

Symbolic product meaning and commitments as predictors of product emotions.

Master thesis Psychology

Author: Linda Sieverink, BEng

Student number: S0211230

Faculty: Behavioural Sciences

Marketing Communication & Consumer Psychology

University of Twente

Supervisors

University of Twente: Dr. T. van Rompay

Dr. ir. P.W. de Vries

Supervisor Susa Group: Marco van Hout, MSc

Date of graduation: 28th of February, 2011

Acknowledgments

Seven years ago I started the study Human Technology at the Hanzehogeschool in Groningen, which focuses on achieving a more user-centred approach in designing products, built environments and IT solutions. When I received my Bachelor degree of Engineering in 2008, I felt the need to broaden my knowledge, which motivated me to begin a Master study in Psychology. After finishing my pre-master year I began to search for a graduation project that corresponded with my previous education. I started a research about the use of metaphors in product design. In the second semester I was introduced to the subject of product emotions, through the course Design & Emotion and a presentation given by the Susa Group. Being motivated by the subject of product emotions, I decided to quit the research I was working on start all over again. Together with the Susa Group I decided to explore the possibilities of predicting product emotions. This article, which I proudly present to you, is the final result of this research.

I would like to express my gratitude to the people who helped me to achieve this final result. First of all I thank my supervisors Thomas, Marco and Peter for their guidance, enthusiasm and patience throughout the whole process. Their useful critical comments and feedback helped me to improve my work and achieve better results. My gratitude goes out to all the people that took the time to participate in the experiments throughout this research.

I would like to thank my friends and family for their support and encouragement. Especially my sister for repeatedly reading this article and providing useful critical comments. Finally I would like to thank my boyfriend Anne Gerben for his love and patience throughout all these years.

Zwolle, February 2011

Linda Sieverink

Abstract

The aim of this study was to explore the possibility of predicting product emotions based on knowledge of people's commitments and the symbolic meaning of products. Product emotions are formed by a process wherein people evaluate the product in the light of their concerns, to determine if the product is useful or harmful for their well-being. When a product is evaluated as useful for their well-being, pleasant emotions will arise and when the product is evaluated as harmful, unpleasant emotions will arise. This usefulness can be determined by analysing the symbolic meaning of a product design, which can be communicated by different product characteristics, for example the product form. Several theories imply that congruence between concerns and the symbolic meaning of a product will lead to a positive response. This article reports an empirical study that investigated the relationship between commitments, a type of concern, and the emotional product experience. The expectation was that a high degree of congruence between commitments and the symbolic meaning of a product design would lead to more pleasant emotions and a low degree of congruence would lead to more unpleasant emotions. An online experiment containing two non-verbal self-report measurement tools was performed to measure the commitments that people find important in life and their emotional response towards six floor lamp designs. The results show that the degree of congruence can be seen as an indicator for predicting product emotions, but the direction of predictions found was not consistent.

Introduction

Traditionally the focus of product design lies on functionality (Bloch, 1995). When a product operates as expected on a functional level, it will receive a positive evaluation. For example a refrigerator will receive a positive evaluation if it keeps food and drinks inside cold. In the current market though, the market is full with products that receive positive evaluations on the level of function, quality, features, price, performance, etc., which makes it difficult to differentiate a product on these levels (Bloch, 1995, McDonagh, Bruseberg & Haslam, 2002; Creusen & Schoormans, 2005). Product designers need to find other ways to differentiate their products, which leads to new approaches to design.

One approach is designing for experience, which focuses on how people experience products while interacting with them (Desmet & Hekkert, 2007). The goal is to design

product experiences that evoke pleasant emotions. To achieve this goal, product developers need to explore which emotions a product experience currently evokes and which emotions they want the experience to evoke. Product emotions are formed by an evaluation of the product in the light of the concerns people possess; the appraisal process (Frijda, 1986; Lazarus, 1991; Desmet, 2002). For example, if someone is confronted with a refrigerator, the person evaluates the refrigerator to determine if it contributes to their concerns. Concerns can be explained as desired end states (Desmet, 2004). A refrigerator that is focused mainly on functionality and not on expressing luxury can evoke different emotional experiences. A person that holds a concern of expressing a luxurious lifestyle to the outside world will experience unpleasant emotions, but a person who holds a concern of possessing functional products will experience pleasant emotions. To design products that lead to positive product experiences, product developers need to explore the concerns of the target group and develop products that are positively evaluated by the target group in the light of their concerns.

Research following the design for experience approach focuses mainly on measuring the emotions that are experienced during interaction with a product (Reijnveld, de Looze, Krause & Desmet, 2003; Desmet & Dijkhuis, 2003). This knowledge is used to improve designs. Measuring the emotional experiences that are evoked by competitive products, helps the designers to determine directions for new products designs. The difficulty in this kind of research lies in exposing the total appraisal process that evokes product emotions. As noted, the appraisal process includes the concerns people possess, the product itself and the appraisal; the evaluation of the product in the light of the concerns. Exposing this process could make it possible to understand why a product or certain product aspects evoke a particular emotion. Literature shows how the appraisal process works, but unanswered is the question if it is possible to predict product emotions by exposing the appraisal process.

The primary purpose of the current study is to explore the possibility of predicting product emotions with knowledge of two constructs of the appraisal process; the concerns people possess, in particular the concern type commitments and the product, focussing mainly on formal characteristics. First the appraisal theory literature is explored, which is the base for explaining product emotions. This is followed by an explanation of the product appraisal process. Then the appraisal process constructs concern and product are further discussed, followed by a description of the role of congruence between these constructs in the process of predicting product emotions. The literature review will end with an introduction of the current study. The method section explains the current study in detail, followed by the results and the discussion.

Appraisal theory and product experience

The appraisal theory explains why similar events can evoke very different emotional experiences by different people (Scherer, Schorr, & Johnstone, 1999). Arnold (1960) was the first to use the term appraisal to explain the different emotions that are elicited in situations. Suggested was that people are constantly evaluating their environment for relevant changes related to their well-being. These appraisals lead to action tendencies and those are experienced as emotions. Lazarus (1991) describes two levels in the appraisal process. A primary appraisal, in which the situation is evaluated on relevance for someone's well-being and a secondary appraisal, in which the coping options are evaluated that are needed to handle the situation. Scherer's et al. (1999) description of emotions corresponds with the primary appraisal, describing emotions as the result of quick evaluations of the situation looking at the usefulness for accomplishing needs or goals. When a situation is evaluated as useful for accomplishing needs or goals, somebody will experience pleasant emotions and when the evaluation results in harmfulness, unpleasant emotions will be experienced. This evaluation is a cognitive process, although it is automatic and unconscious. Scherer et al. (1999) also addresses the secondary appraisal, by suggesting that situations are also evaluated on the ability to cope with consequences of events.

Linking the appraisal theory to product design, Desmet (2002) developed a model that is specified on product emotions. This General Model of Product Appraisal, shown in Figure 1, explains product emotions using the appraisal theory. Desmet (2002) argues that every person experiences different emotions while being confronted with different products, but the underlying way people process these emotions is universal. This model explains the

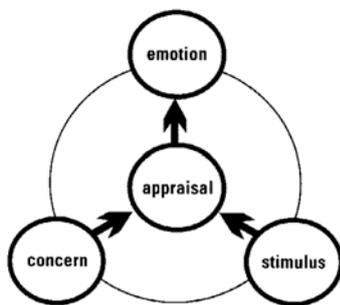


Figure 1. General Model of Product Appraisal (Desmet, 2002).

experienced emotions using three constructs; concern, stimulus and the appraisal. Concerns, include goals, values, standards, needs, commitments, etc., that point out what people find important in life. In the example mentioned earlier a concern was formulated of expressing a luxurious lifestyle to the outside world. The stimulus in this model is the product that is

experienced, including the product appearance which can provide information about functionality, features, quality, but also can express a certain symbolic meaning. A refrigerator can be designed to look powerful by using impressive shapes, but also can be designed to express luxury by means of expensive looking materials. The appraisal in the centre of the model is an automatic evaluation to determine the significance of a product for the concerns. People use the product design to determine if the product contributes to accomplishing their concerns. For example, the refrigerator is evaluated on being significant for the concern of expressing a luxurious lifestyle. When the symbolic meaning of the refrigerator does not contribute to the concern of expressing a luxurious lifestyle, unpleasant emotions will be experienced and vice versa. Desmet (2002) describes a set of fourteen emotions that are experienced towards products. More validation led to a set of twelve product emotions, containing six unpleasant emotions (*disgust, dissatisfaction, shame, fear, sadness and boredom*) and six pleasant emotions (*desire, satisfaction, pride, hope, joy, and fascination*). People can have mixed emotions towards one product, due to the fact that people hold mixed concerns. For instance a person can experience positive emotions due to the significance of a product for their concerns on functionality, but also can experience negative emotions because the product does not contribute to environmental concerns.

The appraisal models imply that it should be possible to predict which product will evoke pleasant or unpleasant emotions. When it is clear which concerns a person holds and which symbolic meaning a product is expressing, it should be possible to predict the result of the appraisal. This implication leads to the question if a general set of concerns can be used to predict which emotions somebody will experience while interacting with a certain product. To explore this possibility first the construct concern is further discussed, followed by the second construct, the product.

Concerns

To determine the significance of a product for someone's well-being, people explore what is important to them and thereby useful for their well-being, their concerns. Desmet, Hekkert and Hillen (2004) comment that it is difficult to measure concerns due to the wide variety of types. Different definitions and types of concerns are described in the appraisal theory literature. Frijda (1986) defines a concern as; "*a disposition to desire occurrence or non-occurrence of a given kind of situation*" (p.335). In other words; more or less stable preferences for certain states of the world. These dispositions can be seen as internal representations that serve as standards, against which situations can be tested. Concerns give

events their emotional meaning (Frijda, 2007). Frijda (2007) notes that there is no consensus on which concerns are the basic ones. Two examples are given by Frijda (2007) that illustrate possible sets of basic concerns. The first set is from Murray (1938), who composed a set of biological needs concerning physical satisfactions (*air, water, food, sex, etc.*) and the psychogenic needs concern mental or emotional satisfaction (*order, achievement, recognition, dominance, aggression, etc.*). These needs lead a person to approach or separate him or herself from an object (Murray, 1938). The second set is that from Schwartz (1992) distinguishing 11 motivational types; *self-direction, stimulation, hedonism, achievement, power, security, conformity, tradition, spirituality, benevolence, universalism*. Each motivation type stands for a set of values. For example the motivational type security is linked to values such as sense of belonging and national security and the achievement type is linked to being ambitious and successful. This set was based on results from research about differences in value priority between different cultures (Frijda, 2007). The needs and values described above can be seen as different types of concerns. A distinction is made by Frijda (2007) between source and surface concerns. Source concerns are defined in terms of general kinds of goals and satisfactions, such as the need to achieve and dominate described by Murray (1938). Surface concerns are defined in terms of goals and satisfactions towards a particular person or object. These more concrete concerns can be seen as instrumental in satisfying source concerns.

Scherer (1999) describes concerns as criteria, addressing that the classical approach to appraisal suggests that individuals use these criteria to evaluate the significance of events that happen to them. These criteria can be organized into four major categories; (a) the intrinsic characteristics of object or events; for example the predictability of events, (b) people's needs and goals; for example the need to achieve, (c) the ability to cope with consequences of events; for example the amount of control and power and (d) compatibility of events or objects with the standards, norms or values people possess; for example the standard that one should not hurt another person.

Lazarus (1991) introduces the concern type commitments, which can be organized in the category of people's needs and goals. Lazarus (1984) defines a commitment as a factor within the person that influences appraisal; "*Commitments expresses what is important to the person, what has meaning to him or her*" (p.56). Novacek & Lazarus (1990) comment that commitments can be general or concrete. This is similar to the distinction made by Frijda (1986) between source and surface concerns. A general commitment could be the commitment to achieve good results in life and a concrete commitment could be to achieve good results at school. Lazarus (1991) argues that people evaluate a situation on goal

relevance, on goal congruence and on ego involvement and that the results of these evaluations lead to an emotional response. The first two include evaluating the situation on being significant for a goal someone possesses and if the situation is useful or harmful for achieving that goal. The latter, ego involvement, is the degree to which people are committed to goals; people's commitments. For example someone is committed to achieving good results at school. That person finds him or herself in the situation where he or she is asked to go out for a drink the evening before an important test. The evaluations show that the situation is relevant to the person's goal and that it has a negative influence on achieving this goal. Going out will prevent him or her from learning for the test. Because the person is highly committed to this goal the person will experience negative emotional feelings towards the situation. Novacek and Lazarus (1990) suggest that it is not possible to understand differences in the emotional experiences of people without understanding the differences in what people find important, where they are committed to. This corresponds with the expectation that differences in emotional experiences can be explained with knowledge of the underlying concerns, for example commitments. Novacek and Lazarus (1990) developed a commitments taxonomy that can be seen as an underlying structure that organizes commitments. The taxonomy consists of six commitment components; *Affiliation, Power-Achievement, Personal Growth, Altruism, Stress Avoidance and Sensation-Seeking*. More concrete commitments can be organized in this underlying structure. The commitment components from the taxonomy appeared at least three times or more in other literature about values, goals, and personal projects. Also similarities can be found with personality literature, showing overlap with the general personality types.

Desmet et al. (2004) points out that the different types of concerns that are addressed in literature have something in common; they are all about reaching a desired end state. Commitments though not only imply the end point, but also the motivational process. They not only imply the goals and needs that people find good or bad, but they refer to the goals and needs that people are committed to (Novacek & Lazarus, 1990). Because the taxonomy of commitments can be seen as an underlying structure, the commitment concern type is ideal for testing the possibility of predicting product emotions. Additionally the resemblance of the structure with literature about values, goals, and personal projects makes the structure more robust. The components in the taxonomy are further described in the following section, together with their resemblance to other literature.

Commitments

As noted, the commitment taxonomy (Novacek & Lazarus, 1990) contains six commitment components; Affiliation, Power-Achievement, Personal Growth, Altruism, Stress Avoidance and Sensation-Seeking. The first component is the Affiliation component, which refers to interpersonal relationships, intimacy, love and family. This includes more concrete commitments such as wanting to have close relationships, receiving love and giving love and affection to others (Novacek & Lazarus, 1990). Loving is seen by Freedman et al. (1951) as a required mechanism to systemize interpersonal behaviour. The importance of love for the well-being is also addressed by Freud (1955) and by Hill (1987), who suggests that affiliation, the need for social contact, is a central influence on human behaviour. Four dimensions are mentioned by Hill (1987) that can underlie the motivation for affiliation; social comparison, emotional support, positive stimulation, and attention. Maslow's (1970) need of belongingness and love also shows similarities with the affiliation component.

The Power-Achievement component is the second component, which refers to leadership, aspiration, wanting recognition, popularity, dominance and influence. More concrete commitments linked to this component are wanting to obtain awards and recognition, or wanting to have a career (Novacek & Lazarus, 1990). This component is also addressed by Freedman et al. (1951), as a required mechanism to systemize interpersonal behaviour. It corresponds with Maslow's (1970) esteem need and with needs described by Murray (1938). The importance of the power-achievement component is also recognized by Hogan (2001), who describes status and approval as primary motives in human life. The loss of status and approval are both very stressful for human beings.

The third component in the taxonomy is the Personal Growth component. It is described by Novacek and Lazarus (1990) as striving for self-understanding, for a personal philosophy and for morality. More concrete commitments that are associated with this component, include wanting to be open-minded and trying to be responsible (Novacek & Lazarus, 1990). This component shows overlap with Maslow's (1970) need for self-actualization, i.e. the striving to become your potential self. There is also an overlap with Maslow's safety need, addressing the need for a clear philosophy of the world to reduce uncertainty. This also corresponds with White's (1959) concept of competence motivation to satisfy the need to deal with the environment.

Altruism, the fourth component concerns the need to help and support others and the need to be involved in organizations. Concrete commitments include wanting to be supportive and wanting to make sacrifices for others (Novacek & Lazarus, 1990). Rushton (1982) definition

of altruism; “*social behaviour carried out to achieve positive outcomes for another rather than for the self*” (p.427). Altruism can be seen as a personality factor, meaning that some people show consistently more altruistic behaviour than others. Rushton (1982) describes altruism as a universal value in human societies, forming the tenet in many movements, for example religious movements. In social psychology altruism is linked to empathy. Batson and Shaw (1991) suggest that pure altruistic behaviour can only occur when it is preceded by empathic concern for another, which includes feelings of compassion and sympathy. These feelings are produced by the perception of someone in need or by adoption of another person’s perspective (Batson & Shaw, 1991).

The Stress Avoidance component is the fifth component in the taxonomy. It refers to the motivation to avoid conflict, criticism and rejection, etc., hoping this will lead to a stable and easy life. Wanting to avoid feeling guilty and trying to avoid failure are concrete commitments that are associated to this component. The Stress Avoidance component is the only one that contains avoidance commitments. The other components contain approach commitments (Novacek & Lazarus, 1990). This avoidance is also included in needs described by Murray (1938). The need for harm avoidance and blame avoidance correspond with the stress avoidance needs to avoid conflict, stress, blame and criticism. Literature concerning self-regulation also addresses the need for security by means of a prevention focus (Crowe, Ellen & Higgins, 1997). A person with a prevention focus has the need for protection and safety and wants to protect him or herself against the occurrence of unpleasant situations. This focus arises in childhood, when receiving messages in the interaction with the parent. The parent refers in his or her communication to a goal that concerns safety and negative outcomes. Because these interactions take place over a long period of time, it determines the child’s position in life. The opposite focus is the promotion focus, aiming for promotion and self-realization and increasing the change of positive outcomes (Crowe, Ellen & Higgins, 1997).

The last component of the taxonomy is the Sensation-Seeking component, which refers to pursuing fun, sex, excitement and novelty. It includes concrete commitments such as wanting to have fun and aspiring to have new and different experiences (Novacek & Lazarus, 1990). People can differ in the degree of stimulus hunger (Eysenck, 1967). This need for change, variety and intensity of stimulation manifests itself in behaviour (Zuckerman, 1971). Different correlations between Sensation-Seeking and behaviour, personality, other needs, etc are found (Zuckerman, 1971). Support for this component can also be found in one of the Big Five traits; Openness to experience (McAdams, 2008). A person high in openness to experience,

are described by themselves and others as original, imaginative, curious, having broad interests, etc., traits also found in sensation seeking commitments.

Now that it is explored which set of commitment components can possibly help predict product emotions, the question remains how people use the symbolic meaning of a product to determine the significance of a product for their commitments. First the concept of symbolic product meaning is explained in the next section, which discusses the second construct in the appraisal process, the product.

Product (stimulus)

Lazarus (1991) described that people evaluate a situation on goal relevance, goal congruence and on ego involvement. When evaluating a product, the situation is an object. This means that people evaluate the product, the object, on being significant for achieving goals they find important. This corresponds with the General Model of Product Appraisal from Desmet (2002). Norman (2004) defines this as the reflective level of design, which means that the product is evaluated in terms of goals and values. When only being confronted with the appearance of a product this evaluation must be performed only with use of the design, including colour, form, material, etc. In this evaluation, an important information source is the symbolic meaning of a product.

Symbolic product meaning

People do not only perceive the visual elements of products in terms of their formal or technical properties, but also see them in terms of the symbolic or affective meaning they embody (Van Rompay, Pruyn & Tieke, 2009). The product design can be used as a means of communication (Crilly, 2008; Karjalainen, 2007). For example, a product design can be used to communicate the identity of a certain brand. Karjalainen (2007) shows that through means of semantic transformation, designers can transform core brand values into value-based design features, to give a product an intended meaning. Explicit or implicit design cues are applied in the product design to communicate the identity of the brand in question. Explicit cues are references that are recognized quickly as being part of a brand and implicit cues are less obvious and better for communicating core values. An example mentioned by Karjalainen (2007) concerns the brand BMW, who uses strong shapes and dynamic forms in their car designs to communicate values of power and performance. Karjalainen (2007) also shows that it is possible to transform brand core values from one product to a totally different product category. For example handheld mixers where designed that communicated core brand values

belonging to Cadillac and Alfa Romeo. Design cues in material were applied to communicate the exclusiveness of the brand Cadillac. The core value dynamic of Alfa Romeo was expressed by flowing shapes and use of the colour red (Karjalainen, 2007).

Aside from communicating brand identity, a product can also communicate characteristics of the product itself. Janlert and Stolterman (1997) argue that people have the tendency to think and talk about objects as having a character. People do not only use personality characteristics to describe and discriminate between people, but also use these characteristics for describing and discriminating products. Govers (2004) introduces the concept of product personality, which is referred to as *“the set of personality characteristics that people use to describe a specific product variant and to discriminate it from others”* (p.15). Govers (2004) shows that products that differentiate in product appearance (colour, form, proportion, material, etc.) differentiate in containing personality characteristics, which corresponds with the theory of Janlert and Stolterman (1997). Designers use associations of personality characteristics and assimilate this in the design. For example, when being asked to design a happy and a tough iron, the majority of design students associated happy with smiling faces and associated though with tools and machines (Govers, 2004). Janlert and Stolterman (1997) address that within the field of product semantics, different approaches build on the assumption that certain shapes, patterns and symbols create certain emotions and associations in the beholder. This product experience is influenced by conventions that people hold, which are learned by interacting with others and the environment within a specific culture (Van Rompay, 2008). Certain signs can create different associations in different cultures.

Several authors inform designers about how meanings are embodied in product design (Krippendorff, 1989; Karjalainen, 2007). Karjalainen (2007) addresses that semantic differential scales can be used to collect impressions that are formed based on implicit design cues. Participants would be asked to indicate to what degree they think that certain characteristics are applicable to different product designs. This data can be rather reliable, when it is collected from a large quantity of people.

Product form by itself can also contain a certain symbolic or affective meaning. For example, Zhang, Feick, and Price (2006) showed that logos with round forms were perceived as more harmonious and logos with angular forms as more aggressive. This is based on the knowledge that round shapes induce associations such as friendliness and harmony and angular shapes induce associations such as energy and strength (Berlyne, 1976). Van Rompay, Hekkert, Saakes and Russo (2005) argue that product expressions are involved with image schemas. These are grounded patterns of recurring interactions with the environment.

An example is the containment schema, which refers to the way containers protect people from their environment. Products that are designs with high degrees of closure will evoke feelings of security and constriction. Another example is the verticality schema; the more a designed object emphasizes a rising upwards, the more the object is perceived as dominant and impressive. Van Rompay et al. (2005) showed that both participants with a design background and naive participants relate characteristics to form changes made in designs of jugs and alarm clocks as was predicted.

The theories discussed in this section explain how people can extract information from the product appearance and how designers can give products their intended meaning. But when is a product design perceived as significantly harmful or useful for people's commitments? Several theories imply that congruence between commitments and the symbolic meaning of products will lead to a positive experience. These theories are discussed in the next section.

Congruence between commitments and products

When people are confronted with a product, an evaluation takes place to determine the significance of the product for their commitments. Several theories imply that congruence between the symbolic meaning of a product and the commitments people possess leads to a positive product experience. In the example of the refrigerator, a positive product experience is expected when a person who is committed to affiliation or altruism is confronted with a refrigerator that includes round forms, which are associated with harmony and friendliness, fitting the Affiliation and Altruism component. These theories are based on the concept of self-congruity, which suggests that consumers prefer products or brands that express an image that match with their own self-concept (Belk, 1988; Sirgy, 1982). People regard possessions as being a part of themselves. Possessions, such as products, can be seen as an extended self (Belk, 1988). Belk (1998) argues that people learn, define and remind themselves of who they are by their possessions. People use products to express their identity to the outside world (Crilly, 2008). McDonagh et al. (2002) comment that even practical products have this symbolic significance. For example, a refrigerator can be used by its owner to express their identity. A person who sees him or herself as powerful and dominant will choose a design that expresses those characteristics. The product choice will be influenced by the match between the image expressed by the product and the self-image of the consumer. Belk (1988) argues that this does not only count on an individual level, but also on a collective level such as a family, community or group. People want to belong to a social group and they want to distinguish themselves in a way that is consistent with their self-concept (Govers, 2004).

Evidence for these theories can be found in research concerning brand and product preferences. Jamal and Goode (2001) for example conducted a study to determine the effect of self and brand image congruence on brand preference and satisfaction in the jewellery market. Jewellery is a product that is likely to be used to enhance self-image. Results show that consumers prefer brands that are congruent with their own self-image and also experience more satisfaction towards those brands. Also evidence was found concerning product personality, which differs from brand personality, because it refers to a specific product and not to a total brand. Personality characteristics expressed by the product design helps people to express their self-concept (Govers, 2004). Mugge and Govers (2004) provided evidence for a relationship between product personality congruence and product attachment. Participants were asked to rate the degree of product attachment in scenarios that contained congruent or incongruent product personality pairs; an extrovert person and an extrovert toaster or an extrovert person and a conscientious toaster and vice versa. Results showed that high product-personality congruence results in a higher degree of product attachment.

Research of Zhang et al. (2006) showed how self-congruity can lead to preferences in shapes. They examined if self-construal - *The extent to which an individual perceives himself or herself as being connected to or distinct from others* (Zhang et al. 2006, p.794) influences the preferences of angular and rounded shapes. It was found that people with dependent self-construal (emphasizing confrontation) prefer angular shapes, which are known to induce associations such as energy and strength. And people with independent self-construal (emphasizing compromise) prefer rounded shapes, which are known to induce associations such as friendliness and harmony. The symbolic meaning of the shapes matches the type of self-construal, which makes it significantly useful for achieving their goal, expressing the correct identity.

The theories discussed above imply that the symbolic meaning of a product design is evaluated as useful when it helps the person communicate the correct identity. A design should express what the person finds important, for example their commitments, to express the correct identity. This means that the symbolic meaning of product designs should match with the commitments people possess to evoke a positive product experience.

Current study

The current study analyses the possibility of predicting product emotions based on knowledge of people's commitments and the symbolic meaning of products. Based on the literature, expected is that people only experience emotions when an object is significant for their well-

being (Novacek & Lazarus, 1990). I.e., only when the product form induces a symbolic meaning that is significant for their commitments. Expected is that the presence of congruence between commitments and the symbolic meaning of the product will evoke a more positive product experience. A high degree of congruence between people's commitments and the symbolic meaning of a product is expected to increase the experience of pleasant emotions and decrease the experience of unpleasant emotions. A low degree of congruence is expected to increase the experience of unpleasant emotions and decrease the experience of pleasant emotions.

Method

Participants

In this study 82 Dutch students participated in the age of 18 to 33 (29 male 53 female). Participants were approached by email or by flyer that contained a short introduction and a link to the experimental program.

Design

The main study was a within participant design, measuring the six commitment components and twelve product emotions towards six lamp designs. The measurement of twelve product emotions contained measurements of six pleasant emotions and six unpleasant emotions. The selection of the lamp designs and their symbolic meaning were determined in two pre-tests.

Pre-tests

Floor lamps were chosen as stimuli for this study. This choice was made based on three reasons; there are no differences in design for men or women, a lamp could be used by the owner to communicate their identity to the outside world and lamps have a wide variety in product form. Two pre-tests were performed to select different floor lamp designs for this study. The first pre-test aimed to select a set of lamp designs that differentiate widely in product form. To differentiate the stimuli in form this study applied the Muller's typological classification system (Muller, 1996). In this typology images are organized into categories and dimensions on different levels; function, use, form. By selecting lamp designs that fit this typology and differentiate in form, only the form aspect is differentiated. Six participants with a design background were presented a pool of floor lamp images (30) that differentiate in form. All lamps were fully developed products, pictured on a plain white background, pictured in black and white. They were asked to select the six lamps that fit the typology and which differentiate most in form. In total fifteen different lamps were selected, which were used in the second pre-test.

The second pre-test aimed to determine the symbolic meaning of the floor lamp designs and select a set of designs that differentiate in meaning. The fifteen lamp designs from the first pre-test were rated on expressing certain symbolic meanings. Three tests were performed, in which 15 participants rated five lamp designs. To find lamp designs that express symbolic meanings that match the commitments measured in this study, meanings were selected that fit the six commitment components. For example social, committed, friendly and

Table 1
Mean symbolic meaning scores and the Cronbach's alpha scores

	<i>Affiliation</i>	<i>Power Achievement</i>	<i>Personal Growth</i>	<i>Altruism</i>	<i>Stress Avoidance</i>	<i>Sensation Seeking</i>
	<i>Cosy Harmonious Warm Sensitive</i>	<i>Dominant Forceful Powerful</i>	<i>Philosophical Self-conscious Open</i>	<i>Social Involved Friendly Modest</i>	<i>Safe Consistent Predictable</i>	<i>Exiting Surprising Thrilling Innovative</i>
Lamp 1	2,93 (0,705)	3,56 (0,480)	2,87 (0,638)	2,75 (0,711)	3,64 (0,384)	2,23 (0,859)
Lamp 2	3,35 (0,770)	3,00 (0,746)	3,29 (0,644)	3,22 (0,438)	3,47 (0,633)	2,64 (0,871)
Lamp 3	3,68 (0,826)	2,22 (0,773)	2,84 (0,114)	3,52 (0,790)	3,36 (0,703)	2,36 (0,764)
Lamp 4	2,47 (0,835)	3,69 (0,786)	3,22 (0,488)	2,22 (0,823)	2,16 (0,569)	3,93 (0,683)
Lamp 5	2,67 (0,764)	3,93 (0,865)	3,38 (- 0,841)	2,38 (0,636)	3,18 (0,555)	3,68 (0,880)
Lamp 6	3,60 (0,725)	2,20 (0,633)	2,87 (0,682)	3,30 (0,724)	3,16 (0,642)	2,32 (0,781)

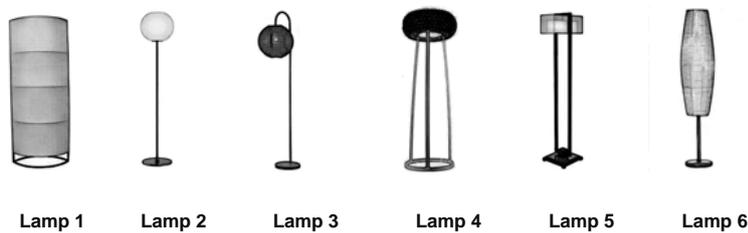


Figure 2. Stimuli used in the experiment.

modest were the symbolic meanings that fitted the Altruism component. In Table 1 all the measured symbolic meanings are shown that match the commitments components. To emphasise the form factor the stimuli were undone from unnecessary aspects that will influence the emotional experience (colour, material, and texture). Six lamp designs were selected, that showed a variety in symbolic meaning. These are presented in Figure 2. The symbolic meaning scores for each commitment component were combined to mean scores for each lamp design. Table 1 contains the mean scores that show which lamp is expressing which commitment. Reliability analyses were performed to measure the homogeneity of the obtained mean scores. Not all mean scores show an acceptable Cronbach's alpha score (> 0,6). Decided was to include all the scores in the main study to explore all commitment types.

Measurements

To measure the emotions that are evoked by the six lamp designs this study used a tool developed by Desmet, the PRoduct EMOTION Measurement Instrument (PrEmo). Desmet (2002) based this development on the notion that facial expressions are universally recognized and are easily interpreted. This led to an intuitive tool to measure the emotions a product evokes. PrEmo consists of twelve emotions, including six pleasant emotions; *desire*,

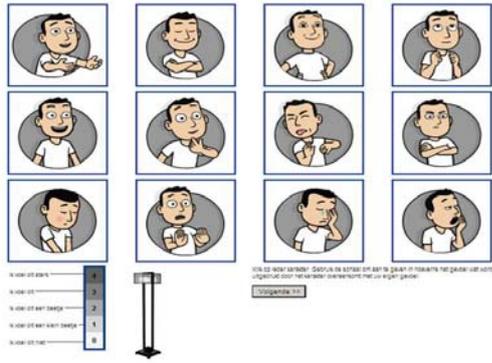


Figure 3. PrEmo.

Table 2
Cronbach's alpha scores

	Pleasant emotions	Unpleasant emotions
Lamp 1	0,896	0,795
Lamp 2	0,897	0,801
Lamp 3	0,902	0,858
Lamp 4	0,911	0,717
Lamp 5	0,893	0,815
Lamp 6	0,850	0,864

satisfaction, pride, hope, joy, and fascination, and six unpleasant emotions; disgust, dissatisfaction, shame, fear, sadness and boredom. The PrEmo tool is displayed in Figure 3. A character expresses the emotion through a facial expression, a short gesture and a vocal expression. The participant indicates to what extent a particular emotion is experienced by rating their feelings on a 5-point scale. All twelve emotions were measured for each product stimulus, which makes it possible to measure mixed emotions. The possibility of predicting product emotions was analysed for predicting pleasant and unpleasant emotions in total and for the emotions individually. Reliability analyses were performed that showed that a total emotion score could be obtained. The Cronbach's alpha scores are shown in Table 2.

The second measurement included measuring the six commitment component scores. These scores were obtained by measuring the related commitment items, described by Novacek and Lazarus (1990). The total list of 41 commitment items was shortened to 29 based on the results of the reliability analyses that were performed. The items used in the current study are shown in Table 3, together with the Cronbach's alpha scores. The Sensation Seeking items did not show an acceptable Cronbach's alpha score (> 0,6). Decided was to include one Sensation Seeking item, to make further analyses possible.

Table 3
Commitments items for each component and the Cronbach's alpha scores

<p>Affiliation ($\alpha = 0,690$)</p> <ul style="list-style-type: none"> Wanting to have close and satisfying relationships with others Wanting to give affection and love Wanting to receive affection and love Wanting to be involved and intimate with others 	<p>Power-Achievement ($\alpha = 0,724$)</p> <ul style="list-style-type: none"> Wanting to obtain awards and recognition Desiring to be popular and accepted Aspiring to be well-off financially Wanting to be dominant and forceful Wanting to be able to influence others Wanting to complete successfully Wanting to have a career Desiring to be a leader or organizer 	<p>Personal Growth ($\alpha = 0,671$)</p> <ul style="list-style-type: none"> Wanting to be open-minded Trying to be responsible Aspiring to be a fair and ethical person Wanting to develop a personal philosophy of live Needing to develop a strong sense of who I am Trying to be assertive Needing personal growth
<p>Altruism ($\alpha = 0,615$)</p> <ul style="list-style-type: none"> Wanting to help others in need Wanting to make sacrifices for others Trying to be supportive of close others 	<p>Stress Avoidance ($\alpha = 0,831$)</p> <ul style="list-style-type: none"> Wanting to avoid blame and criticism Trying to avoid conflict Aspiring to have a stable life Wanting to avoid feeling guilty Wanting to avoid rejection Trying to avoid failure 	<p>Sensation-Seeking</p> <ul style="list-style-type: none"> Wanting an exciting life

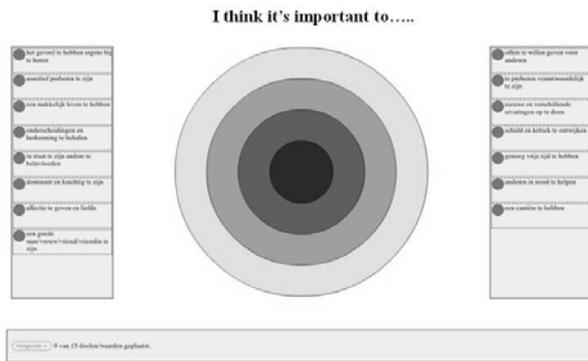


Figure 4. Commitment Profile tool.

A Commitment Profile tool was developed to measure the six commitment components from the commitment taxonomy. The tool uses an intuitive way to measure the items, by asking the participant to drag the item towards the centre of a circle when the commitment is strongly felt and more towards the outer circle when the commitment is weakly felt. The items were divided over three circles. The circles measure the strength of the commitment on a 5 points scale from 1 (placed outside the circle) “I am not strongly committed to this goal of value” to 5 “I am very strongly committed to this goal or value” (centre of the circle). An example of the Commitment Profile tool is presented in Figure 4. This tool gives the participant a clear picture of his or her profile and the proportions between different commitment items. This intuitive way of measuring commitments corresponds with the way emotions are measured by PrEmo.

Procedure

The computer program used in the current study contained two parts; PrEmo and the Commitment Profile tool. At the beginning of the computer program a short introduction and welcome was given, explaining the purpose of the study. Following the general introduction, PrEmo was introduced, explaining the purpose, the characters and the scale. Participants were then asked to report their emotions towards the six different lamp designs. After finishing PrEmo the Commitment profile tool was introduced, explaining the purpose and the operation. Additionally an example was shown for further explanation. Finally the participants were presented with the profile tool. Here the participants were asked to order their commitments on importance. The computer program ended with two short questions concerning sex and age, followed by a thank you screen.

Data Analysis

First the data was checked for outliers; scores more than three standard deviations from the mean were excluded from the analyses. Three cases, which data showed multiple outliers were excluded. The following step was to explore the product emotion and commitment scores separately. Differences in the emotional experience toward the lamp designs were analysed by performing Paired-sampled t tests. Mean commitment scores were obtained from the related commitments items. The following step contained standardizing the mean commitment and the symbolic meaning scores to make comparison possible. It is necessary to standardize these scores, because the symbolic meaning scores were obtained in a pre-test with a different participant group. The degree of congruence between the symbolic meaning of a lamp and the matching commitment score was measured by obtaining a difference score, subtracting the symbolic meaning score from the corresponding commitment score. To analyse the possibility of predicting pleasant and unpleasant emotions and the emotions separately, the difference scores (congruence scores) were included in multiple regression models.

The following chapter will present the results in three parts, starting with exploring the measured emotions scores, followed by the commitment scores and finally the results from the multiple regression analyses for testing the hypotheses.

Results

Product emotions

Appendix A displays the emotional response towards the six lamp designs. The bars in Figure 5 graphically show the mean scores of the measured product emotions towards each lamp. The first six are unpleasant emotions and the remaining six are pleasant emotions. To determine the differences between the emotional experiences towards the six lamp designs, Paired Samples T tests were performed. An alpha of .05 was used as the significance level. The results are shown in Table 13. Results show that lamp 4 evokes significantly more unpleasant emotions and lamp 5 significantly more pleasant emotions. It should be noted that although significant differences are found between the emotional experiences, the difference are small. Also should be noted that the mean scores show that the lamp designs do not evoke a strong emotional response.

Commitments

For each commitment component a mean score was obtained from the related commitment items (Table 3). Table 4 summarizes the statistics for the mean scores for each commitment component. Paired samples t-tests were performed to test the differences between the commitment components. The difference between the Personal Growth and the Altruism component was the only one that was not significant.

Table 4
Statistics commitment components scores

	<i>Affiliation</i>	<i>Power- Achievement</i>	<i>Personal Growth</i>	<i>Altruism</i>	<i>Stress- Avoidance</i>	<i>Sensation- Seeking</i>
Mean	4,462	3,391	3,987	4,008	3,217	4,023
SD	0,502	0,535	0,501	0,567	0,766	0,460
Minimum	3,250	2,250	3,000	2,667	1,167	2,800
Maximum	5,000	4,875	5,000	5,000	5,000	5,000

Congruence as predictor of product emotions

Multiple regression analyses were performed to test if the degree of congruence can be seen as an indicator for predicting product emotions. This means that the possibility was tested to predict the emotion score, based on the difference scores. The difference score indicates the degree of congruence; a high difference score indicates a low degree of congruence and a low difference score indicates a high degree of congruence. The difference score was obtained by subtracting the symbolic meaning score from the corresponding mean commitment score. These difference scores were recoded in absolute scores, because the direction of the

difference was not relevant in this study. Expected was that when a difference scores increase, the experience of pleasant emotions would decrease and the experience of unpleasant emotions would increase.

A standard multiple regression method was used in this study. A hierarchical multiple regression analysis was not appropriate, because no literature exists that suggests a particular order for the commitments to predict product emotions. Certain assumptions had to be met before performing the standard multiple regression analyses. These include controlling for normality and linearity, by checking the normality plots and scatter plots. Analysing the data revealed that the assumptions were met by the data. The data was also checked for the existence of multicollinearity, by checking the Pearson correlation between the independent variables and the tolerance of the variables. The correlation should not be higher than 0,9 and the tolerance no lower than 0,1. The assumption that there is no multicollinearity was met by the data. After the assumptions were checked, the multiple regression analyses could be performed. For each total score of pleasant and unpleasant emotions towards the six lamp designs a multiple regression analysis was performed. An alpha of ,05 was used as significance level.

Expected was that high difference scores (low congruence) would lead to an increase of the experience of pleasant emotions and a decrease in the experience of unpleasant emotions and vice versa. This means that negative β -scores were expected in the models of pleasant emotions and positive β -scores were expected in the regression models of unpleasant emotions. The results show that the Power Achievement difference score was the most important indicator for predicting product emotions. This difference score was a significant indicator in several models tested, which are shown in Table 5. These results provide some evidence for the hypotheses that the level of congruence can be seen as an indicator for

Table 5
Models resulting from multiple regression analyses for predicting pleasant and unpleasant emotions in which the Power Achievement difference score is a significant indicator

Variables	Unpleasant Emotions Lamp 2		Unpleasant Emotions Lamp 3		Unpleasant Emotions Lamp 6	
	β	<i>P</i>	β	<i>P</i>	<i>B</i>	<i>P</i>
Difference Affiliation	,079	0,489	-,041	0,724	-,027	0,814
Difference Power Achievement	,323*	0,005	,299*	0,012	,255*	0,028
Difference Personal Growth	,035	0,765	-,104	0,360	-,136	0,224
Difference Altruism	-,036	0,764	,165	0,156	,197	0,085
Difference Stress Avoidance	,005	0,964	,073	0,515	-,110	0,324
Difference Sensation Seeking	,068	0,553	-,022	0,843	,083	0,462
Adjusted R ²	,055		,049		,068	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

Table 6
 Model resulting from multiple regression analyses for predicting pleasant and unpleasant emotions in which the Affiliation and Stress Avoidance difference score are close to significant indicators

<i>Pleasant Emotions Lamp 6</i>		
Variables	β	<i>P</i>
Difference Affiliation	-,224	0,056
Difference Power Achievement	-,035	0,763
Difference Personal Growth	,116	0,303
Difference Altruism	-,109	0,343
Difference Stress Avoidance	,217	0,056
Difference Sensation Seeking	,018	0,873
Adjusted R ²	,046	

Note: High difference scores indicate a low degree of congruence

predicting product emotions, but only for the commitment Power Achievement. The three models in Table 5 all show data following the expectations. An increase in the experience of unpleasant emotions was indicated, when the degree of congruence decreased. The unpleasant emotions which are predicted by the models predict all are felt towards lamp designs that score low on expressing a symbolic meaning that matches with the Power Achievement commitment.

Additionally, the results of the multiple regression analyses show that the Affiliation and Stress Avoidance difference scores are close significant indicators in predicting pleasant emotions towards lamp 6. This model is displayed in Table 6. A low degree of congruence concerning the Affiliation component indicated a decrease in the experience of pleasant emotions, which confirms the hypotheses. The prediction made concerning the Stress Avoidance did not confirm the hypotheses. A low degree of congruence concerning the Stress Avoidance component indicated an increase in the experience of pleasant emotions.

To gather more evidence for confirmation of the hypotheses, multiple regression analyses were also performed for each emotion separately. For each emotion, towards each lamp, multiple regression models were tested, to determine if the difference scores (congruence scores) are indicators for predicting the experienced emotions. For this second analysis also certain assumptions had to be met before performing the standard multiple regression analyses. Controlling the data for normality and linearity revealed that the assumptions were not met by data concerning the emotions *shame*, *fear* and *sadness*. The results from the analyses for these emotions were excluded. The data was also checked for the existence of multicollinearity. The assumption that there is no multicollinearity was met by the data. After the assumptions were checked, the multiple regression analyses could be performed. On the following pages the models are displayed in which the difference scores were significant

indicators for predicting product emotions. The models are discussed for each commitment component separately. Again an alpha of ,05 was used as significance level for the multiple regression analyses.

Affiliation

Table 7 displays the model in which the Affiliation difference score was a significant indicator for predicting product emotions. The prediction found confirms the hypotheses, indicating that less desire will be experienced, when the degree of congruence decreases.

Power-Achievement

Ten models were found in which the Power Achievement difference score was a significant indicator for predicting product emotions. These models are displayed in Table 8. Similar to the analyses of the total emotion scores, almost all models concern predictions of unpleasant emotions. The predictions found concerning the unpleasant emotions *dissatisfaction*, *disgust* and *boredom* all confirm the hypotheses, indicating that the experience of unpleasant emotions increase when the degree of congruence decreases. These results are similar to the results of predicting the total unpleasant emotions. All the emotions that are predicted are felt towards lamp designs that score low on expressing Power Achievement. Two models were found in which the Power Achievement was a significant indicator for predicting the pleasant emotion *hope*. The prediction of *hope* towards lamp 3 confirms the hypotheses, indicating that the experience of *hope* decreases, when the degree of congruence decreases. The prediction of *hope* towards lamp 1 does not confirm the hypotheses, indicating that the experience of *hope* increases, when the degree of congruence decreases. It should be noted that the Power Achievement symbolic meaning score concerning lamp design 1 had a Cronbach's alpha score below 0,6, which may have influenced this outcome. The number of models found in

Table 7
Model in which the Affiliation difference score is a significant indicator for predicting product emotions

Variables	Desire towards Lamp 6	
	β	p
Difference Affiliation	-,256*	0,030
Difference Power Achievement	-,051	0,663
Difference Personal Growth	,166	0,144
Difference Altruism	,013	0,910
Difference Stress Avoidance	,094	0,403
Difference Sensation Seeking	,162	0,159
Adjusted R ²	,041	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

Table 8
Models resulting from multiple regression analyses for predicting individual emotions in which the Power Achievement difference score is a significant indicator

Variables	Hope Lamp 1		Disgust Lamp 2		Dissatisfaction Lamp 2		Hope Lamp 3		Disgust Lamp 3	
	β	p	β	p	B	p	β	p	β	p
Difference Affiliation	,038	0,735	,175	0,130	,046	0,684	-,106	0,356	-,100	0,374
Difference Power Achievement	,235*	0,041	,253*	0,028	,315*	0,006	-,277*	0,019	,339*	0,004
Difference Personal Growth	-,140	0,236	-,047	0,694	-,081	0,490	-,033	0,766	-,223	0,044
Difference Altruism	,185	0,124	-,084	0,484	-,039	0,741	-,122	0,287	,180	0,109
Difference Stress Avoidance	,027	0,811	-,069	0,540	-,100	0,371	-,124	0,266	,028	0,796
Difference Sensation Seeking	-,149	0,184	,029	0,804	,085	0,455	,030	0,788	-,135	0,220
Adjusted R ²	,039		,040		,068		,066		,110	

Variables	Dissatisfaction Lamp 3		Boredom Lamp 3		Disgust Lamp 6		Dissatisfaction Lamp 6		Boredom Lamp 6	
	β	p	β	p	B	p	β	p	β	p
Difference Affiliation	-,101	0,386	-,010	0,929	-,057	0,617	-,099	0,348	,053	0,643
Difference Power Achievement	,312*	0,009	,417*	< 0,001	,268*	0,021	,293**	0,006	,279*	0,016
Difference Personal Growth	-,149	0,189	-,083	0,436	-,176	0,117	-,285	0,007	-,186	0,095
Difference Altruism	,072	0,535	,150	0,172	,099	0,383	,264	0,013	,172	0,127
Difference Stress Avoidance	-,059	0,597	-,014	0,893	-,091	0,411	-,131	0,200	-,094	0,392
Difference Sensation Seeking	,015	0,897	,028	0,795	,136	0,228	,182	0,081	,056	0,617
Adjusted R ²	,049		,146		,067		,216		,087	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

which the Power Achievement difference score was a significant indicator, suggests that this difference score can be seen as an important factor in predicting product emotions.

Personal Growth

The Personal Growth difference score was shown to be an indicator in predicting both pleasant and unpleasant emotions. The models in which the Personal Growth difference score was a significant or close to significant indicator are displayed in Table 9. All difference scores predicted the emotions in the opposite direction than expected. In two models, the Personal Growth difference score was an indicator for predicting *joy*, indicating that the experience of *joy* increases when the degree of congruence decreases. In two other models, the Personal Growth difference score was an indicator for predicting the unpleasant emotions *disgust* and *dissatisfaction*. These predictions indicated that the experience of *disgust* and *dissatisfaction* decreases when the degree of congruence decreases. It should be noted that the Personal Growth symbolic meaning scores concerning lamp 3 had a Cronbach's alpha score below 0,6, which may have influenced the outcome.

Table 9
Models resulting from multiple regression analyses for predicting individual emotions in which the Personal Growth difference score is a significant indicator

Variables	Joy Lamp 3		Disgust Lamp 3		Joy Lamp 6		Dissatisfaction Lamp 6	
	β	p	B	p	β	p	β	p
Difference Affiliation	,048	0,678	-,100	0,374	-,109	0,328	-,099	0,348
Difference Power Achievement	,013	0,913	,339*	0,004	-,122	0,276	,293*	0,006
Difference Personal Growth	,206	0,073	-,223*	0,044	,246*	0,026	-,285*	0,007
Difference Altruism	-,169	0,147	,180	0,109	-,203	0,068	,264*	0,013
Difference Stress Avoidance	,203	0,074	,028	0,796	,216*	0,048	-,131	0,200
Difference Sensation Seeking	-,005	0,966	-,135	0,220	-,091	0,408	,182	0,081
Adjusted R ²	,042		,110		,116		,216	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

Table 10
Models resulting from multiple regression analyses for predicting individual emotions in which the Altruism difference score is a significant indicator

Variables	Desire Lamp 5		Hope Lamp 5		Joy Lamp 6		Dissatisfaction Lamp 6	
	β	p	B	p	β	p	β	p
Difference Affiliation	-,175	0,150	-,181	0,135	-,109	0,328	-,099	0,348
Difference Power Achievement	-,101	0,383	,067	0,561	-,122	0,276	,293*	0,006
Difference Personal Growth	-,058	0,620	-,145	0,214	,246*	0,026	-,285*	0,007
Difference Altruism	,225	0,059	,317*	0,008	-,203	0,068	,264*	0,013
Difference Stress Avoidance	-,039	0,732	,014	0,905	,216*	0,048	-,131	0,200
Difference Sensation Seeking	,225	0,059	,097	0,408	-,091	0,408	,182	0,081
Adjusted R ²	,039		,056		,116		,216	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

Altruism

In Table 10 the models are displayed in which the Altruism difference score was a significant or close to significant indicator for predicting product emotions. Two models for predicting emotions towards lamp 6 in which the predictions follow the hypotheses. It was indicated that a decrease in the degree of congruence decreased the experience of *joy* and increased the experience of *dissatisfaction*. The two other models found show predictions that do not confirm the hypotheses. The experience of *desire* and *hope* towards lamp 5 increased, when the degree of congruence decreases.

Stress-Avoidance

Three models were found in which the Stress Avoidance difference score was shown to be a significant or close to significant indicator for predicting product emotions. These models are displayed in Table 11. All models contain predictions that do not confirm the hypotheses. The

Table 11

Models resulting from multiple regression analyses for predicting individual emotions in which the Stress Avoidance difference score is a significant indicator

Variables	Joy Lamp 3		Pride Lamp 6		Joy Lamp 6	
	β	p	β	p	β	p
Difference Affiliation	,048	0,678	-,179	0,123	-,109	0,328
Difference Power Achievement	,013	0,913	-,133	0,249	-,122	0,276
Difference Personal Growth	,206	0,073	,112	0,318	,246*	0,026
Difference Altruism	-,169	0,147	-,067	0,554	-,203	0,068
Difference Stress Avoidance	,203	0,074	,266*	0,019	,216*	0,048
Difference Sensation Seeking	-,005	0,966	,074	0,511	-,091	0,408
Adjusted R ²	,042		,059		,116	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

Table 12

Models resulting from multiple regression analyses for predicting individual emotions in which the Sensation Seeking difference score is a significant indicator

Variables	Dissatisfaction Lamp 4		Desire Lamp 5		Dissatisfaction Lamp 5	
	B	p	β	p	β	p
Difference Affiliation	-,024	0,843	-,175	0,150	-,064	0,600
Difference Power Achievement	,105	0,365	,101	0,383	-,070	0,545
Difference Personal Growth	-,145	0,212	-,058	0,620	,094	0,423
Difference Altruism	,043	0,722	,225	0,059	,168	0,159
Difference Stress Avoidance	,088	0,447	-,039	0,732	-,083	0,469
Difference Sensation Seeking	-,248*	0,035	,225	0,059	-,254*	0,035
Adjusted R ²	,032		,039		,027	

* $p \leq 0,05$

Note: High difference scores indicate a low degree of congruence

models indicate that the experience of pleasant emotions increases, when the degree of congruence decreases. A decrease in the degree of congruence led to an increase in the experience of *joy* and *pride* towards two lamp designs.

Sensation Seeking

Table 12 displays the models in which the Sensation Seeking difference score is a significant or close to significant indicator for predicting product emotions. While exploring these results it should be noted that the Sensation Seeking commitment score was based on one single commitment item; “*Wanting to have an exciting life*”. All the models found predict the emotions in the opposite direction than was expected. It was indicated a decrease in the degree of congruence led to a decrease in the experience of *dissatisfaction* and an increase in the experience of *desire*. All the emotions are felt towards lamp designs that score high on expressing meanings that are related to the Sensation Seeking component.

Discussion

The main goal of this study was to analyse the possibility of predicting product emotions based on knowledge of the symbolic meaning of products and the commitments that people possess. People only experience emotions when a product is significant for their commitments. It was expected that people determine this significance by analysing the degree of congruence between the symbolic meaning of the product design and their commitments. A high degree of congruence between people's commitments and the symbolic meaning of a product is expected to increase the experience of pleasant emotions and decrease the experience of unpleasant emotions. A low degree of congruence is expected to increase the experience of unpleasant emotions and decrease the experience of pleasant emotions. Several results found in this study are consistent with these expectations.

The General model of Product Appraisal (Desmet, 2002) argues that product emotions are the result of an evaluation (appraisal) of the product in the light of the concerns. The current study provided evidence for this model by showing that relations can be found between product emotions, the product design and the concerns that people possess. The current study extends the existing literature by specifying on the symbolic meaning of the product design, in particular the product form and specifying on the concern type commitments. It was found that the degree of congruence between the symbolic meaning of product designs and the commitment that people possess can be significant indicators for predicting product emotions. These results are consistent with literature on self-congruity, which suggests that consumers prefer products or brands that express an image that match with their own self-concept (Belk, 1988; Sirgy, 1982). The degree of congruence concerning the Affiliation, Power Achievement and Altruism components are significant indicators for predicting product emotions in the direction that was expected in this study. Especially strong results were found concerning the Power Achievement component. These results are also consistent with research of Zhang et al. (2006) who showed that people with dependent self-construal (emphasizing confrontation) prefer angular shapes, which are known to induce associations such as energy and strength. People with independent self-construal (emphasizing compromise) prefer rounded shapes, which are known to induce associations such as friendliness and harmony. The symbolic meanings scores found in this study are consistent with these findings, showing that lamp designs that contain round forms are perceived as more warm and harmonious. Participants that score high on the Power Achievement component experienced more unpleasant emotions towards these lamps. Participants that score high on the Affiliation component experience

more pleasant emotions. Especially predictions were found for unpleasant emotions towards these lamp designs.

The results of the current study also showed that for some commitment components, a high degree of congruence does not lead to a positive product experience. The results indicate that when the degree of congruence decreased the experience of pleasant emotions increased and the experience of unpleasant emotions decreased and vice versa. This was the case for the commitment components Personal Growth, Stress Avoidance, Sensation Seeking and partly for Altruism. For example, a decrease in the degree of congruence concerning Stress Avoidance indicated an increase in the experience of *joy* towards lamp 3. This lamp design scores high on expressing Stress Avoidance associations, such as predictable and safe. These findings relate to a well know discussion in the field of social psychology, concerning the question if similarity in personality traits facilitates attraction. The alternative hypothesis, the complementarity hypothesis suggests that relational partners experience more satisfaction when certain personality traits differ, rather than match (Shiota & Levenson, 2007). Research of Schimel, Pyszczinski, Greenberg, O'Mahen and Arndt (2000) confirmed this hypothesis by showing that participants were more likely to distance themselves from confederates who displayed behaviour that matched their own supposed negative traits. This corresponds with the concept of self-enhancement, address by Govers (2004), which suggests that people can prefer a product with a negative image, because it is a match with his or her self-concept, but will reject it because it conflicts with the self-enhancement motive. These theories can offer possible explanations for the contrasting results. A person who scores high on Stress Avoidance may see this avoidance as a negative trait, which may cause the person to respond negatively towards a product that expresses these traits. A person who scores high on Altruism may want to enhance their self-esteem by expressing more dominance, which may cause the person to respond positively towards a product that expresses dominance and power.

The theories described above do not offer an explanation for the results found concerning the Sensation Seeking component, which showed that more *dissatisfaction* was experienced towards lamp designs that show a high degree of congruence, i.e. designs that are perceived as exciting and surprising. A possible explanation could be that the lamp designs used in the current study were not novel enough, which would explain the negative product experience towards the lamp designs that express Sensation Seeking associations.

Summarizing these results it can be concluded that the degree of congruence between the symbolic meaning of lamp designs and commitments can be seen as an indicator for predicting product emotions. The question remains though which degree of congruence leads to positive product experiences. This study shows contrasting results, showing that low and high degrees of congruence lead to more positive product experiences. The results suggest that the outcome is determined by the commitment component. Future research should show if consistent results can be found in the results for each commitment components. The strong results found concerning the Power Achievement commitment do show a clear picture, indicating that positive product experiences are evoked by lamp designs that match their commitments. The proportions of variance that is accounted for by the models do indicate that other factors have to be included in the model to predict total product experiences.

There are some limitations that may have influenced the outcome of this study that should be noted in this discussion to improve further research. The first limitation is the weak emotional response that the stimuli evoked in this study. Multiple factors may have caused this response to be weak. One factor is the use of abstract images as stimuli. This choice was made to highlight the product form, which was the focus of this study. The participants may have had trouble responding to an image that is this far from the realistic product. Another factor that is related to this is the limited amount of information that is offered by the stimuli. The participants cannot extract any information about functionality, price, etc. They were not familiar with the lamps and had no experience using the lamps that could provide them with information. The participant may have needed this information to form a strong emotional response. A possible third factor that may have caused the weak response is the choice of product type. McDonagh et al. (2002) comment that even practical products have a symbolic significance and may be used by people for expressing their identity. The weak emotional response towards floor lamps may possibly contradict this. This could possibly also be influenced by another factor; the target group. It is possible that students do not use the product type furniture to express their identity. Price and functionality may be more important factors in the student's product choice. Products such as watches or mobile phones may be more relevant to students, and would possibly evoke a stronger emotional reaction. These products are also more likely to be used by students as a way to express their identity. Additionally Belk (1988) argued that furnishing may be a product type that is not seen as an extension the self, but more as an extension of the family. This means that the product is

evaluated in the light of the concerns of the whole family. Future research should investigate different type of target groups and product types.

Another limitation caused by the use of the target group students is that several commitments items are possibly not relevant for students, for example ‘to be a good parent’, which was excluded from the current study to increase homogeneity. A study with participants in another age group could lead to other results and patterns in the relationship between commitments and product emotions. The commitment items that are excluded from the total scales in this study to increase the homogeneity may not be excluded in studies with another target group. This should be analysed in further research.

Not all scores are extracted from one participant group, which may be a limitation for obtaining accurate measurements. This approach was chosen for two reasons. To make sure that the participants were not aware of the hypotheses and to limit the size of the main study. The consequence was that the difference scores had to be obtained with use of the mean symbolic scores from the pre-test. It could be possible that there are differences in the perception of the symbolic product meaning. For example, Van Rompay et al. (2005) showed that differences exist in the perception of symbolic product meanings between Dutch and Brazilian participants. It is addressed that these differences are possibly grounded in cultural differences in their embodied interaction. The environment that people interact with, within different cultures may vary and this influences their perceptions. These perceptual differences may possibly also exist within cultures. Future research should consider a within participant design for all measurements to obtain an accurate symbolic meaning score. This approach will also lead to more accurate congruence scores.

Culture is a factor that should be taken into account in future research concerning predicting product emotions. As noted above, culture may be an influence on how people perceive symbolic product meanings. Culture may also influence the importance of the commitments for predicting emotions. Research of Hofstede (2011) showed that there are differences between cultures concerning the importance of values. For example, the Dutch culture scores high on the dimension of Individualism, indicating that the society has more individualistic attitudes. For example, bonds with others are relatively loose and more self-reliant behaviour is shown. These cultural differences may possibly influence which commitment components are important for predicting product emotions. In Dutch culture it would be expected that commitments related to self-reliance would be a strong indicator for predicting emotions. The result that Power Achievement is a significant indicator for product emotions is consistent with this idea. These differences in culture also influence shape

preferences in design. Research of Zhang et al. (2006) showed that individualistic cultures prefer logos with angular shapes and collectivistic cultures prefer round logos. As noted earlier in this discussion, the results of this study correspond with these findings; more unpleasant emotions were predicted towards lamp designs that scores low on Power and Achievement, containing round forms.

The findings of this study have practical implications for the design practice. The results imply that the Power Achievement commitment is an important commitment in predicting product emotions towards the lamp designs. Product developers can use this kind of knowledge to develop products that evoke positive product experiences. The starting point for developing new product designs would be to gather insight about the commitments of the product's target group. The following question would be how the important commitments can be connoted through features in the product's design. The measurements in the current study reveal that lamps with round forms are perceived as harmonious and warm and lamp designs with angular forms as more powerful and dominant. These results correspond with research from Berlyne (1976) and Zhang et al. (2006). Results also reveal that designs that are perceived as more harmonious and warm also are seen as more safe and consistent. Powerful and dominant designs also tend to express excitement. Such findings can be used to implement important commitments of the target group in the product design.

Other elements of the product design, such as colour, material, surface and texture also express certain symbolic meanings. For example, smooth, symmetric surfaces can give a product an appearance of harmony and friendliness and a dynamic appearance can be achieved by the use of the colour red (Karjalainen, 2007). All the relevant product design characteristics should express the same symbolic product meaning to achieve a consistent impression. It is important that this symbolic meaning is not only implemented in the product design, but also is implemented in the total product development, such as package design and marketing. Only then the product can express a consistent symbolic meaning that may lead to positive product experiences.

References

- Arnold, M. B. (1960). *Emotion and personality*. New York: Columbia University Press.
- Belk, Russell W. (1988). Possessions and the extended self. *Journal of Consumer Research*, 15 (September): 139-68.
- Bloch, P. (1995). Seeking the ideal form: product design and consumer response. *Journal of Marketing*, 59, 16–29.
- Creusen, M. E. H., & Schoormans, J. P. L. (2005). The different roles of product appearance in consumer choice. *Journal of Product Innovation Management*, 22(1), 63-81.
- Crilly, N., Moultrie, J., and Clarkson, P. J., (2008). Shaping things: Intended consumer response and the other determinants of product form. *Design Studies*, 30, pp.224-254.
- Crowe, Ellen and E. Tory Higgins (1997), Regulatory Focus and Strategic Inclinations: Promotion and Prevention in Decision-Making. *Organizational Behavior and Human Decision Processes*, 69 (February), 117-132.
- Desmet, P. M. A (2002). *Designing Emotion* (Dissertatie, Technische universiteit Delft, 2002). Derived from: <http://repository.tudelft.nl/view/ir/uuid:937aaf05-12f0-4283-adfb-007bdbbeaaa2/>
- Desmet, P. M. A. and Dijkhuis, E. (2003). A Wheelchair can be Fun: A Case of Emotion-driven Design. In Proceedings of DPPI'03. ACM Press, pp. 22-27.
- Desmet, P. M. A., Hekkert, P., & Hillen, M. G. (2004). Values and emotions; an empirical investigation in the relationship between emotional responses to products and human values. In: *Proceedings of Techné: Design Wisdom 5th European Academy of Design conference, Barcelona, Spain*.
- Desmet, P. M. A., & Hekkert, P. (2007). Framework of product experience. *International Journal of Design*, 1(1), 57-66.
- Eysenck, H J (1967). *The biological basis of personality*. Springfield, IL Charles C Thomas.
- Freedman, M.B., Leary, T.F., Ossorio, A.G., Coffey, H.S. (1951). The Interpersonal Dimension of Personality. *J. Personality*, 20, 143-161.
- Freud, S (1955). Beyond the pleasure principle In J Strachey (Ed), The standard edition of the complete psychological works of Sigmund Freud. (Vol 18, pp 7-64) London Hogarth Press (Original work published 1920).
- Frijda, N.H. (1986). *The emotions*. Cambridge: Cambridge University Press.
- Frijda, N.H. (2007). *The laws of emotion*. Mahwah, NJ: Erlbaum.
- Govers, P. (2004). *Product personality*. Dissertation, Delft University of Technology.

- Hofstede (2011). 'Geert Hofstede™ Cultural Dimensions', http://www.geert-hofstede.com/hofstede_netherlands.shtml, consulted on 20th of January 2011.
- Hogan, R., & Hogan, J. (2001). *Personality and status*. In D.G. Gilbert & J.J. Conley (Eds.), *Personality, social skills, and psychopathology: An individual differences approach*. New York: Plenum.
- Hill, C. (1987). Affiliation Motivation: People Who Need People...but in Different Ways. *Journal of Personality & Social Psychology*, 52(5), pp.1008-1018.
- Janlert, Lars-Erik and Erik Stolterman. (1997). The character of things. *Design Studies*, 18: 297-314.
- Jamal, A. and Goode, M. (2001). Consumers and Brands: A Study of the Impact of Self-Image Congruence on Brand Preference and Satisfaction. *Marketing Intelligence and Planning*. Vol. 19, Iss. 6/7.
- Jordan, P.W. (1998). Pleasure for all through inclusive design. In: *Global ergonomics – Proceedings of Ergonomic Conference*, Cape Town, South Africa 9-11 September 1998. South Africa: pp. 453-457, ELSEVIER.
- Karjalainen, T. M. (2007). It looks like a Toyota: Educational approaches to designing for visual brand recognition. *International Journal of Design*, 1(1), 67-81.
- Lazarus, R. S. & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lazarus, R. S. (1991). *Emotion and adaptation*. New York: Oxford University Press.
- Maslow, A (1970). *Motivation and personality*. (2nd ed) New York Harper & Row.
- McAdams, D. P. (2008). *The Person: An Introduction to the Science of Personality Psychology*. (5th ed.). New York: John Wiley & Sons.
- McDonagh, D., Bruseberg, A. and Haslam, C., (2002). Visual product evaluation: exploring users' emotional relationships with products. *Applied Ergonomics*, 33 (3), pp. 231-240.
- Mugge, Ruth and Pascalle C. M. Govers (2004). "I love my Jeep, because it's tough like me": The effect of product-personality congruence on product attachment. In *Proceedings of the Fourth International Conference on Design and Emotion*, ed. Aren Kurtgözü, Ankara, Turkey.
- Muller, W., & Pasman, G. (1996). Typology and the organization of design knowledge. *Design Studies*, 17, 117-130.
- Murray, H. A. (1938). *Explorations in personality*. New York: Oxford University Press.
- Novacek, J., & Lazarus, R. S.(1990). The structure of personal commitments. *Journal of personality*, 58, 693-715.
- Reijnveld, K., de Looze, M., Krause, F. and Desmet, P. (2003). Measuring the Emotions Elicited by Office Chairs. *Proc. DPPI'03*, ACM Press, 6-10.

- Rushton, P. (1982). Altruism and society: a social learning perspective. *Ethics*, 92:425-446.
- Scherer, K.R., Schorr, A., & Johnstone, T. (Eds.) (1999). *Appraisal Processes in Emotion: Theory, Methods, Research*. (pp.99-120). New York and Oxford: Oxford University Press.
- Schimmel, J., Pyszczynski, T., Greenberg, J., O'Mahen, H., & Arndt, J. (2000). Running from the shadow: Psychological distancing from others to deny characteristics people fear in themselves. *Journal of Personality and Social Psychology*, 78, 446–462.
- Schwartz, SH, (1992). Universals in the structure and content of values: theoretical advances and empirical tests in 20 countries. In: Zanna, MP, Editor, , 1992. *Advances in experimental social psychology* vol. 25, Academic Press, Orlandd, FL, pp. 1–65.
- Shiota, M.N., & Levenson, R.W. (2007). Birds of a feather don't always fly farthest: Similarity in Big Five personality predicts more negative marital satisfaction trajectories in long-term marriages. *Psychology and Aging*, 22(4), 666-675
- Sirgy, M. Joseph. (1982). Self-concept in consumer behavior: A critical review. *Journal of Consumer Behavior*, 9 (December): 287-300.
- Van Rompay, T. J. L., Hekkert, P., Saakes, D., & Russo, B. (2005). Grounding abstract object characteristics in embodied interactions. *Acta Psychologica*, 119 (3), 315-351.
- Van Rompay, T. J. L. (2008). Product expression: Bridging the gap between the symbolic and the concrete. In: H. N. J. Schifferstein, & P. Hekkert (Eds.), *Product Experience* (pp 333-351). Amsterdam: Elsevier Ltd.
- Van Rompay, T. J. L., Pruyn, A. T. H., & Tieke, P. (2009). Symbolic meaning integration in design and its influence on product and brand evaluation. *International Journal of Design*, 3(2), 19-26.
- White, Robert W. (1959) Motivation reconsidered: The concept of competence. *Psychological Review*, Vol 66(5), Sep, pp. 297-333.
- Zhang, Y., Feick, L., & Price, L. J. (2006). The impact of self-construal on aesthetic preference for angular versus rounded shapes. *Personality and Social Psychology Bulletin*, 32 (6), 794-805.
- Zuckerman, M (1971). Dimensions of sensation-seeking. *Journal of Consulting and Clinical Psychology*, 36, 45-52.

Appendix A

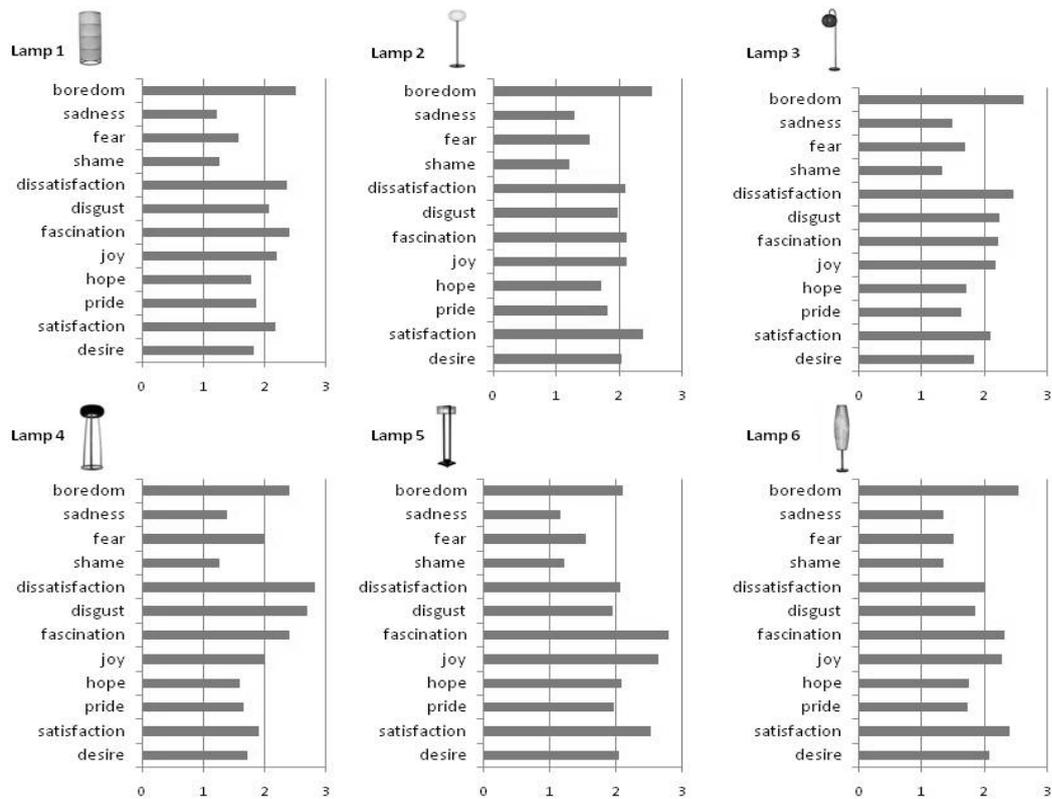


Figure 5. Mean scores of product emotions for each lamp.

Table 13

Results of the Paired samples t-tests

Unpleasant emotions		Pleasant emotions	
Boredom	5 < 1,2,3 and 6	Fascination	5 > 1,2,3,4 and 6
Sadness	3 > 1,2 and 5; 4 > 1 and 5	Joy	5 > 1,2,3,4 and 6
Fear	4 > 1,2,3,5 and 6	Hope	5 > 1,2,3,4 and 6
Shame	No differences	Pride	5 > 3 and 4
Dissatisfaction	4 > 1,2,3,5 and 6; 3 > 2,5 and ; 1 > 6	Satisfaction	5 > 1,3 and 4; 2 > 3 and 4; 6 > 3 and 4
Disgust	4 > 1,2,3,5 and 6; 3 > 6	Desire	4 < 2,5 and 6

Note: > = emotion is significantly experienced more compared to other lamp designs, < = emotion is significantly experienced less compared to other lamp designs