			
63	goed isoleren	3.60	20	13
66	duur	4.80	4	1
67	te duur			
68	slecht			
69	prijs	3.20	12	5
70	duur of goedkoop	4.00	2	1
77	troep			
81	weggooien			

84	uiterlijk is belangrijk	5.40	1	1
85	slecht isoleren			
86	lomp	3.20	2	1
87	kleine inhoud	1.60	10	7
89	te groot			
90	te klein			
92	passend in interieur	6.00	10	7
94	slechte ring			
95	grote inhoud	3.00	6	6
96	groot			
97	duurzaam	4.20	7	3
99	groot of klein			
100	paar kopjes			
103	kannetje en kopje			
104	opening	3.20	1	1
105	gewoon			
106	met zijn tweeën			
107	niet willen hebben			
108	kwaliteit	5.00	4	1
111	dop als mok	1.40	1	1
112	aan de mond			
116	verkleuren			
117	snel stuk			
121	artistiek			
122	goed schoon te maken	3.20	12	10
123	onhygiënisch			
124	vies			
126	gemiddelde prijs	2.80	9	6
127	ziet er goedkoop uit			
128	goedkoop			
130	moeilijk schoon te maken			
134	aanduiding op knop	3.00	2	1
135	hoekig			
136	hoge kan			
137	ronde kan			
138	bolvormig	3.20	3	2
140	niet glad			
141	strakke vormgeving	5.20	8	4
142	vierkant			
143	rond			
144	wit	1.40	6	1
145	de bol neemt veel plaats in			
146	bloemen			
147	decoraties			
148	tierelantijnjes			
149	strepn			
152	groen			
153	neutrale kleur	4.00	9	8
154	felle kleur			
156	tuit niet goed			
158	zwart	1.40	1	1
159	bruin			
160	veelkleurig			
161	geen voorkeur			
162	geen tuitje			
163	brede tuit			
164	niet morsen tuit	3.20	1	1
167	die lekt	1.80	3	1

168	goed sluiten	3.00	10	9
169	niet open te krijgen			
171	mooi			
172	lelijk			
173	niet lekken	3.20	1	1
174	makkelijk open draaien	3.60	2	1
175	slecht sluiten			
176	onduidelijke instructieknop			
177	handig in gebruik	4.80	6	2
182	van plastic			
183	slecht bruikbaar			
184	handelen om te schenken			
185	niet goed schenken	4.00	3	2
186	niet praktisch			
187	dop erop toch schenken	2.20	2	1
188	goed schenken	4.00	13	9
189	slecht plastic			
190	slecht materiaal			
191	goed materiaal	4.40	3	2
198	met kurk			
199	knoeien	4.00	2	2
201	slecht handvat			
205	verkeerde kleuren			
206	cilindervormig			
210	(niet ingedeeld)			

APPENDIX 8.1

Photographs used in the study (Chapter 8). Colours of telephones: Light grey, Beige Green, respectively; of thermos flasks: Metal, White, Black.

