a Multilayered Model of Product Emotions

Pieter M.A. Desmet
Industrial Design Delft, Delft University of Technology

This paper introduces a theoretical basis for the process that underlies all emotional responses to consumer products. Five distinct classes of product-evoked emotions are discussed, which are each the outcome of a unique pattern of eliciting conditions. The framework for these patterns was drawn from a model that reveals the cognitive basis of product emotions. The main proposition of this model is that all emotional reactions result from an appraisal process in which the individual appraises the product as (potentially) harming or favouring one or several of his or her concerns. In this perspective, the concern and the appraisal are considered key-parameters that determine if a product evokes an emotion, and if so, what emotion is evoked. Because each of the five classes of product emotions (i.e. instrumental, aesthetic, social, surprise, and interest emotions) is discussed in terms of these key-parameters, it can be used to explain the complex and often personal nature of product emotions, and support designers in their efforts to design for emotion.

INTRODUCTION

Emotions enrich virtually all of our waking moments with either a pleasant or an unpleasant quality. Many studies have shown that a person's general experience of well-being is strongly influenced by his or her day-to-day felt emotions (see Diener and Lucas, 2000). Given the fact that a substantial portion of these emotional responses is elicited by 'cultural products,' such as art, clothing, and consumer products (Oatley and Duncan, 1992), designers may find it rewarding to design for emotions that appeal to or stimulate the intended users. In addition, emotional responses can incite customers to select a particular artefact from a row of similar products, and will therefore have a considerable influence on our purchase decisions. As a consequence, more and more producers currently challenge designers to manipulate the emotional impact of their designs, or, to 'design for emotion.' In design practice however, emotions elicited by product appearance are often considered to be intangible and therefore impossible to predict or design for. This persistent preconception is partly caused by some typical characteristics of these 'product emotions.' First, the concept of emotions is broad and indefinite, i.e. products can evoke many different kinds of emotions. We can admire the latest ultra-slim laptop, be irritated by an annoying alarm clock, attracted to a beautiful line in a car model, and so on. And although the touch of melancholy felt when coming across a long forgotten childhood teddy bear seems incomparable to the thrill of driving a motorcycle, both these responses belong to the wide spectrum of human emotions. Second, emotions are personal, that is, individuals differ with respect to their emotional responses to a given product. For instance, one person may be fascinated by the restyled BMW Mini, whereas another may be disappointed because he feels that the original Mini was far more charming. Third, products often evoke 'compound emotions.' Rather than eliciting one single emotion, products can elicit multiple emotions simultaneously because these emotions are elicited not only by the product's aesthetics, but also by other aspects, such as the product's function, brand, behaviour, and associated meanings.

It seems that designers do not have much control over these apparently intangible emotional responses. However, designers *can* influence the emotions elicited by their designs because these emotions are not as intangible as they seem. This position is based on theories of emotion maintaining that although emotions are idiosyncratic, the conditions that underlie and elicit them are universal. In the tradition of these theories, we developed a model of product emotions that sets forth three key-parameters in the process that underlies each emotion (see Desmet, 2002; Desmet and Hekkert, 2002). By revealing the cognitive basis of product emotions, the model can be used to explain the broad, personal, and compound character of product emotions. The next section briefly introduces the model and explains each of the three parameters. It is discussed how these parameters combine to emotion-specific patterns of eliciting conditions. In an explorative study, which resulted in a database of hundreds of anecdotal cases of product emotions, it was found that on the one hand a similar product can elicit many different emotions, but on the other hand, the underlying process can be explained with these patterns of eliciting conditions. In order to develop the classification of product emotions in five emotion types, which is introduced in the subsequent section, the study results were structured with the use of several contemporary cognitive theories of emotion.

THE BASIS OF PRODUCT EMOTIONS
Arnold (1960, p.182), a pioneering psychologist in the cognitive perspective of emotion, defined an emotion as "the felt tendency toward anything intuitively appraised as good (beneficial) or away from anything intuitively appraised as bad (harmful)." This definition adheres to the view that emotions are instrumental. In this view, emotions are considered to serve an adaptive function because they establish our position in relation to our environment, pulling us toward certain people, objects, and ideas, and pushing us away from others (Frijda, 1986). This implies that although people differ with respect to their emotional responses, the process that precedes these responses is universal. To facilitate the study of emotional responses to consumer products, Desmet (2002) and Desmet and Hekkert (2002) established a basic 'model of product emotions' that represents this underlying process. The model, which is shown in Figure 1, sets forth four main parameters in the eliciting process of emotions: (1) appraisal, (2), concern, (3) product, and (4) emotion. The first three parameters, and their interplay, determine if a product elicits an emotion, and if so, which emotion is evoked.
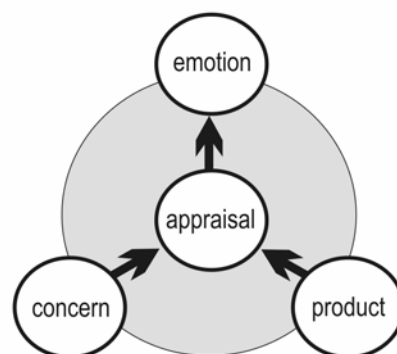

Figure 1. Basic model of product emotions.

(1) APPRAISAL

Cognitive theorists of emotion argue that an emotion *always* involves an assessment, or appraisal, of how an event may harm or benefit a person. This appraisal is a non-intellectual, automatic evaluation of the significance of a stimulus for one's personal well-being (e.g. Roseman and Smith, 2001). The central implication of the concept of appraisal is that not the event as such, but the *meaning* the individual attaches to this event, is responsible for the emotion. An example would be when a friend makes a derogatory remark about you. Depending on the meaning you attach to this remark you might experience *anger* (i.e. "I am being insulted"), or *amusement* (i.e. "This is a joke!"). In the case of products, an appraisal has three possible outcomes: the product is beneficial, harmful or not relevant for personal well-being. These three general outcomes result in a pleasant emotion, an unpleasant emotion or an absence of emotion, respectively.

The notion that appraisals mediate between products and emotions explains why people differ with respect to their emotional reaction to a given product. Compare, for example, the response to an injection needle of a diabetic in need of insulin to the response of a five year old boy waiting in line for a preventive injection. The first will probably experience a pleasant emotion (e.g. hope) as the outcome of an appraised benefit, whereas the second will more likely experience an unpleasant emotion (e.g. fear) as the outcome of an appraised potential harm.

(2) CONCERN

Every emotion hides a concern, that is, a more or less stable preference for certain states of the world (Frijda, 1986). According to Frijda, concerns can be regarded as points of reference in the appraisal process. Thus, the significance of a product for our wellbeing is determined by an appraised concern match or mismatch: products that match our concerns are appraised as beneficial, and those that mismatch our concerns as harmful. Why do I feel attracted to an umbrella? Because it matches my concern for staying dry. And why am I frustrated when my computer repeatedly crashes? Because it mismatches my concern for efficiency. The number and variety of human concerns is endless. Types of concerns reported in the research literature are, for example, drives, needs, instincts, motives, goals and values (see Scherer, 2001). Some concerns, such as the concern for safety and the concern for love, are general, and others are context-dependent, such as the concern for being home before dark or the concern for securing a good seat for your friend at the cinema.

Events are construed as emotionally meaningful *only* in the context of one's concerns (Lazarus, 1991). Some first explorative studies have confirmed the relationship between emotions evoked by consumer products and underlying concerns. Desmet, Hekkert and Hillen (2003), for example, found that people who have the concerns "to be independent," and "to be stress-free," are significantly more disgusted by the Volkswagen new Beetle than those with a concern "to have an own identity" and "to seek challenges." Rather than disgusted, this latter group is fascinated by that particular car model. These findings verify that in order to understand emotional responses to consumer products, one must understand the users' concerns given the context in which the product is or will be used.

(3) PRODUCT

Emotions always imply and involve a relation between the person experiencing them and a particular object: one is afraid *of* something, proud *of* something, in love *with* someone and so on (Frijda, 1994). Note that the stimulus that evokes the emotion is not necessarily also the object of that emotion. The stimulus can be an actual event, such as someone calling our name or catching sight of an object, as well as a remembered or imagined event. We all know from experience that thinking of someone we love is sometimes enough to elicit strong emotions. Or merely fantasising about a planned summer vacation can fill us with anticipatory excitement. Although in these cases the thought and the fantasy are the stimuli, the objects of our emotions are the person we love and the summer vacation respectively. This implies that with respect to emotional responses to products, a basic distinction can be made between emotions of which the object is the product as such (e.g. "I am excited by the soft finish of this chair"), and emotions of which the object is some association or fantasy that is induced by the product (e.g. "I am excited by the idea of surprising my friends with this chair"). This distinction corresponds to the one made by Tan (2000) regarding emotions elicited by works of art. First, A-emotions are emotions related to the material artefact. One can, for instance, be fascinated by the lines and colours of a painting, or admire the artist who created the work of art. Second, R-emotions are emotions related to representations of something besides the artefact itself. An example is the emotional response one may experience to the person who is represented on a figurative painting. Non-figurative works of art may also represent things besides the artefact itself (e.g. memories or imaginary landscapes evoked by a piece of music). Whereas A-emotions have 'real' objects, such as the object of art itself, the objects of R-emotions are imaginative, existing only in a fictitious world.

Obviously, products can also elicit A-emotions. One can, for example, admire the designer who created an innovative new bicycle concept, or be fascinated by the mechanical complexity of a wristwatch. Products also elicit R-emotions. In these cases, the objects are the fantasies we have about what a product means or may mean to us. These fantasies can be both anticipatory and retrospective. For instance, a person may feel desire towards a new abdominal work-out device because they anticipate that with this device the perfect body is within their reach. Or, someone may be inspired by the sight of a backpack because it reminds them of an exciting hiking expedition.

(4) EMOTION

A difficulty of affective concepts is that they are probably as intangible as they are appealing. Design literature tends to refer to 'emotions' or 'moods' when studying anything that is thought of intangible non-functional or non-rational. Although the words emotion and mood are often used interchangeably, they do in fact refer to specific and different experiential phenomena. First, they differ in terms of duration (Ekman, 1994). Emotions are acute states that exist only for a relatively short period of time. Usually, the duration of an emotion is limited to seconds, or minutes at most. Moods, however, tend to have a relatively long-term character: one can be sad or cheerful for several hours or even for several days. A second and more important difference is that emotions are intentional whereas moods are essentially non-intentional (e.g. one is not sad or cheerful *at* something). As opposed to emotions, moods are not directed at a particular object but rather at the surroundings in general or, in the words of Frijda (1994, p. 60), at "the world as a whole." Whereas emotions are usually elicited by an explicit cause (e.g. some event), moods have combined causes (e.g. "It is raining," "I didn't sleep well,"

"Someone has finished the coffee!"). Consequently, we are generally unable to specify the cause of a particular mood (Ekman, 1994). A person is sometimes not even aware of being in a certain mood (e.g. if we are grumpy in the morning we usually only realise it when someone else tells us).

The model of product emotions was developed to facilitate the study of relationships between products and emotions. Given this aim it was decided not to include moods in the model because the influence of moods on our emotional responses to products is independent of product characteristics. A person in a cheerful mood will experience more pleasant emotional responses towards products in general –regardless of the particular characteristics of the product. Note that although the current focus is on emotions, this does not imply that other types of affective states are irrelevant for product experience. In fact, the various types of affective states influence each other. Obviously, our emotions are influenced by our moods. For instance, a person in an irritable mood becomes angry more readily than usual (Ekman, 1994). In the same way, a person's emotional response to products may vary depending on their mood. Consumer researchers found that moods have a strong influence on consumer behaviour (e.g. Faber and Christenson, 1996). Someone who is cheerful will be attracted to products more readily than someone who is in a bad mood. Conversely, emotions also influence our moods. A person who is repeatedly disappointed by a malfunctioning computer may very well end up in a bad mood. Nevertheless, the model of product emotions is focussed specifically on emotions because only these imply and involve a relation between the person experiencing them and a particular object.

CLASSIFICATION OF PRODUCT EMOTIONS
Most, if not all, contemporary researchers in the cognitive tradition of emotion hold that particular types of emotions are associated with particular types of appraisals, and that emotions can be predicted from the nature of the underlying appraisal (e.g. Lazarus, 2001; Roseman and Smith, 2001). Many appraisal models advanced to date include small sets of appraisal types to differentiate between emotions. Each appraisal type (and related concern type) addresses a distinct evaluative issue, which can be seen as a particular 'appraising question.' In the case of products, these questions relate to issues such as: "Does this product help me to attain some goal? Can I afford it? Will my neighbours approve? Is it safe to use?" etcetera. With these various underlying appraisal types, product emotions can be classified in one of the following five classes: instrumental, aesthetic, social, surprise, and interest emotions. This classification, which is shown in Figure 2, was developed on the basis of cognitive models of emotions developed by psychologists such as Scherer (2001), Smith and Ellsworth (1987), Roseman (2001), and Ortony, Clore and Collins (1988).
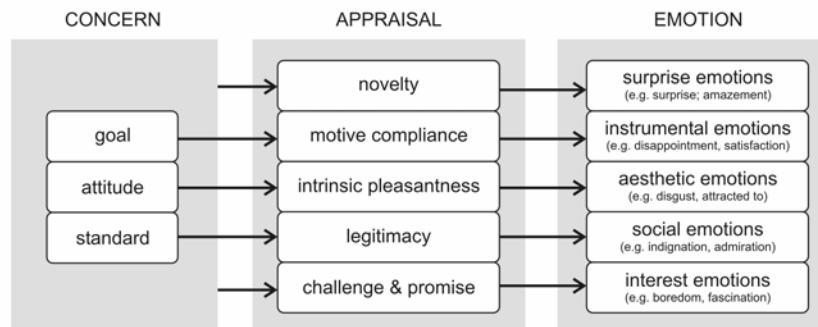
Figure 2. Classification of product emotions.

Each type is illustrated with an example that was drawn from an explorative study to the eliciting conditions of product emotions. In this study, participants photographed products to which they felt emotional responses. Participants were instructed to write down in a booklet what emotion the product elicited, and why this particular emotion was experienced. They were asked to formulate their explanation as completely as possible and invited to describe whatever they thought was relevant to explain their emotion (e.g. context, product design, associations, etcetera). The result of the study comprised 357 cases, which filled an anecdotal database of product appraisals. Each case includes a picture of a product, a participant number, an emotion, and a description of the underlying appraisal and concern type.
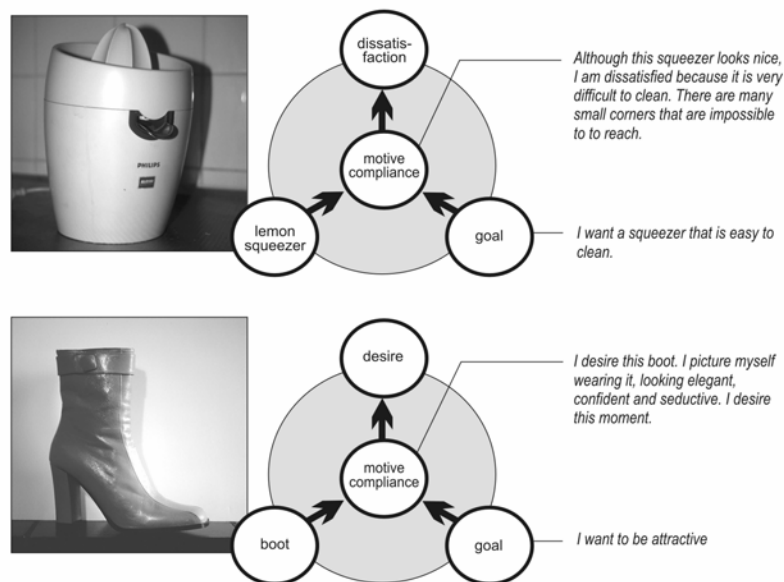

Figure 3. Examples of instrumental product emotions.

(1) INSTRUMENTAL PRODUCT EMOTIONS
We never buy a product without having some motive to invest our resources.
Products can be regarded instrumental because we belief they can help us
accomplish our goals. The concern type 'goal' refers to states of affairs that we
want to obtain, i.e., how he would like things to be (Ortony *et al*, 1988). Humans
have numerous goals, which vary from abstract (e.g., I want to be happy), to
concrete (e.g., I want to have lunch). Our goals are the points of reference in the
appraisal of motive compliance. A product that facilitates goal achievement will be
appraised as motive compliant, and elicit emotions like *satisfaction*. Similarly,
products that obstruct goal achievement will be appraised as motive incompliant,
and elicit emotions like *disappointment* (see Figure 3; 'lemon squeezer').

   Also products that threaten to obstruct or promise to facilitate goal
achievement elicit instrumental emotions. Each time we see a product, we
anticipate its future use or possession. We predict the experiences of using the
product and the consequences of owning it. These anticipations are based on
knowledge about the type of product or the product brand, and on information
conveyed by the product itself (e.g., appearance, price, and packaging). When
shopping for new shoes, one might, for example, anticipate that wearing a
particular pair of elegant shoes will have the consequence of 'being attractive.' If
this person has the goal to be attractive, he or she will appraise this particular pair
of shoes as motive compliant and, for instance, experience *desire* (see Figure 3;
'boot'). If the same person has the goal of 'comfortable walking,' he or she might
appraise the anticipated discomfort as motive incompliant and experience
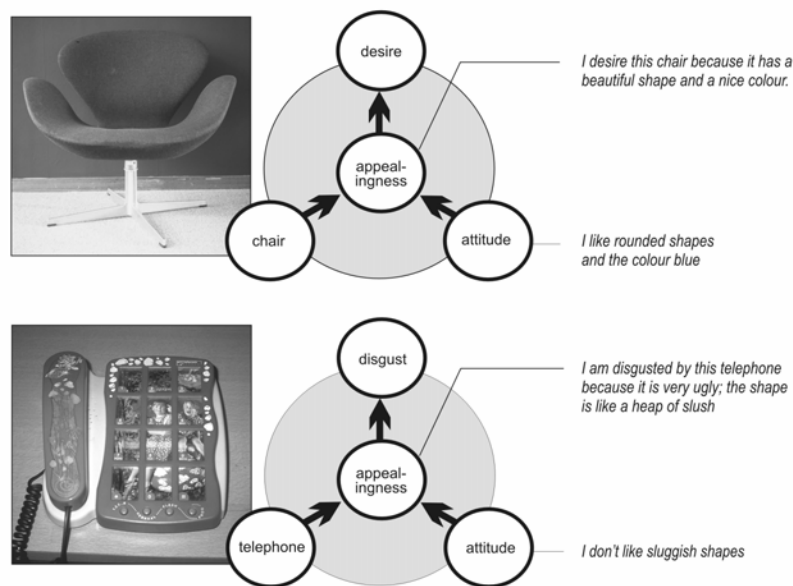*dissatisfaction*.

Figure 4. Examples of aesthetic product emotions.

(2) AESTHETIC PRODUCT EMOTIONS
As products are physical objects, they look, feel, smell, taste, and sound in a particular way. Each of these perceivable characteristics can both delight and offend our senses. Like all objects, products, or aspects of products, can be appraised 'as such' in terms of their appealingness. The concerns that are the points of reference in the appraisal of appealingness, are attitudes. Our attitudes are our dispositional likings (or dislikings) for certain objects or attributes of objects (Ortony *et al*, 1988). Like goals, we have many attitudes, of which some are innate (e.g., the innate liking for sweet foods), and others are learned (e.g., the acquired taste for oysters or wine). We have attitudes with respect to aspects or features of products, such as product colour or material (see Figure 4). We also have attitudes with respect to product style. For instance, some people have developed an attitude for the style of Japanese interior design, whereas others have a taste for Italian design.

A product that corresponds with (one of) our attitudes, is appraised as appealing and will elicit emotions like *attraction*. A product that conflicts with (one of) our attitudes, is appraised as unappealing and will elicit emotions like *disgust*. In some cases, the appealingness is based on characteristics of the product itself, such as shape, size, or particular details. As a result, a dispositional liking for a certain model will be generalisable to other products. Sometimes, however, the dispositional (dis)liking is restricted to only one specific product. In those cases, the liking results from previous usage or ownership of that particular exemplar. One can have a dispositional liking for a ring because it was a gift from someone special or for a particular backpack because one travelled with it to many different countries. In these cases, the attitudes are embedded with personal meaning and not applicable to other exemplars of the product type.
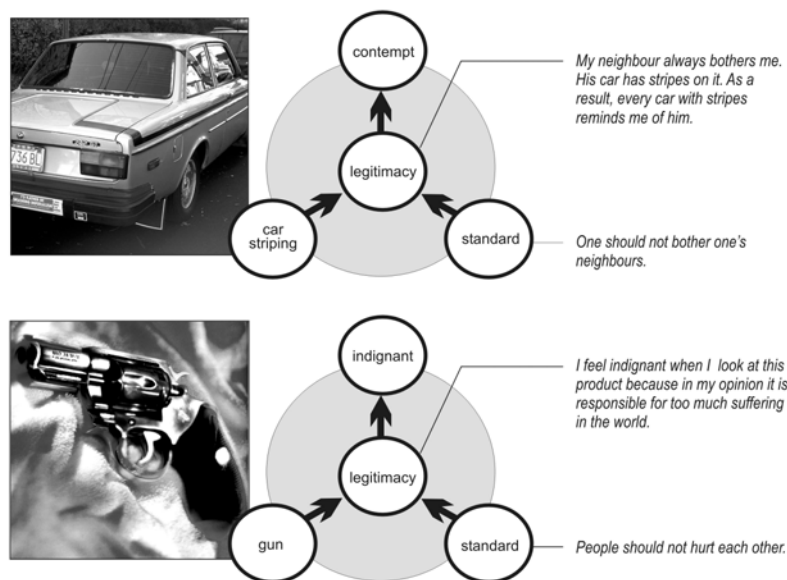

Figure 5. Examples of social product emotions.

Desmet, P.M.A. (2003). A multilayered model of product emotions. *The Design Journal*. In press.

8

(3) SOCIAL PRODUCT EMOTIONS

Next to goals and attitudes, standards are a third type of human concerns relevant to product emotions. Our standards are how we believe 'things should be' and how 'people should act' (Ortony *et al*, 1988). For example, many of us have the standard that we should respect our parents and eat fruit and vegetables. Most standards are socially learned and represent the beliefs in terms of which moral and other kinds of judgmental evaluations are made. Products are embedded in our social environment; they are designed by people, used by people, and owned by people. Because we cannot separate our view on products from our judgments of the people we associate them with, we apply our social standards and norms, and appraise products in terms of 'legitimacy.' Products that are appraised as legitimate elicit emotions like *admiration*, whereas those that are appraised as illegitimate elicit emotions like *indignation*.

The objects of social emotions are essentially agents. This agent can be either the product itself that is construed as an agent, or an associated agent, such as the designer or a typical user. Firstly, products are the result of a design process and the designer or company is the construed agent. While looking at a product, one can for example, praise its originality or blame the designer for a lack of product quality and experience *contempt*. Secondly, products are also often associated with particular users or user groups. Most of us have no difficulty in envisioning typical users of, for example, German cars, or skateboards. In those cases the typical user group or institution that is associated with the product is the object of appraisal. We can blame the user of a big car for not caring about environmental issues, or admire the owner of a digital agenda for their presumed time-efficiency (see Figure 5; 'car striping'). Thirdly, we also tend to apply our social standards to products themselves. Although products are not people, they can be treated as agents with respect to the presumed impact they generally (can) have on people or society. A person can, for instance, experience *indignation* towards mobile telephones because they blame these products for the disturbance they cause in public spaces such as train compartments (see Figure 5; 'gun').
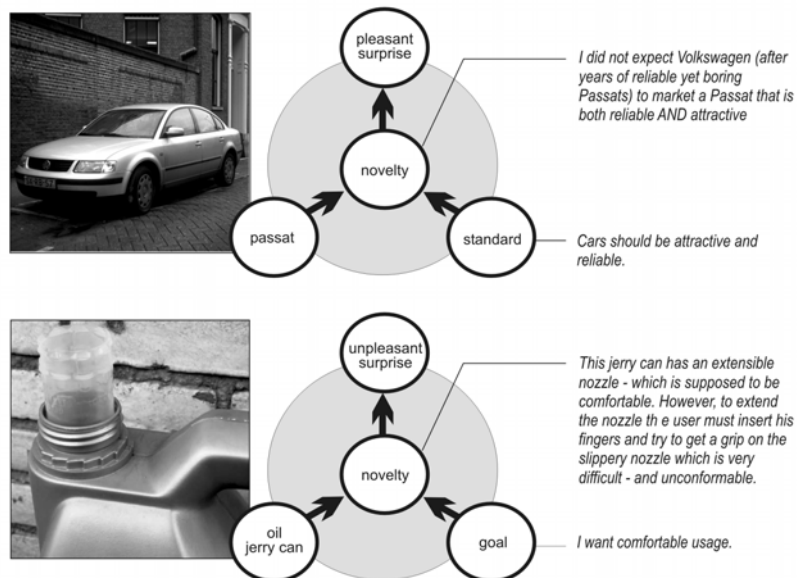

Figure 6. Examples of surprise product emotions.

(4) SURPRISE PRODUCT EMOTIONS

Any product (feature) that is appraised as 'novel,' i.e., sudden and unexpected, will elicit a surprise response. Surprise emotions differ from the previous three emotion types because they are not related to a particular concern type. Instead, *pleasant surprise* is elicited by a sudden and unexpected match with any concern (i.e., a goal, attitude, or standard), and *unpleasant surprise* is elicited by a sudden and unexpected concern mismatch.

We can be surprised by products that are totally new to us (see Figure 6; 'Passat'). A person can, for instance, be pleasantly surprised when first encountering a wireless computer mouse (that unexpectedly matches the concern of comfort). Besides totally new products, also product aspects or details can elicit surprise (see Figure 6; 'oil jerry can'). A printer, for instance, can be surprisingly fast, or a door handle surprisingly soft. In the latter case, we expect door handles to be rigid and are pleasantly surprised because this particular handle disconfirms that expectation. Once we have become familiar with the novel aspect of the product, it will no longer elicit surprise. Therefore, these are often *one-time-only* emotions.
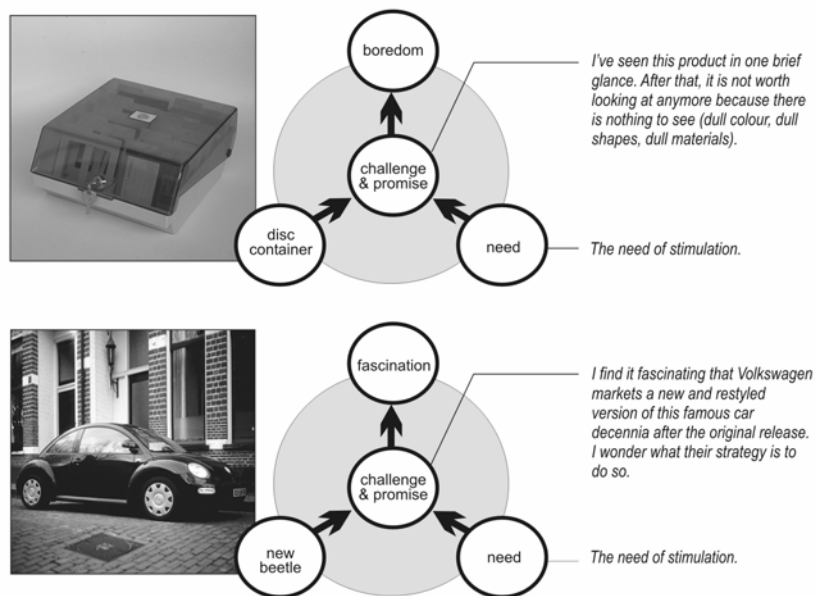

Figure 7. Examples of interest product emotions.

(5) INTEREST PRODUCT EMOTIONS

The fifth product emotion type comprises emotions like *fascination*, *boredom*, and *inspiration*. These emotions are all elicited by an appraisal of challenge combined with promise (Tan, 2000) and all involve an aspect of (a lack of) stimulation. Products that evoke interest emotions make us laugh, stimulate us, or motivate us to some creative action or thought. A well-established psychological principle is that people are 'intrinsically' motivated to seek and maintain an optimal level of arousal. A shift away from this optimal level is unpleasant. Since low arousal levels seem to be disliked, we appear to have a 'stimulus hunger.' Products that are appraised as not holding a challenge and a promise will elicit emotions like

boredom (either because they do not provide us with any bodily sensation or leave nothing to explore; see Figure 7; 'disc container'). Products that are appraised as stimulating because they bring about some question or because they require further exploration will elicit emotions like fascination and inspiration (see Figure 7; 'New Beetle'). Interest emotions are similar to aesthetic emotions because in both cases the object of emotion is the product 'as such.'

DISCUSSION

The classification introduced in this paper has some important implications for our understanding of the emotional impact of consumer products. First, it shows that the popular assumption that emotional responses to products only relate to aesthetic (and not to functional) qualities is incorrect. Although the aesthetic emotions are an important class of product emotions, the other four classes are no less relevant. Emotion-driven design should therefore not be considered to be merely a matter of styling. To design for emotion requires a profound understanding of the manifold emotional meanings that can be construed by the intended users. Second, it illustrates that the present-day focus on generalised pleasure (see e.g. Green and Jordan, 2002) is rather narrow. Although the increasing interest in product experience is commendable, this obvious focus on 'pleasure of use' ignores the wealth of pleasant and unpleasant emotions that may be experienced during product use. One can, for instance, be fascinated by a new material of a chair, be disappointed by the uncomfortable seat, admire the designer for his or her visionary design, and so on. The study of product emotions requires an approach that acknowledges this possible co-occurrence of several different emotions.

Note that the model of product emotions and the corresponding classification provide a basic but incomplete explanation of how emotions are elicited by products. Firstly, they do not explain differences between emotions that are the outcomes of the same appraisal type. The emotions contempt and indignation, for example, are both outcomes of the appraisal of legitimacy. Nevertheless, they are different emotions, and if one wants to understand the differences in eliciting conditions between these two emotions, it is necessary to specify the particular appraisals in more detail. Secondly, the discussed five classes of product emotions are not claimed to cover all possible emotional responses towards products. Nevertheless, they do illustrate that products have many different layers of emotional meaning, and that some of these emotional meanings can be predicted. Designers that are aware of the patterns that underlie emotional responses (and the concerns and appraisals that make up these patterns) can therefore influence the emotions elicited by their designs. In several design cases (see e.g. Desmet and Dijkhuis, 2003) we found that these patterns enable the designer to understand the intended users and at the same time surpass the direct wishes of these users and therefore to create something that both befits the users' wishes and still is new and stimulating to them.

Note that it is not assumed that to serve humans' well-being, designers should create products that elicit *only* pleasant emotions. Instead, it may be profitable to design products that elicit 'paradoxical emotions,' that is, positive and negative emotions simultaneously. Frijda (1996) stated that in experiencing art, these paradoxical emotions are the ones that we seek. It may be rewarding for designers to investigate the possibilities of designing paradoxical emotions because this may result in products that are unique, innovative, rich, challenging – and, therefore, desirable.

REFERENCES

Arnold, M.B. (1960). *Emotion and personality.* New York: Colombia University Press.

Desmet, P.M.A. (2002). *Designing emotion.* Unpublished doctoral thesis. ISBN 90-9015877-4.

Desmet, P.M.A. and Hekkert, P (2002). 'The basis of product emotions.' In. W. Green and P. Jordan (Eds.). *Pleasure with products, beyond usability* (60-68). London: Taylor & Francis.

Desmet, P.M.A. and Dijkhuis, E. (2003). 'A wheelchair can be fun: a case of emotion-driven design.' *Proceedings of DPPI03,* Pittsburg, USA. In press.

Desmet, P.M.A., Hekkert, P. and Hillen, M.G. (2003). 'Values and emotions; an empirical investigation in the relationship between emotional responses to products and human values.' *Proceedings of the fifth European academy of design conference,* Barcelona, Spain. In press.

Diener, E. and Lucas, R.E. (2000). 'Subjective emotional well-being.' In M. Lewis and J.M. Haviland-Jones (Eds.), *Handbook of Emotions; second edition* (325-337). New York: The Guilford Press.

Ekman, P. (1994). 'Moods, emotions, and traits.' In P. Ekman and R.J. Davidson (Eds.), *The nature of emotions, fundamental questions* (56-58). Oxford: Oxford University Press.

Frijda, N.H. (1986). *The emotions.* Cambridge: Cambridge University Press.

Frijda, N.H. (1994). 'Varieties of affect: emotions and episodes, moods, and sentiments.' In P. Ekman and R.J. Davidson (Eds.), *The nature of emotion, fundamental questions* (59-67). Oxford: Oxford University Press.

Faber, R.J. and Christenson, G.A. (1996). 'In the mood to buy: differences in mood states experienced by compulsife buyers and other consumers.' *Psychology and marketing,* 13, 803-819.

Green, W. and Jordan P. (2002). *Pleasure with products, beyond usability.* London: Taylor & Francis.

Lazarus, R.S. (1991). *Emotion and adaptation.* Oxford: Oxford University Press.

Oatley, K. and Duncan, E. (1992). 'Structured diaries for emotions in daily life.' In K.T. Strongman (Ed.) *International review of studies in emotion, vol. 2,* (250-293). Chichester: Wiley.

Ortony, A., Clore, G.L. and Collins, A. (1988). *The cognitive structure of emotions.* Cambridge: Cambridge University Press.

Roseman, I.J. (2001). 'A model of appraisal in the emotion system: integrating theory, research, and applications.' In K. Scherer, A. Schorr and T. Johnstone (Eds.), *Appraisal processes in emotion* (68-91). Oxford: Oxford University Press.

Roseman, I.J. and Smith, G.A. (2001). 'Appraisal theory: assumptions, varieties, controversies.' In K. Scherer, A. Schorr and T. Johnstone (Eds.), *Appraisal processes in emotion* (3-19). Oxford: Oxford University Press.

Scherer, K.R. (2001). 'Appraisal considered as a process of multilevel sequential checking.' In K. Scherer, A. Schorr and T. Johnstone (Eds.), *Appraisal processes in emotion* (92-120). Oxford: Oxford University Press.

Smith, C.A. and Ellsworth, P.C. (1987). 'Patterns of appraisal and emotion related to taking an exam.' *Journal of Personality and Social Psychology,* 52, 475-488.

Tan, E.S.H. (2000). 'Emotion, art, and the humanities.' In M. Lewis and J.M. Haviland-Jones (Eds.), *Handbook of emotions; second edition* (116-134). New York: The Guilford Press.

BIOGRAPHY
Pieter Desmet is assistant professor at Industrial Design Delft. He has a background as an industrial designer and obtained a PhD degree with research focussed on emotional product experience. His main research interest is in the question why and how consumer products evoke emotions. In addition, he develops tools and methods that facilitate an approach for emotion-driven design. He works with several international companies (e.g. Mitsubishi Motor R&D) who acknowledge the relevance of emotional responses in consumer behaviour and are interested in knowledge and tools to support them in developing products and services with an added emotional value. Besides his research initiatives, he organized design workshops for designers and design students in, for example, Tokyo (Japan), and Delft (The Netherlands).

ADDRESS FOR CORRESPONDENCE
Pieter Desmet, Department of Industrial Design, Delft University of Technology. Landbergstraat 15, 2628 CE Delft, The Netherlands. Email: p.m.a.desmet@io.tudelft.nl